



# S&T&I FOR 2050

## Science, Technology and Innovation for Ecosystem Performance – Accelerating Sustainability Transitions

### CASE STUDY: LAW FOR NATURE

**Authors:**

Michael J. Bernstein, AIT Austrian Institute of Technology  
Dana Wasserbacher, AIT Austrian Institute of Technology

November 2022

**Scope:** This case study explores legal and regulatory approaches to environmental law on rights of nature and the implications for flourishing of human and non-human life and ecosystems on planet Earth. **Background** information is provided on the rights of nature discourse, as well as precedent in national and international contexts. Consideration is also given to the current state of environmental law in Europe. **Drivers** associated with advancing or hindering flourishing of human, non-human life and ecosystems (through rights of nature approaches or otherwise), related to global climate change, legal philosophy, scientific monitoring, and societal pressure and resistance, will be discussed. Different plausible **futures** of environmental stewardship, according to the 3 perspectives taken by the larger Foresight on Demand: STI 2050 project – Protecting and Restoring; Co-Shaping; Immersing and Caring – are described. The case study closes with a discussion of **implications** for research and innovation policy to address cross-cutting issues with law for nature. Implications include monitoring and enforcement, paradigmatic conceptual and behavioural shifts, and transition considerations (e.g., responsibility for harms, anticipating and integrating various consequences, from employment to education and training and the courts) -- to inform programming and implementation of Horizon Europe and future frameworks.

## 1. INTRODUCTION

Human ideas about nature vary across culture (Selin 2003). Our ideas of what constitutes nature evolves over time (Eder 1996; Gervais 1997). The way in which our cultures construct and bound what is or is not considered “nature,” “natural,” or part of “the environment” directly affects which individuals and groups wield power over others in a society – as well as in said environment (Demeritt 2002). The translation from construction of nature by a culture to the way nature is then valued, devalued, exploited, cared for, and otherwise related to thus carries as all-to-real physical, material, and social consequences—as increasing efforts to decouple natural resource use and environmental degradation from economic development attest (Fischer-Kowalski and Swilling 2011). Beyond direct impacts on terrestrial and aquatic systems, biodiversity, air quality, and many other environmental factors, concentration of economic power in large corporate monopolies leads to further ecosystem degradation as these actors deploy their economic power in political arenas to undermine environmental protections (Hanley 2021), and generally fail to uphold pledges to undertake initiatives for sustainability (Davis-Peccoud et al 2016; Goddard 2022). Governments, too, fall short, as regularly on display at the Conference of the Parties to the UN Framework Convention on Climate Change (Townend 2022).

Harm to environments is part and parcel of human environmental history across civilizations (Kwiatkowska and Holland 2010). Yet today’s so-called WEIRD nations – Western educated, industrialized, rich, and democratic societies (Henrich et al 2010) – bear outsize responsibility for the current state of global environmental degradation and human induced global climate change (Evans 2021). Human history is rife with examples of wanton environmental degradation contributing to the decline of ancient human civilisations (Mesopotamian, Greco-Roman, Mayan, Asian), and contemporary Western notions of progress and providence seem to be rushing many societies and species on a path of unprecedented global destruction of nature (LaFreniere 2007). While much can be learned from non-Western cultures on alternative way of more gently co-existing with environmental systems (Dudgeon and Berkes 2003), it is easy to ignore this environmental history and romanticize pre- or non-industrial ways of living (Selin 2003).

In this context, we explore in depth one way in which human-nature relationships might be reconstructed in service of flourishing life on Earth for humans, more than human species, and ecosystems. Specifically, we delve into the implications for granting rights to nature in Western legal systems. By looking at what law for nature could entail, we become better able to identify and suggest amendments to current environmental laws that ostensibly seek to conserve and protect nature. From this vantage point, as well as through exploring future developments of law for nature across three different scenarios, we conclude with implications for developing science, technology and innovation (STI) themes, programs, knowledge, infrastructure, and other policies in Europe to help forestall or even buck trends in the destruction of nature as we know and rely upon it.

## 2. RIGHTS OF NATURE: A BRIEF REVIEW

### The Rights of Nature Discourse in contemporary Western industrialized nations

Fifty years after Professor Christopher Stone proposed a legal argument to extend rights to nature, Western legal tradition still holds fast to a belief in the instrumental – rather than intrinsic – value in Nature. Stone (1972) wrote his work amidst a groundswell in global environmentalism in the West—the publication of the Club of Rome’s “Limits to Growth” report; a United Nations Conference on the Human Environment (Stockholm Conference); and the revelation from the Apollo mission of the fragility of our finite planet (i.e., that blue marble in space) (Mührel 2022).

Case law and legal research on the subject of “law for nature” is situated in the “rights of nature” discourse. The concept of rights of nature (RoN) in “Western” legal discourse traces to Professor Christopher Stone’s argument inspired by The Sierra Club’s attempt to halt development in the Mineral King Valley of the Sierra Nevada in the U.S. (Bryant 1975). Stone argued for legal extension to nature of a series of rights in a manner similar to the way rights have been extended to children, women, prisoners, and people of colour in the United States over time (Stone 1972). Stone and others since argue that legal systems allow social fictions like corporations to be persons, represented in court, and given representation and voice (like estates, states, infants, municipalities, and universities) --why not nature and ecosystems (Stone 1972; Kolbert 2022)? The extension of rights to inanimate, natural objects, such as a lake or tree, is necessary, Stone argued, because otherwise the value of nature is derived solely from its value to humans and can be destroyed and extinguished without legal consequences (Stone 1972).

The rights of nature discourse has burgeoned since 1972 and covers several points reviewed below. Paradigmatically, the RoN discourse takes issue with conceptualizing humans as separate from nature and thus somehow independent of Planetary carrying capacity, ecosystem integrity, and vibrant biodiversity. Such a perspective on rights of nature differs from the discourse on a human right to a healthy environment in which standards for ecological integrity might be higher, but still in service of human well-being. Discourses on human rights to a healthy environment may be found in the UN Brundtland commission, and the Stockholm Declaration of the United Nations Conference on the Human Environment, also in 1972,<sup>1</sup> which presented a first view of human rights to a health environment in the “Western” international scene. These human rights pertain to clean air, healthy food, safe water and sanitation, nontoxic environments, biodiversity, healthy ecosystems, and a safe climate.

Animal rights issues also connect to the RoN discourse. The connection is particularly strong in the consideration of non-traditional ways of viewing—and seeking to change—Western legal systems. In the case of animal rights, this line of legal research and action seeks to improve protections for nonhuman species. In a novel and radical piece of legal thinking, Bradshaw (2018) argued, for example, that legal scholars ought to consider advancing property rights to nonhuman animals further protect them from harm. Bradshaw notes that animal *welfare* arguments are distinct from animal *rights* arguments. Animal *welfare* arguments consider animals to be human property and seek laws to prevent cruel or inhumane treatment of species, for example pets and livestock. Animal *rights* advocates seek rather to extend more robust legal protection to non-human species. Noting that neither approach does much to help wildlife, sea creatures or less charismatic fauna, Bradshaw (2018) proposed a strategy of granting animals the right to own land (i.e., *property rights*), and humans' fiduciary status “to help ensure intergenerational wellbeing of all creatures within an animal-owned ecosystem” (p. 18). Such an approach, for example, might help animals “command economies of scale” to prevent subdivision and parcelling of landscapes, and counter historic legacies of disposition and habitat fragmentation.

In the context of converging climatic and ecological crises, and ecosystem degradation, RoN proponents argue for radical departure from an economic system, and associated laws, that reinforce and privilege destructive growth, extraction, and unsustainable development (Bosselmann 2019). Rights of nature proponents hold as untenable the status quo position of nature in law as an object for free human exploitation (i.e., liberating nature from position as object, as it remains even in conversations about a human right to a healthy environment). This view on human exploitation connects to a dominant reading of property rights in European, UK,

---

<sup>1</sup> <https://www.un.org/en/conferences/environment/stockholm1972>

and American legal traditions, drawing from Roman law, in which possession of slaves involves unquestioned right to destroy said 'property' (Macpherson 1968; Graeber and Winegrow 2021).

## Rights of Nature arguments

The Universal Declaration of the Rights of Mother Earth (UDRME) (<https://www.garn.org/universal-declaration/>), adopted in 2010 at a World People's Conference on climate change and the Rights of Mother Earth, offers an example of what "rights" exemplify when talking about "rights of nature." Article 2 of the declaration reads:

*the right [of Mother Earth] to life and to exist; the right to be respected; the right to regenerate its bio-capacity and to continue its vital cycles and processes free from human disruptions; the right to water as a source of life and clean air; the right to be free from contamination, pollution and toxic or radioactive waste; the right to not have its genetic structure modified or disrupted in a manner that threatens its integrity or vital and healthy functioning; and the right to full and prompt restoration for violation of the rights caused by human activities.*

Affording nature personhood and legal standing in courts would theoretically allow nature to seek the cessation of exploitation, plundering, and degradation currently sanctioned by law and human governments the world over. It could also, theoretically, provide grounds for bringing claims for harms and environmental damages already committed. In combination with efforts like the Nature Restoration proposed regulation (European Commission 2022), efforts to address damages could reference targets for restoring ecosystem integrity. Changes implicated by affording nature such a set of rights include: calling for public and private actors to recognize, promote, and enforce these rights; establishing norms and empower people to defend rights of nature; and implementing precautionary, "restrictive measures" to prevent further extinction of species, ecosystem disruption and ecological capacity degradation (Darpö 2021).

## Rights of Nature applications around the world (outside of Europe)

A range of legislative and constitutional acts around the world have sought to advance a more ecocentric (as opposed to anthropocentric) approach to including nature in human thinking and action. One such set of acts include granting constitutional protections to nature for the purposes of conservation. The most prominent example here includes the Ecuadorian Constitution, Article 71, from 2009: the right of "Pacha Mama". Another example is the Bolivian constitutional right of citizens to protect the environment and subsequent Law on the Rights of Mother Earth. A 2010 Universal Declaration of the Rights of Mother Earth (after the first World People's Conference on Climate Change and the Rights of Mother Earth in Cochabamba, Bolivia) further advocate such an approach (Darpö 2021).

Contrastingly, there are those efforts seeking to afford natural entities the status of "legal personhood" for legal proceedings. These changes are intended to give standing to interested parties representing or acting as guardians of these non-human entities, as well as broaden the scope of permissible evidence in related decisions. In many instances, efforts to advance this cause are made under cultural preservation and anticolonial action (as with the cause of a constitutional right of nature (Espinosa 2019)). In certain instances, people can bring grievances to court and be given standing on environmental issues relates may rely on the principle of *actio popularis*, where no direct impact is necessary to prove on the part of the claimant.<sup>2</sup> Several examples in New Zealand, Latin America, the U.S., India, and Uganda adopt forms of legal personhood for nature:

- Aotearoa New Zealand, legal personhood of the Whanganui River under guardianship of a joint council; Te Urewera, legal recognition of the former national park.
- Latin America—a Framework Law of Mother Earth and Integral Development to Live Well in Bolivia.
- Lake Erie Bill of Rights, passed by the city of Toledo, Ohio, USA (to exist, prosper and evolve naturally).
- Grizzly Treaty, signed by 200 US and Canadian tribal nations, on rights of bear species to exist in healthy ecosystem, 2016.
- India, recognition of the Ganga and Yamuna rivers as legal persons (High Court of Uttarakhand), 2017. The Indian Supreme Court since the 1990s, has increasingly recognized the importance of an

<sup>2</sup> This in addition to farmers holding companies to account for polluting farmland and fishponds rendering them unfit for human use, as in the 2021 finding where the Dutch Court of Appeals has held Shell Nigeria of Royal Dutch Shell liable for and owing a duty of care to affected villagers. <https://www.business-humanrights.org/en/latest-news/shell-lawsuit-re-oil-pollution-in-nigeria/>

ecocentric view to rulings. Although in cases of the rivers Ganges and Yamuni, legal personhood has not been issued.

- Uganda, National Environmental Act, 2019, recognizing RoN to “exist, persist, maintain and regenerate its vital cycles, structure, functions and its processes in evolution.”
- Bangladesh, in February 2019, the Supreme Court delivered a decision granting legal personhood to all rivers. A government-appointed entity -- the National River Conservation Commission – can now take people to court.<sup>3</sup>

In the U.S. state of Florida, a court case is currently underway in which a lake is suing for its rights for the first time, as planned construction projects threaten to permanently damage the lake and surrounding wetlands (Kolbert 2022). Named Lake Mary Jane, her representatives claim that the prospected damage posed by development in this instance is concrete, distinct, and palpable. In Orange County Florida, however, there are disagreements on Lake Mary Jane's future—or lack thereof. Indeed, the Lake is being pre-empted by business lobbyists pushing for a Florida state ban on local governments granting legal rights to the natural environment in any form (Kolbert 2022).

The case of Lake Mary Jane reveals that people and organizations hold strongly different opinions when it comes to ideas of rights for nature in practice. While environmental non-governmental organizations (ENGOS), civil society organizations, and citizens often argue or push for the rights of nature, corporate representatives, and conservative (not of nature but of its status quo exploitation) voices campaign against any "humanisation" of nature. Opponents point to the jobs associated with construction and development activities and the need to extract natural resources that benefit human prosperity and well-being.<sup>4</sup>

We can turn here again, briefly, to the issue of animal rights. One may look to recent case law for attempts to use legal proceedings to enhance protections of species. A recent New York Court of Appeals case, in which claimants sought to have an elephant, an intelligent, “cognitively complex animal,” released from captivity, is particularly instructive. On the elephant's behalf, an ENGO sought to secure protections of *habeas corpus* (a procedural vehicle people can “assert to protect their bodily liberty and to contest illegal confinement” (Shanahan 2022)) for an elephant in the Bronx Zoo.<sup>5</sup> Writing for the dissent, one judge noted that definitions of personhood change over time, pointing – as do RoN advocates -- that corporations are treated today as legal persons in certain situations. Judge Rowan D. Wilson also argued the court had a duty, “To recognize Happy's right to petition for her liberty not just because she is a wild animal who is not meant to be caged and displayed, but because the rights we confer on others define who we are as a society.” This larger point about the moral ambitions of society is likely to remain a source of legal tension as scientific understanding of ecosystems, nonhuman species, their interdependence, and humans' interdependence on the two, evolves. This evolution of understanding may press ever harder the question not only of whether nature and animals ought to have rights to protect them from humans, but also on the merits of their own existence.

Challenges to the legal approaches of the RoN have revealed mixed results of successfully empowering nature in courts and constitutions. Despite the constitutional provision in Ecuador, several cases have been lost on the merits (of the case), allowing economic and development practices to proceed over the objections of individuals and groups suing on behalf of Mother Earth. Contrastingly, in Colombia, where there is no legal right to nature, court orders have been made to establish personhood of the Atrato River (Darpö 2021).<sup>6</sup> In Colombia, the precedent of the New Zealand personhood of Aotearoa was used as precedent. In the U.S., some ENGOS have been able to obtain standing on behalf of waterways, in citizen suits allowed by the Clean Water Act (1972), as well as the Clean Air Act (1970), Endangered Species Act (1973) and Resource Conservation and Recovery Act (1976). Some efforts to recognize rights of ecosystems by Municipal entities, like Tamaqua Borough (Pennsylvania) and Shapleigh (Maine), have not been challenged in court; while others (the Bill of Rights of Lake Erie (Toledo, Ohio) have been tossed out as unconstitutional (Darpö 2021).

3 <https://www.vox.com/future-perfect/2019/8/18/20803956/bangladesh-rivers-legal-personhood-rights-nature>

4 <https://www.nationalreview.com/corner/nature-rights-a-lake-in-florida-sues/>

5 Shanahan (2022) Happy the Elephant Isn't Legally a Person, Top New York Court Rules. *New York Times*. Available at: <https://www.nytimes.com/2022/06/14/nyregion/happy-elephant-animal-rights.html?smid=em-share>

6 Citing *Dejusticia y otros v Presidencia de la República y otros*. Colombian Supreme Court, ruling STC4360 of 4 May 2018. Full text in Spanish, available at <https://cdn.dejusticia.org/wp-content/uploads/2018/01/Fallo-Corte-Suprema-de-Justicia-Litigio-Cambio-Clim%C3%A1tico.pdf?x54537>



## Limitations of Rights of Nature applications in general

The above challenges with adoption of a right of nature in law reveals a larger question of implementation. Namely, how would these rights be asserted in practice; how can the interests of a natural object be represented? Stone (1972) suggested establishing representation by legal guardians, who are “friends” of the natural objects and may speak for them in court in instances of an existential threat. The WEF (2020)<sup>7</sup> has proposed bodies or assemblies be established for representation. As an example, movement of the Loire Parliament consults among relevant stakeholders and explores proposals for potential governance procedures and structures that could ensure the river’s interest in the long-term.<sup>8</sup>

Given the state of current environmental law enforcement, Darpö argues it is not clear why granting nature rights would result in any more than a symbolic gesture (Darpö 2021). This point is borne out in the mixed success of RoN even when won, as the above instances explored. Darpö argues this perspective given the insufficiency of existing legal commitments to the environment (see also Bataille 2019). Further, Darpö notes that the so-far limited success of constitutional or regulatory efforts to implement a right of nature suggests a further limitation of its potential in democratic states (Kramer 2020; Richardson and Hamaski 2021). As Kauffman and Martin (2017) note in an analysis of 13 challenges in Ecuador between 2008 and 2017, where major infrastructure and development projects are involved, defendants of rights of nature were consistently unsuccessful in staving off ecosystem devastation and species extinction. In Ecuador, Kauffman and Martin (2017) conclude, rights of nature arguments are rejected by the State when brought by environmental interests, and used, in other cases by the State to extend its power over informal mining actors in favour of formal government sanctioned industrial activity. Finally, Darpö takes issue with an observed “democratic deficit” in strong arguments for a right of nature in which nature dictates requirements for its well-being. The problem here, Darpö argues, rests in the fact that in any case where nature has rights or not, such rights will still need to be administered and defended in a system of law in which some form of human representation and administration are vital.

Approaches to implementing rights of nature are not without difficulty in and of themselves. One strategy might entail extending rights directly to biological entities (species or ecosystems), however this model might end up bogged down in attempting to navigate a potentially infinite ambivalence in balancing conflicting interests in natural systems (e.g., among predators and prey; hunters; wildlife managers; farmers (organic or not); pet owners; symbionts; parasites; etc.)—as well as competition among rights of other human actors in legal systems (Guim and Livermore 2021). Put another way, how might one begin to arbitrate the right of a rabbit to prey on a gardener’s lettuce; a hawk to prey on a rabbit; a virus to reproduce in a host (issues of *interpersonal* or *interspecies comparison*); or the rights of marine life against property rights or energy access rights (issues of *competing interest*)? Would property rights even continue to exist were the land eligible to exert claims in its own right? Which entities beyond human are counted for consideration, and how are effects across entities to be compared?

Contrastingly, one might grant rights to ecosystems or communities of species in their entirety, at the level of species, populations, or ecosystems. However, it is often the case that such aggregations are interdependent in a complex web of other species, populations, or ecosystems, or nested within other taxonomic or ecosystem classifications. In this case, aggregation introduces the challenge of how to non-arbitrarily decide on the appropriate biological or ecological group to which to recognize rights (Guim and Livermore 2021). Overall, cases of rights of nature force judges and courts into novel, complicated “intellectual terrain” where many parties may claim the mantle of nature with or without grounds (issues of *representation*); have competing rights or interests in play; and present an unsolvable calculus of ascertaining net benefits or costs among a range of claimants (Guim and Livermore 2021).

Ultimately, rights of nature proponents argue that granting nature legal personhood is essential to combating the disastrous effects of climate change, biodiversity loss and environmental degradation more generally from human activity. With current environmental law often poorly implemented, prospects of legitimate granting and defence of rights for nature to ensure thriving ecologies seem bleak. In this setting it may be helpful to appreciate other ways in which laws, symbolically, may affect norms, popular culture, and subsequent consequences for behaviour change over time. For example, if granting rights to nature might meaningfully influence

<sup>7</sup> <https://www.weforum.org/agenda/2020/05/nature-legal-personhood/>

<sup>8</sup> <http://www.projetcoal.org/coal/en/2020/10/12/les-auditions-du-parlement-de-loire-%E2%80%93-n%C3%A9gociation-en-contexte-inter-sp%C3%A9cifique/>

norms in culture about human-nature relations, for example, where greater intrinsic value is placed on nature (Houck 2017; Sheehan 2015). In this sense, law may set a valuable “normative vision” for an alternative way to centre more-than-human beings in society (Akchurin 2015).

Practically, however, the current state of legal and economic realities suggests that the path to securing such a right is treacherously steep and far from guaranteed. In such an understanding, a substantive right for nature will only be as good as the practical limitations on implementation in a legal system (Guim and Livermore 2021; Darpö 2021). Reviews of the effect of constitutional rights in practice suggest that certain rights are more effective than others. Prohibitions on torture or proclaimed rights to education or healthcare – all rights that fall to individuals to uphold, for example – seem less legally potent than rights of organized groups (unions, religious organizations, etc.) (Cope et al. 2019). This may be because, “organizations have both the incentives and the means to protect themselves against rights encroachment by the government” (Cope et al. 2019, 171), as compared to most individuals.

Such potential short comings in the way rights of nature might be realized in contemporary legal systems thus raises a critical question: what is the current state of environmental and climate law? By critically considering the current state of European environmental law, alongside proposals for rights of nature, it becomes easier to discern the unique contributions and pitfalls of such a reform to Western legal systems. In this light, before considering possible futures of a Right of Nature in Europe, we turn to a high-level review of contemporary European environmental law as it relates to law for nature.

## European Environmental Law related to Rights of Nature

Darpö (2021) reviewed a range of ways, spanning international, European, and national levels, current environmental law offers (or fails in applying) protection for nature. At a **constitutional level**, European Union Treaties and a range of regulations and directives focus on environmental protection and preservation, from pollution permitting and prevention to chemical control to species and habitat protection to environmental impact assessment. Of course, as distinct from any intrinsic value of nature, these legal protections are in place to ensure environmental quality for human health and use of natural resources. For example, recent climate and environmental law enshrined 6 environmental objectives of the Union: (i) climate change mitigation; (ii) climate change adaptation; (iii) the sustainable use and protection of water and marine resources; (iv) the transition to a circular economy; (v) pollution prevention and control; and (vi) the protection and restoration of biodiversity and ecosystem (European Commission 2020).

European environmental law centres on the polluter pays and precautionary principles. The precautionary principle is mentioned in Article 191 in the Treaty on the Functioning of Europe and has been elaborated by the Commission since (European Commission 2000). Implementation of the polluter pays principle is highly inconsistent (European Court of Auditors 2021). In addition, the Birds (Directive 2009/147/EC) and Habitats (Council Directive 92/43/EEC) directives, respectively, recognize an “intrinsic value of biodiversity.” This acknowledgement draws upon European implementation of the 1979 Bern Convention on Conservation of European Wildlife and Natural Habitats<sup>9</sup> and the EU’s adoption of the Convention on Biological Diversity of 1992, which similarly recognizes an “intrinsic value of biodiversity.” The recently proposed regulation on Nature Restoration (European Commission 2022) is intended to work with the Birds and Habitats and other directives covering marine and terrestrial areas to reverse decades of decline in the integrity of ecosystems across Europe. Although the proposed regulation does not reference the intrinsic value of biodiversity, it adopts a One Health approach recognizing, “the intrinsic connection between human health, animal health and healthy resilient nature” (p. 1).

Procedurally, EU ascension into the Aarhus Convention in 2005 set in motion a range of additional rights and protections related to **environmental justice proceedings** (Regulation (EC) No 1367/2006). The Aarhus convention ensures rights for public participation regarding preparation, modification or review of environmental plans and programmes. The law requires European institutions, bodies, and national authorities to inform the public and open possible public participation—and a duty to accurately account for the results—for environmental plans and programs. Access to environmental justice in European and national courts was recently expanded by Regulation (EU) 2021/1767 amending Regulation (EC) No 1367/2006. Whereas for the first almost twenty years of the act, the public and environmental NGOs had ambiguous and limited recourse to

<sup>9</sup> <https://www.coe.int/en/web/bern-convention>

redress environmental harms, the amendment grants NGOs and other publics to request review of administrative acts impinging on their rights. The law denies “*actio popularis*”, or the ability of any individual to make a claim on behalf of environmental concern. Rather, defendants need to demonstrate direct effect (e.g., imminent threat to health and safety or prejudice to a Union right based on contravention of environmental law) greater than what is posed to the general public. This modification of the EU law governing adoption of the Aarhus convention demonstrates how the Aarhus Compliance Committee, charged with reviewing and providing feedback on the law, does allow for reforms to occur (although in instances taking 10 -20 years or more) (Darpö 2021, p. 37)

Finally, at the level of **environmental case law**, the Court of Justice of the European Union has been gradually strengthening potential standing of environmental complaints and cases. Under the Aarhus convention and environmental procedural justice statutes, publics concerned with nature conservation and environmental protection have increasingly been able to bring cases to the Court of Justice of the European Union (CJEU). CJEU case law is thus an important source not only for implementing and understanding environmental justice proceedings, but also in strengthening them over time. Primary successes here have involved creating more ground for NGO standing in court and overcoming the cost barriers to environmental justice such cases often entail. Essentially, these outcomes elevate civil society as a check on EU institutions and private sector actors, as well as helping ensure delivery of the aspirations of the European Green Deal. However, the CJEU at the same time still restricts standing of concerned publics in challenges to EU institutions directly (as opposed to through Member State suits).

Related to case law, the “**doctrine of direct effect**”<sup>10</sup> holds in European environmental law. The doctrine of direct effect is a product of secondary case law wherein EU law applies not only for Member States but also for individual rights (*NV Algemene Transporten Expeditie Onderneming van Gend & Loos v Netherlands Inland Revenue Administration 1963*)<sup>11</sup>. This doctrine holds that demands for environmental quality against Member States, where there is clear and precise EU law and the qualifications of being a “bearer of interest” met, can be brought to the CJEU by individuals. The aim of the doctrine of direct effect is protection of individual rights and the duties of Member States to comply with EU law. Critically, the legal system cannot “discriminate between different areas of law concerning enforcement of common obligations” (Darpö 2021, p39). This means that law on individual rights (such as labour, movement of goods and services), does not trump public interests related to clean air, water, and thriving biodiversity. Indeed, EU environmental case-law demonstrates that property rights are neither absolute nor unqualified when it comes to environmental protection and natural conservation. Here the EU Court of Human Rights draws upon some 300 cases pertaining to broad issues of a healthy environment (ECHR 2022).

Related to European Law on environmental issues is the **question of a human right to a healthy environment**. Considering human rights to a healthy environment in EU law offers an additionally useful foil for considering the potential added value of a RoN approach in Europe. At present, there is no formal right to a healthy environment of peoples in Europe. The European Convention of Human Rights (ECHR) and Fundamental Freedoms<sup>12</sup> is concerned with protecting humans from harmful environmental effects. The charter if understood broadly, does not pertain to guaranteeing any right to a healthy environment (i.e., to a state of the environment experienced independent of harm people experience from damage to the environment). The Aarhus Convention covers only rights to environmental information, public participation, and justice. While European law regulates environmental harm, air pollution, water and noise contamination and other impacts on homes and living spaces, only the most serious breaches qualify as infringements on human rights.

Darpö (2021) referenced a range of CJEU cases illustrating how such infringements have dealt with, “natural disasters, city dumps, incineration plants, industrial installations and similar activities with severe environmental pollution”. He lists, for example: *Lopez Ostra v. Spain* (1994), *Guerra v. Italy* (1998), *Fadeyeva v. Russia* (2005), *Ladyayeva v. Russia* (2006), *Budayeva v. Russia* (2008), *Tâtar v Romania* (2009), *Öneryildiz v. Turkey* (2004) and *Budayeva v. Russia* (2008). The ECHR and Aarhus convention together offer thus only indirect protection for the environment, as mediated by human health needs and concerns. Nature remains an object in this perspective, and humans separate from the environment. Further, ECHR and the Aarhus Convention

<sup>10</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:114547>

<sup>11</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:61962CJ0026&from=EN>

<sup>12</sup> [https://www.echr.coe.int/Documents/Convention\\_ENG.pdf](https://www.echr.coe.int/Documents/Convention_ENG.pdf)



require people or NGOs meet the requirement of "direct victim" for standing. Darpö (2021) noted, however, that as living texts, the (ECHR) and EU law governing implementation of the Aarhus Convention can change, should appreciation of the links between human well-being and environmental integrity continue to advance in social and political consciousness.

### Benefits of a RoN approach to European Environmental Law

Darpö's (2021) analysis highlighted several ways in which elements of the RoN discourse might enhance European environmental law as it stands today. First is the perspective on **enhancing safeguards for the environment**. Here, the "principle of non-regression", active for example in the Water Framework directive (Directive 2000/60/EC) is illustrative. Enshrining non-regression at the constitutional level in Europe would introduce a general prohibition on Member State action entailing "environmental degradation" or "weakening environmental laws". Second, in law that exists, **employing more wholistic, systemic, and rigorous understandings of harm to the environment**. This covers modifications to law that might require reassessment of permits to consider cumulative effects on environmental systems. Related, this might include requirements for tracing ecological impact of human activities, and when considering species and habitat conservation and restoration.

Third, **strengthening environmental liability and enforcement statutes** resourced and competent to safeguard environmental integrity. This might entail establishing Environmental Ombudspersons at the EU and national levels capable and in separate institutions to bring environmental cases to court. Such entities might be able to seek stiffer consequence for Member States shirking obligations of EU environmental laws, with more serious sanctions for non-compliance. Enforcement might also include establishing an independent administrative body charged with addressing conflicts of interest between "short-term economic development and environmental protection" (Darpö 2021, p57). It might entail giving courts greater sanction administrations—e.g., to fine per periods of time until environmental qualities are improved (as may be found in France and Italy). Finally, this would entail stricter environmental liability with regard to environmental contamination. Changes to environmental liability might also establish remediation funds to restore contaminated habitats, with resources raised from taxation of hazardous industries and breaches of environmental law when more rigorously enforced.

Finally, RoN actions point to concerns around **pursuing environmental justice**, namely the need to improve the ability interested parties to bring complaints regarding environmental damages and harm (whether NGOs, the public, and civil society more generally) (Faure 2020). Here, examples of improvements in environmental liability law—as found in Portugal, Italy, the Netherlands, and France—afford NGOs and civil society groups to seek polluter reimbursements for remediation of environmental damages (Fasoli 2015). In addition, courts where such redress is sought need enhanced **scientific and technical competence** to administer environmental law; whether of judges themselves, or of independent research or advisory bodies.

## 3. FUTURES OF LAW FOR NATURE

In this section, we first summarize the above review, in combination with results of an STI-directions Delphi survey (described elsewhere in project documents). The summary conveys a selection of key drivers which may affect the future of law for nature. Next, we present three scenarios—one according to each of the three horizon perspectives adopted in this project—to help illustrate worlds where STI plays a role in advancing (or undermining) ecosystem health. The key drivers inform and are present in the three scenarios to a different degree, with different weight, and with diverse consequences based on the overarching perspective.

The scenarios are not intended to be predictions. The scenarios are not intended to be pathways to a future state. The scenarios instead illuminate possible worlds in which law for nature is—to a lesser or greater degree—taken seriously in 2050. The scenarios are intended to illuminate possible critical decisions, and, "areas to invest time and resources, new opportunities and potential pitfalls, vital relationships and connections, and aspects of the future that require further investigation, and aspects of the present that require further interrogation" (Keeler and Bernstein 2021, p.12). The scenarios start from the premise that while something called the present exists, it is experienced differently by different people and, correspondingly, the future will very likely also be experienced in diverse ways (Wack, 1985; Ramírez & Selin, 2014; Keeler et al., 2019).

**In the above light, the scenarios support answering the hypothetical: were rights of nature to exist in the future, how might STI policy be reimaged to get us there in a way that supports ecosystem health?** We take several steps to generate information that helps us arrive at this answer. **For each scenario**, we first summarize the basic world elaborated in each perspective; second, we discuss whether and how effective law for nature might be at supporting ecosystem health in the scenario. We do this for each of the three scenarios. Then, based on Warnke et al (2021) proposed criteria for a framework to support STI for ecosystem health, we look at the way STI has the potential to undermine or support ecosystem health **across scenarios**.

## Summary of key drivers

In light of the case of law for nature, several factors seemed prominent as drivers determining whether or how rights of nature might manifest in the future. The **term “drivers” in this context is used to mean an important factor that might positively or negatively influence the way rights of nature are or are not advanced in the future**. Drivers may have different relative weights in different settings. Further research and targeted survey work would need to be done to ascertain the relative importance of different drivers and their potential effect on the future of law for nature in Europe and beyond. In this case study, we summarize below, at a general level and in light of the above review, those drivers seem to have an important influence on whether law for nature might take root. The summary below is intended to be representative rather than exhaustive.

On the one hand, there are drivers that would seem to inhibit the future takeoff or viability of any law for nature. These include:

- A predominant premise in legal theory and practice that nature is an object intended for free human exploitation. Such political and economic positions consequently privilege extractive, destructive, unsustainable development. While such forces might galvanize greater support for granting rights to nature, they undermine and degrade ecosystems and reinforce power structures benefiting from exploitation and degradation of nature.
- Privileging certain social fictions in legal systems, but not others. So long as the legal fiction of a corporation is granted personhood given rights, standing, and representation—but not nature corporate rights and actions that degrade and exploit nature will be more likely to prevail. This would plausibly be the case until complete failure of natural systems, at which point the legal fiction of a corporation becomes somewhat meaningless. In the meantime, business and government interests may run counter to environmental protection and ecosystem integrity.
- Insufficient will to fully implement environmental protections as written. Although there are legal and constitutional commitments to principles of precaution and polluter pays, so long as transgressing these principles can be factored as a cost of doing business, they will not be upheld. In such a context, adding a right of nature might simply increase the cost of doing business without resulting in serious changes to improve ecosystem health. So long as existing legal protections for the environment—from permitting to prevention, protection, or restoration—are easy to undermine, a meaningful right of nature will likely remain elusive.

On the other hand, there are drivers that would seem to hold promise for future takeoff and viability for law for nature. These include:

- Changing values around human-nature relations, human rights to a healthy environment, and the intrinsic value of nature. If and as more and more people hold these values, express them, build community around and advocate for them, they will have an increasing effect on policy, industry, research, and a range of activities in society—including referenda on or legislation supporting or enforcing rights of nature. In economic and government realms, this might look like transitions to degrowth or circularization of resource flows; increased efforts to represent nature in systems, etc.
- Consideration of nature in development (rural or urban), natural resource governance, and ecosystem management with appreciation of biodiversity concerns, One Health, and ecosystem service perspectives. As the EC proposed regulation on Nature Restoration shows, there is increased recognition of the importance of healthy ecosystems. As such efforts take hold and thrive, they might reasonably reinforce further efforts to move from regulation on restoration to rights of nature against further degradation.
- Legal innovations ranging from rights of public participation in concerns of environmental justice to rights of individuals to bring cases withstanding on behalf of environmental systems to rights to a healthy environment. As these innovations take hold, legal protections for the environment, from permitting to prevention to protection and restoration, may have a greater chance of being defended.

Appreciating property rights are neither absolute nor unqualified when it comes to environmental protection and natural conservation is similarly important in this driver. So too is the principle of non-discrimination against environmental law (e.g., not privileging labour, service, goods, property, or other types of law over any other). Together, these factors lay a legal groundwork and trajectory toward more, and more robust, safeguards for ecosystem health.

- Improved information about natural systems. A range of knowledge systems improve human abilities to monitor and remediate ecosystem health. These include—to name a few—earth systems models; intelligent earth observation; data-driven species and ecosystem service models; ecological impact tracing techniques; innovative, rapid biodiversity assessments; use of soundscapes as an ecological indicator; and understanding how pathogenic microorganisms move around the world as one effect of climate change. Together, these sources of information may help make the case for and defend the rights of nature, should law for nature be championed in a serious way.

## Scenarios

In this section, we first present the generic “perspective” out of which the scenario is drawn. We then transition to how a broader presentation of a right of nature — in a given future perspective — might support or undermine ecosystem health (per the ecosystem health in innovation criteria set forth in Warnke et al. 2021). The three perspectives each adopt a fundamentally different point of view, thus—together—offering diverse insights for STI directions, *regardless of how the future unfolds*, to better support ecosystem health.

### Perspective 1: Protecting and Restoring: Rights for Nature, without Justice

The perspective “protecting and restoring” describes a future in which a “great decoupling” has occurred, enabling continued economic growth without devastating environmental impacts. Digital Green Growth has been pushed for the transition to a more sustainable economy. Systemic management of terrestrial and marine ecosystems; regeneration of specific nature reserves and wilderness; massive deployment of carbon capture and storage technology; renewable energy; and nature-based solutions as well as technological innovations are prioritized as the norm in this future. Where nature has not been successfully restored, technological substitutes have been attempted, with mixed success. Major societal actors continue to drive models of consumption and growth, couched in sustainability. Human beings remain the most dominant disturbance to ecosystems.

Rights of nature in this scenario have contributed to modest gains for nature restoration, although far short of the more transformative ambitions of the vision of law for nature. Classical ecosystem performance measurement and ecosystem protection approaches persist, in which nature is objectified and managed—although at least the measurement and calculation of harm done to parts of nature, now with their own legal personality, are precisely quantifiable to enable restitution in the form of technological substitution. Implementation of law for nature increased, in some areas, tensions between human and societal interests and ecosystem recovery and protection. Hostility to nature—and ecosystem stewards empowered by the law—increased too, as do the opposite, as green industrial activities take over and substitute natural systems in support of continued sustainable growth trajectories.

Rollout of law for nature entailed a significant additional administrative burden, with monitoring, analysis, accounting, legal proceedings, and restitution significantly increasing the cost of business. Efforts to overcome the challenges of assigning representation, balancing conflicting interests (for example across trophic levels), and determining net benefits and costs are, often used by hold-out opponents to torpedo rights of nature initiatives. In some cases, valuation from ecosystem services is enough to offset the costs of the transition—in others, major sectoral changes contribute to a period of social unrest amidst massive retraining efforts. Some large multinational companies and governments, after a period of competing to purchase and fence off wild and restored areas, use these to generate additional revenue.

Unequal access to green spaces amongst rich and poor nations increases in perverse ways, as the former plunder diverse terrestrial and marine ecosystems for their restorative value. The victories in legal cases empowered by law for nature threatened to bankrupt many large multinational companies, who collectively persuaded government and taxpayer subsidies to weather the transition to a world in which nature's rights enable more robust protection. As part of broad settlements, some areas where wilderness and restoration efforts were won were relegated to less robust or fertile lands, raising questions of rights for nature without justice.

### Tensions and opportunities created the ways STI might be deployed in this scenario in 2050

- STIs enable more precise monitoring and measurement of nature degradation, protection, and restoration.
- STIs enable more robust inter and transdisciplinary collaboration for ecosystem health management goals.
- STIs exacerbate demarcations among human and environmental systems, perpetuating notions of human-nature separateness.
- STI approaches to monitoring and data collection and processing, as well as STI deployment, perpetuate a view of nature as an object of observation and control, even with good intention, without any notion of human reciprocity or obligation to nature.
- STI reinforces technocratic modes of approaching and understanding nature as opposed to more experiential and engaged modalities.
- STI approaches reinforce political economic hegemony impinging environmental justice and rights of nature.
- STI approaches threaten to extinguish alternative and traditional ways of knowing and being in the world, impoverishing humanity irreversibly.
- STI incumbents restrict opportunity for nature, future generations, and other-than-human-beings to participate in agenda setting and user orientation.

## Perspective 2: Co-Shaping: Rights of Nature, Missing the Forest for the Trees

The perspective “co-shaping” describes a future of more blended, interconnected human activity and nature. Resilience comes to be increasingly prized alongside efficiency. Multifunctional green spaces, diets, and lifestyles become increasingly popular. The goal of these approaches is to move socio-ecological systems that are in unstable critical condition towards renewal, resilience, and sustainability to prevent collapse. Due to the inherent uncertainty of complex adaptive systems, this cannot be achieved by top-down steering but only by co-shaping the system dynamics in very specific contexts. Notions of controlling nature have become widely dispelled. Large-scale transformative ambitions are displaced by incremental, responsive, and adaptive shifts in society.

Through practical approaches like biomimicry and regenerative design, designers use complex systems thinking to design community practices that are positively interacting with ecological systems. The notion of the planetary and human health, especially the EcoHealth concept, the “Doughnut Economy” within planetary boundaries (Rockström et al 2009) provide guiding frameworks locating some of the critical arenas of interaction of human and ecological system elements. A core aspect is the acknowledgment that there can be no one correct view on a system. Subsequently there arises the need for negotiation procedures to mediate among different perspectives (e.g., industry, communities, indigenous peoples, nature stewards, governments, etc., but also regions and territories) and to establish institutions for polycentric governance in social-environmental systems—a “diplomacy of the commons”.

Governments, private sector actors and communities have developed adaptive, innovative consent-based approaches to establishing regional economic zones based on ecosystem functions, flora, fauna, and capacities. Establishment of such partnership zones have allowed for drastic reductions in environmental footprints of human habitation, supply chains, and consumption patterns. Such partnership zones develop regional ecosystem based competitive advantages and local production sufficiency in a manner such that, while intra-regional trading enhances, global trade becomes less urgent. In this transformed, polycentric world, digital technologies enable intraregional exchange, along with circularized resource cycling within regions.

Goals for ecosystem health have transitioned from precise measurement and management to shaping, navigating, and reducing pressures. Widespread implementation of rights of nature supports the introduction of new practice for co-shaping—for negotiation human and non-human interests and values. Legal systems more robustly guarantee and protect direct and indirect ecosystem services. While growth-oriented objectives remain popular, presence of law for nature provides strong pressure for addressing biodiversity and ecosystem conflicts in the context of growth. Precautionary and anticipatory approaches to technology and innovation governance have become better equipped to account for the complexity and uncertainty associated with socio-technical change. Such governance approaches enable the design of more adaptable, resilient systems.

### Tensions and opportunities created from the ways STI might be deployed in this scenario in 2050

- STIs enable more precise monitoring of nature degradation, protection, and restoration.
- STIs enable more robust inter and transdisciplinary collaboration for ecosystem health management goals.
- STIs promote views of complex interdependences among human and environmental systems.
- STI approaches to monitoring and data collection and processing, as well as STI deployment, perpetuate a view of nature as primarily for human benefit, but acknowledging need for human reciprocity and obligation to sustain healthy ecosystems.
- STIs support modes of approaching and understanding nature through complex adaptive systems perspective, including experiential and engaged modalities.
- STI approaches advance environmental justice and rights of nature, but unevenly, as polycentric governance means previously well-resourced places are better equipped to transition society for improving and managing better ecosystem health.
- STI approaches support capability building across government, private sector, nongovernmental, and citizen actors to engage in consent-based decision-making processes in which nature is represented.
- STI approaches take from alternative and traditional ways of knowing and being in the world to strengthen management objectives and co-shaping initiatives.
- STI incumbents selectively include nature, future generations, and other-than-human-beings in agenda setting and co-shaping activities.
- STI policy supportive of law for nature enabled research endeavours testing options of polycentric governance approaches and their implications.

### Perspective 3: Immersing and Caring: Rights and Justice with Nature

The perspective “immersing and caring” describes a future characterised by the prevalence of relational ontologies and epistemologies. Subjects are viewed not as pre-given independent entities, but rather as being continuously (re)produced through interaction in real-life contexts. Consequently, by 2050, predefined categories like “nature” or “human” and “non-human beings” are falling out of fashion as new norms about the intrinsic value of diverse beings, modes of existence, and dynamic status changes in the world and relationships. Agency is considered not the result of specific action by entities but rather emergent from relational network interactions. In such relations, “care” is recognized and valued as a reciprocal practice among human and non-human beings and ecosystems.

Multi-species justice is essential to thriving life in this world, along with deep ecological principles recognizing nature's intrinsic value (not as something with a price of zero but has having no price). Indeed, economic language prizing individual consumption has given way to nuanced, nested property regimes in which rights and resources are in dynamic relationship across needs of various actors. Well-being in such contexts translates to ecosystem health, and relationships offering care, safety, and sufficiency. Traditional ecological and scientific communities, along with civil society, business, and public representatives share responsibilities in dynamic and deliberative systems of shared governance—shared between human and natural systems, that is. Regionally elected ecosystem representatives deliberate policy, with ecosystem health (including biochemical, biodiversity, and human indicators) are independent and robustly maintained to ensure deliberations are presented with state-of the art information.

Nature guardians appointed by representative elections or administrative acts largely reject notions of “ecosystem performance”, as these reflect an anthropocentric, rather than ecocentric approach to the new law of Earth, where nature has rights. Guardianships were established in the 2030s as part of a 100-year plan to advance human cultural norms from anthropo- to ecocentricity, at which point guardianships are designed to gradually sunset for the 100 years after. Ecosystem protection is supported in some places by budgets as large as military defence budgets of the early 2020s but pioneering non-lethal – for nature -- modes of protection. The intrinsic value of nature and species represents a central pillar of the legal approach enshrining rights of nature. Anthropocentric concepts are increasingly viewed as quaintly old-fashioned, at best, or actively discouraged as a form of hate-speech, in the most vigorously defended cases. Reparations from the anthropocentric times are still being paid out to support the ecocentric transition made possible by a rights of nature doctrine.



Relational ways of knowing and being, in which individuals and collectives of individuals learn and cultivate healthy interdependence with ecosystems mean that, thanks to the RoN doctrine, separations of individual, social, and ecological knowledge are increasingly moot. As a result, questions of representation, competing interests, and ascertaining net benefits and costs, which plagued the advance of rights of nature in its early decades, are less difficult to resolve. Much resolution comes in the form of resurgent rituals in which trophic levels, cycles of birth and death, harm, joy, and other resplendent emotions experienced across existence are cared for as they arise. Global and regional teleconnections among ecosystems, historically poorly understood, are now respected at the level of individuals, communities, and regional ecosystem governance bodies (nation-states have begun in some cases to phase out in favour of regional governance bodies that better conform to ecosystem boundaries and interdependences).

In this perspective, the concept of ecosystem services is incidental to the reality that all human life is recognized as fully dependent on ecological integrity and flourishing. Nature, in addition to Earthly abundance, has become the primary beneficiary of all human knowledge as countless rights of nature cases across the world have transferred nearly all biochemical and mineral-related intellectual property to Nature Guardians and representatives (as various plants and natural chemicals are source or antecedent to major human industries), along with assets and royalties. In this context, corporations have nearly completed a process of re-incorporation with ecosystem advisory boards holding sway over key operations and activities.

Multi-species perspectives acknowledge, value, and cultivate collaborations to reveal new solution spaces related to scientific and technological innovation. Care is expressed in research itself, involving rethinking the political relations of “subjects”, “objects”, “stakeholders”, “beneficiaries”, “collateral damage” and other concepts in practice. Centuries of failures with sociotechnical system design and implementation aimed at “uniformly improving human well-being” while incurring massive environmental devastation has contributed to having this approach fall out of favour. Instead, thanks to law for nature, an eco-social approach to innovation now predominates. This approach ensures high standards of human well-being and ecosystem health are met before tinkering with novelties that undermine such vital pursuits. With rights of nature doctrine in place, human, non-human beings, and ecosystems all share in agenda setting processes from places of equal privilege (after some decades of human reparations to nature and species).

#### **Tensions and opportunities created the ways STI might be deployed in this scenario in 2050**

- STIs enable more precise monitoring and measurement of nature degradation, protection, and restoration.
- STIs enable more robust inter and transdisciplinary collaboration for ecosystem and human health.
- STIs support novel, integrated measures of ecological integrity that include not only biogeochemical and biodiversity data but also human health and wellbeing information
- STIs breakdown barriers between concepts of “human” and “natural” systems, strengthening notions of human-nature dependence.
- STIs demonstrated irrefutably human life is fully dependent on ecological integrity and flourishing.
- By opening up to critique and reform from indigenous people and decolonization approaches, STIs advance relational ways of knowing and being, in which individuals and collectives of individuals learn and cultivate healthy interdependence with ecosystems.
- Major investments in human, social, and material resources for rigorous environmental law enforcement mean that STIs were essential to enabling the first Green Deal to be realized, and its successors, in a way focused on socioecological integration and ecosystem health
- STIs helped experiment with and build evidence about responsibilities in dynamic and deliberative systems of shared governance—shared between human and natural systems – among traditional ecological and scientific communities, along with civil society, business, and public representatives
- STIs support an eco-social approach to innovation that ensures high standards of human well-being and ecosystem health are met before tinkering with novelties that undermine such vital pursuits.

With rights of nature doctrine in place, human, non-human beings, and ecosystems all share in STI agenda setting processes from places of equal privilege (along with future generation representatives).

## 4. IMPLICATIONS FOR STI POLICY

The above review of rights of nature discourse, as well as the future scenarios across three perspectives, showcases the way STIs may play a variable role in supporting or undermining ecosystem health. In this section, we first present main lessons learned from reviewing the state of environmental policy and law for improving ecosystem health. Then, based on these insights for improving environmental policy and law – as well as the insights drawn from across all three perspectives – broad recommendations for STI policy in support of ecosystem health are offered. These recommendations are intended to stand in service of ecosystem health regardless of future scenario from which they are drawn.

### Recommendations based on potential changes to environmental policy and law

As Darpö (2021) summarized, “the key [for any approach to environmental law] still lies in proper funding and staffing of the competent authorities, transparency, and involvement of the public, as well as the possibility to challenge administrative action and inaction” (p., 57). Recommendations for enhancing STI policy to support healthy ecosystems and human society are based on Darpö’s observed limitations with current environmental law in Europe (2021). Such limitations can be summarised along the following lines:

- issues about the standing of environmental NGOs (ENGOs), members of the public, and other civil society organizations to bring cases and complaints to court and achieve fair hearings;
- deficiencies in enforcement of environmental law and implementation by Member States of EU environmental law;
- limited competence of courts to adjudicate on the scientific and technical merits of cases, as well as inconsistent standards for such factors across a range of EU directives and regulations;<sup>13</sup>
- insufficient oversight and sanctions for noncompliance at Member State levels.

Based on the recommendations provided by Darpö (2021), suggestions for how STI policy could make valuable contributions to these reforms are explored. These suggestions for STI policy – like Darpö’s analysis – are made independent of future states and based on the need that ecosystem health depends, regardless of whether there is law for nature, on environmental laws being robustly enforced.

### Recommendations to enhance principles of environmental care at the constitutional level

Recommendations for EU law here support the advance of principles of non-regression, holistic and systemic approaches to studying environmental degradation, and recognizing intrinsic value of nature. STIs that build social, natural, and physical sciences capacities to contribute to the study and cultivation of ecosystem health would be important here.

- Regarding legal prohibitions against degrading the environment or weakening environmental law, STI investments in environmental, social science and humanities scholars to monitor deployment, study **effects of, and suggest alternatives to regressive environmental laws would be of high value**. By supporting information gathering, learning, and evidence-based governance to improve environmental outcomes and democratic governance, STIs can support more robust policy making in this domain.
- Regarding more holistic, systemic understandings of consequences of environmental degradation, STI investment in natural, social, and physical sciences could illuminate integrative, systemic **measures and approaches not only of cataloguing but—essentially—reversing environmental degradation**.
- Regarding advancing an intrinsic appreciation of biodiversity and ecosystems, STI investment in **formal and informal science and nature education** would be vital, as well as social scientific **research on the manifestation of values of nature alongside livelihood and other cultural values, and how to mediate and resolve tensions in mutually beneficial ways**.

### Recommendations related to suggested enhancements to environmental standards

Legal recommendations in this domain include implementing requirements for pollution permits to be dynamically re-assessed over time; for ecological impact tracing to include more systemic understanding of not only

<sup>13</sup> “Significant impact on the environment” (EIA Directive), “good ecological status” (WFD), “likely to have a significant effect on the conservation objectives” (Habitat directive), “significant adverse effects” (Environmental Liability Directive, referencing human harm) or “do no significant harm” (sustainable finance framework)

primary but also secondary, tertiary, and quaternary effects of environmental damage; and caps on *cumulative* environmental harms. For all of these areas, significant investment in STI could **promote the efficacy and cost-effectiveness of environmental damage assessment methods**. For example, **building robust independent ecological health monitoring capabilities** across regions would include investment not just in **research infrastructure** but also the **human and social networks and resources** required to staff such efforts. These expert-based governance regimes could include, as well, **citizen scientific oversight** efforts to enhance societal coherence.

### **Recommendations related to improving legal-technical standards, EU environmental laws, and environmental liability thresholds**

Recommendations in this tranche of environmental policy and law relate to harmonizing environmental principles across the many EU regulations and directives and case law; improving coordination across directives; enhancing independent scientific committee oversight about biodiversity and species risk listings; and review of criteria of serious damage and liability exemption. The potential for STI contributions in such areas are many, and include:

- In **social scientific support of harmonization of environmental principles across various European and national environmental regimes**. Rather than fixing standards, such a research investment or infrastructure might **enhance cross-translation and understanding of local contexts necessitating differentiation**.
- Regarding improvement of coordination across directives STI investment in partnering **legal scholars with environmental researchers and social scientists to study effects of and develop ways to improve legal coordination** not only at European but also member state levels.
- STI investments natural, physical, and social sciences could help ensure a **robust and vibrant human and social resource base from which to staff independent scientific committees to oversee changes to legal directives**. Such investments could also aid the contribution of these bodies to raising standards for **environmental liability and lowering damage thresholds to reflect actual ecological integrity concerns**.

### **Recommendations related to environmental liability law**

Reform recommendations related to environmental liability law revolve in part around establishing remediation funds for destroyed habitats and restoration from taxation on environmental hazardous industry and breach of law. STI policy could make a **practice of matching such compensation funds with separate and supportive scientific research funds to enhance natural, social, and physical science understandings of approaches to environmental remediation and restoration**.

Another recommendation related to environmental law suggests the importance of affording ENGOs and civil society groups the ability to ask for damages on behalf of environment, and in a manner that removes exorbitant costs of bringing such cases. STI policy might consider **investment in ENGO capacity building by paying for staffing of environmental and social scientific capabilities of ENGOs and CSOs and citizen groups seeking damages and restoration** and do so in ways that further help lower costs (financial and expertise thresholds) for defending environmental health.

### **Recommendations from addressing shortcomings in environmental law in Europe**

Enhancing ecosystem health in Europe through addressing shortcomings in environmental law suggests a key role for strengthening independent environmental law administration and enforcement. Recommendations here suggest the benefits of independent, horizontal regulatory authorities charged with ensure member states meet environmental obligations under EU law, with the power to sanction administrative inertia to implement such law. Such recommendations also reference the potential need to establish an Environmental Ombudsman at EU and national levels.

STI policy in such circumstances could offer **insight into governance arrangements to effectively establish and coordinate knowledge exchange** across such an administrative apparatus. **Natural, physical, and social sciences investments would augment the human and social resource base with which to staff such entities**, along with **building citizen capacity to further supplement data collection and monitoring efforts**. Further, **STI policy might pioneer effective, adaptive methods at long-term ecological health monitoring** which might be deployed to **demonstrate costs of inaction and consequence of unremediated environmental degradation**. Advancing STI policy in these directions could be vital to equipping any agencies

or Ombudspersons and their staff to take direct action against Member States on matters of weak environment of environmental law, or systematic failures to implement and uphold EU environmental law, when the Commission fails to act (for example in defence of any novel non-regression laws, the proposed Nature Restoration regulation, or other EU laws protecting the environment).

### **Recommendations from strengthening court authorities and expertise.**

A range of STI recommendations flow from suggestions to enhance environmental law by strengthening court authority and expertise to cover cases related to rights of nature (were it to advance, or to support improved enforcement of existing environmental law). Actions here include enhancing court ability to administrate sections or monitor non-compliance; build judge and court experiences with environmental law; establishing independent scientific advisory bodies to support judicial action. Across the board STI investment to address such concerns might support

- development of **environmental expertise exchanges**, for example providing fellowship and research experiences for established professionals and early career researchers;
- **environmental expertise trainings** for courts and judges; building capacity to staff advisory bodies;
- **establishing legal environmental education for environmental, natural, social, and physical scientists** to help them understand ways their knowledge can be translated to action in defence of environmental systems.

More generally, STI investments that **build the evidence base** regarding environmental monitoring and issue identification; cause-impact relationships; impact assessment; and knowledge of remediation could also be beneficial for the courts in efforts to advance ecosystem health.

### **Closing Summary and Reflection Across Environmental Law, Policy, and Scenarios**

Affording nature personhood and legal standing in courts would theoretically allow nature to seek cessation of and damages for exploitation, plundering, and degradation currently sanctioned by law in Europe, where no rights of nature or human right to a healthy environment exist. If nature were afforded rights, there would be implications covering how such rights are recognized and promoted; establishment of norms to empower defence of these rights; more robust implementation of precautionary measures to prevent ecological devastation; and enhanced measures to restore ecological integrity. There has been mixed success of establishing RoN across many countries. Further, there are significant limitations with the current state of environmental law enforcement in Europe.

Whether nature has rights or not, such rights will still need to be administrated and defended in systems of law wherein human representation and administration are vital. Therefore, regardless of whether law for nature is pursued through a “right of nature”, a range of environmental legal remedies could improve the prospects for ecosystem health in Europe. These include:

- enhancing safeguards for the environment,
- employing more wholistic, systemic, and rigorous understandings of harm to the environment,
- strengthening environmental liability and enforcement statutes,
- pursuing environmental justice.

More generally, extending research on constitutional law to consider rights of nature suggests that beyond granting rights to individual species or aggregated biomes, a potentially more effective route to explore may be to **extend specific organizational rights to environmental groups** (e.g., rights to create such organizations; to protect funding and freedom from government or private sector harassment; to be involved in government processes; to be assured legal standing, etc.) (Guim and Livermore 2021). **Concurrently, enhancements to STI policy may help Europe realize many the ambitions thriving environmental systems regardless of the environmental legal solutions pursued across Europe.** Such enhancements flow not only from recommendations regarding critical reviews of European environmental law, but also an exploration of how STI policies might create tensions or opportunities in a range of future conditions. “No-regrets” approaches to STI policy for ecosystem health, implemented wisely, would likely help Europe regardless of which future it may find itself resembling. These approaches broadly breakdown as investments in:

- 1) **Building ecological, integrative monitoring capabilities across regions.** Such efforts would include **not only physical but also social and human resource infrastructures**. Such infrastructures would be committed **not only to cataloguing environmental damage but developing novel,**

**holistic remedies to support ecological restoration (STI infrastructure; knowledge production).** Examples of such interventions might include:

- building robust independent ecological health monitoring capabilities across regions and physical and social research infrastructure (**STI infrastructure**)
- studying effects of, and craft defences and alternatives to regressive environmental laws (**knowledge production**)
- measures and approaches not only of cataloguing but—essentially—reversing environmental degradation (**knowledge production**)
- pioneering effective, adaptive methods at long-term ecological health monitoring (**program design**)
- increasing research into cross-national and sub-national disparities and offers for innovative solutions (**STI themes**)
- advancing means of assessing harm / impacts of R&I on nature (**STI themes**)
- exploring balancing rights in complex trophic systems (**STI themes**)
- reconceptualizing understandings of harm in the context of trophic levels and human food systems

2) **Enhancing civil society, citizen, and youth capabilities to support environmental health (STI infrastructure; program design).** Such interventions might include not only education but also **ecological research methods considerate of novel human-environment relations (knowledge production; STI themes)**. Such investments recognize importance not only of expertise, but also time and monetary **resources of ENGOs and other CSOs**, as well as **social scientific research into environmental values (program design; other policies)**. Examples of such interventions might include

- formal and informal science and nature education (**STI themes**),
- research on the manifestation of values of nature alongside livelihood and other cultural values, and how to mediate and resolve tensions (**STI themes**),
- advancing understanding of means of valuing nature and changes in ways nature is constructed in societies (**STI themes**),
- investment in ENGO capacity building by paying for staffing of environmental and social scientific capabilities of ENGOs and CSOs and citizen groups seeking damages and restoration (**STI infrastructure**).

3) **Enhancing expert capability and exchange across legal and natural, physical, and social science traditions (STI infrastructure).** Such efforts would include not only **mutual-exchange and knowledge translation**, but capacity for **trans-disciplinary research to support environmental health (STI themes)**. In addition to broadening the human and social resource base, such interventions provide key **input to vital, independent environmental oversight efforts (knowledge production)**. Examples of such interventions might include:

- enhance cross-translation / interdisciplinary research and understanding of local contexts necessitating differentiation (**STI themes**),
- environmental expertise exchanges of legal bodies and practitioners, and researchers themselves (**STI infrastructure; program design**),
- improvement of coordination across directives STI investment in partnering legal scholars with environmental researchers and social scientists to study effects of and develop ways to improve legal coordination (**STI infrastructure; program design**),
- robust and vibrant human and social resource base from which to staff independent scientific committees to oversee changes to legal directives (**STI themes, knowledge production; STI infrastructure**),
- enhanced ways to include and represent species and ecosystems in R&I (**program design**)
- considering ways to appoint / empower advocates for nature, future generations in R&I (**program design**).



- 4) **Augmenting conceptualization, study, implementation, and learning from alternative governance arrangements to support environmental health (STI themes)**. Such efforts, accompanying any environmental ombudsperson or horizontal environment harmonization or enforcement efforts, would allow for **strategic, robust, inclusive experimentation with novel forms reformulating governance systems for environmental health (STI themes; knowledge production)**. Examples of such interventions might include:
- insight into governance arrangements to effectively establish and coordinate knowledge exchange (**knowledge production; STI theme**),
  - demonstrate costs of inaction and consequence of unremedied environmental degradation (**knowledge production; STI theme**),
  - greater research into cross-national and sub-national disparities in environmental enforcement (**knowledge production; STI theme**),
  - greater research into means of building empathic connections with species and ecosystems (**knowledge production; STI theme**),
  - Other policies might include raising standards and revising approaches to assessing harm of R&I in ecosystems (Bernstein et al. 2022) (**other policies**).

Future EU STI policies must more centrally consider human and environmental flourishing if our human knowledge systems hope to mutually benefit from adoption of RoN improvements to EU environmental law. These questions delve profound issues related to philosophy of life, identity, navigating death, exploring more-than-human ways of being, and radically reimagining how we inhabit and move around in our environments (**impact areas**). Research to enhance ecosystems and biodiversity on land and in waters; sustainable food systems from farm to fork on land and sea; clean and healthy air, water, soil; climate change mitigation and adaptation; circular and clean economy; secure and open democratic EU society; good health and high-quality accessible healthcare; and inclusive growth and new job opportunities all have a vital role to play in supporting a future of ecosystem flourishing (**impact areas**). Ultimately, human knowledge flows – just like nature – do not recognize artificial political boundaries. Any advances in European STI policy for environmental and human flourishing may offer a vital example to research communities worldwide. Afterall, global environmental flourishing will be required if Europe is to thrive in our interconnected planetary system. To begin, environmental degradation must be recognized as an unacceptable status quo, and ecosystem flourishing – and our human health and wellbeing in relation to our environments –elevated as a paramount.

## 5. REFERENCE

- Akchurin, M. (2015). Constructing the Rights of Nature: Constitutional Reform, Mobilization, and Environmental Protection in Ecuador. *Law & Social Inquiry*, 40(04), 937–968. <https://doi.org/10.1111/lsi.12141>
- Bernstein, M. J., Franssen, T., Smith, R. D. J., & de Wilde, M. (2022). The European Commission's Green Deal is an opportunity to rethink harmful practices of research and innovation policy. *Ambio*. <https://doi.org/10.1007/s13280-022-01802-3>
- Betaille, J. (2019). Rights of Nature: Why It Might Not Save the Entire World. *Journal for European Environmental & Planning Law*, 16(1), 35–64.
- Bosselmann, K. (2013). Grounding the rule of law. *Rule of Law for Nature*, 19.
- Boyd, D. R. (2018). Recognizing the Rights of Nature: Lofty Rhetoric or Legal Revolution? *Natural Resources & Environment*, 32(4), 13–17.
- Bryant, P. T. (1975). Should Trees Have Standing? Toward Legal Rights for Natural Objects by Christopher D. Stone. *Western American Literature*, 9(4), 319–320. <https://doi.org/10.1353/wal.1975.0069>
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7), available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31992L0043>
- Cope, K. L., Creamer, C. D., & Versteeg, M. (2019). Empirical Studies of Human Rights Law. *Annual Review of Law and Social Science*, 15(1), 155–182. <https://doi.org/10.1146/annurev-lawsocsci-101317-031123>
- Davis-Peccoud, J., Stone, P., & Tovey, C. (2016). Achieving Breakthrough Results in Sustainability. Bain & Company. <https://www.bain.com/insights/achieving-breakthrough-results-in-sustainability/>
- Demeritt, D. (2002). What is the 'social construction of nature'? A typology and sympathetic critique. *Progress in Human Geography*, 26(6), 767–790. <https://doi.org/10.1191/0309132502ph402oa>
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7), available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147>.
- Dudgeon, R. C., & Berkes, F. (2003). Local Understandings of the Land: Traditional Ecological Knowledge and Indigenous Knowledge. In H. Selin (Ed.), *Nature Across Cultures: Views of Nature and the Environment in Non-Western Cultures* (pp. 75–96). Springer Netherlands. [https://doi.org/10.1007/978-94-017-0149-5\\_4](https://doi.org/10.1007/978-94-017-0149-5_4)
- Eder, K. (1996). *The social construction of nature: A sociology of ecological enlightenment*. Sage Publ.
- Evans, S. (2021, October 5). Analysis: Which countries are historically responsible for climate change? Carbon Brief. <https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/>
- ECHR 2022. Factsheet – Environment and the ECHR: [[https://www.echr.coe.int/Documents/FS\\_Environment\\_ENG.pdf](https://www.echr.coe.int/Documents/FS_Environment_ENG.pdf)]([https://www.echr.coe.int/Documents/FS\\_Environment\\_ENG.pdf](https://www.echr.coe.int/Documents/FS_Environment_ENG.pdf))
- Fasoli, E & McGlone: The non-compliance mechanism under the Aarhus Convention as 'soft' enforcement of international law: Not so soft after all! *The Netherlands International Law Review*, 2018 p. 27-53
- Faure, M: The export of ecological civilization: Reflections from law and economics and development. *Sustainability 2020 (MPDI)* p. 1-19; <https://www.mdpi.com/2071-1050/12/24/10409>
- Fischer-Kowalski, M., & Swilling, M. (2011). Decoupling natural resource use and environmental impacts from economic growth, A Report of the Working Group on Decoupling to the International Resource Panel. United Nations Environment Programme.
- European Commission. (2000). Communication from the Commission on the Precautionary Principle (COM(2000) 1 final). [<https://eur-lex.europa.eu/legal->

content/EN/TXT/PDF/?uri=CELEX:52000DC0001&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52000DC0001&from=EN)

- European Court of Auditors. (2021). *The Polluter Pays Principle: Inconsistent application across EU environmental policies and actions* (Special Report 12/2021; p. 50).  
[https://www.eca.europa.eu/Lists/ECADocuments/SR21\_12/SR\_polluter\_pays\_principle\_EN.pdf](https://www.eca.europa.eu/Lists/ECADocuments/SR21\_12/SR\_polluter\_pays\_principle\_EN.pdf)
- European Commission. (2022). *Proposal for a Regulation of the European Parliament and of the Council on Nature Restoration (COM(2022) 304 Final; Version 1)*. European Commission.  
<https://doi.org/10.5281/ZENODO.5657041>
- Espinosa, C. (2019). *Interpretive Affinities: The Constitutionalization of Rights of Nature, 'Pacha Mama'*, in Ecuador. *Journal of Environmental Policy & Planning*, 21(5), 608–622.  
[https://doi.org/10.1080/1523908X.2015.1116379](https://doi.org/10.1080/1523908X.2015.1116379)
- Gervais, M.-C. (1997). *Reviewed Work(s): The Social Construction of Nature: A Sociology of Ecological Enlightenment by Klaus Eder*. *The British Journal of Sociology*, 48(4), 704–705.
- Goddard, J. (2022, August 11). *Why Companies Aren't Living Up to Their Climate Pledges*. *Harvard Business Review*. <https://hbr.org/2022/08/why-companies-arent-living-up-to-their-climate-pledges>
- Graeber, D., & Wengrow, D. (2021). *The Dawn of Everything: A New History of Humanity*. Farrar, Straus and Giroux.  
[https://us.macmillan.com/books/9780374157357/thedawnofeverything](https://us.macmillan.com/books/9780374157357/thedawnofeverything)
- Guim, M., & Livermore, M. A. (2021). *Where Nature's Rights go Wrong*. *Virginia Law Review*, 107, 73.
- Hanley, D. A. (2021). *The Climate Movement's Secret Weapon*. Noema: Published by The Berggruen Institute. <https://www.noemamag.com/the-climate-movements-secret-weapon/>
- Houck, O. A. (2017). *Noah's Second Voyage: The Rights of Nature as Law*. *Tulange Environmental Law Journal*, 31(1). <https://doi.org/10.5840/enviroethics19901216>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). *The weirdest people in the world?* *Behavioral and Brain Sciences*, 33(2–3), 61–83.
- Krämer, L. (2020). *Rights of Nature and Their Implementation*. *Journal for European Environmental & Planning Law*, 17(1), 47–75. [https://doi.org/10.1163/18760104-01701005](https://doi.org/10.1163/18760104-01701005)
- Kauffman, C. M., & Martin, P. L. (2017). *Can Rights of Nature Make Development More Sustainable? Why Some Ecuadorian lawsuits Succeed and Others Fail*. *World Development*, 92, 130–142.  
<https://doi.org/10.1016/j.worlddev.2016.11.017>
- Kolbert, E. (2022, April 11). *A Lake in Florida Suing to Protect Itself*. *The New Yorker*.  
[https://www.newyorker.com/magazine/2022/04/18/a-lake-in-florida-suing-to-protect-itself](https://www.newyorker.com/magazine/2022/04/18/a-lake-in-florida-suing-to-protect-itself)
- LaFreniere, G. F. (2007). *The decline of nature: Environmental history and the Western worldview*. Academica Press.
- Macpherson, C. B. (1964). *The political theory of possessive individualism: Hobbes to Locke*. Oxford University Press.
- Mührel, J. (2022, January 6). *The Birth of Global Environmentalism*. *Völkerrechtsblog: International Law and International Legal Thought*. <https://voelkerrechtsblog.org/the-birth-of-global-environmentalism/>
- NV Algemene Transport- en Expeditie Onderneming van Gend & Loos v Netherlands Inland Revenue Administration, (European Court of Justice 1963). [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:61962CJ0026&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:61962CJ0026&from=EN)
- Regulation (EC) No 1367/2006 of the European Parliament and of the Council of 6 September 2006 on the application of the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters to Community institutions and bodies, Pub. L. No. 32006R1367, 264 OJ L (2006).  
[http://data.europa.eu/eli/reg/2006/1367/oj/eng](http://data.europa.eu/eli/reg/2006/1367/oj/eng)
- Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU)

2019/2088 (Text with EEA relevance) (No. 32020R0852). European Commission.  
[<http://data.europa.eu/eli/reg/2020/852/oj/eng>](<http://data.europa.eu/eli/reg/2020/852/oj/eng>)

Regulation (EU) 2021/1767 of the European Parliament and of the Council of 6 October 2021 amending Regulation (EC) No 1367/2006 on the application of the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters to Community institutions and bodies, 356 OJ L (2021).  
[<http://data.europa.eu/eli/reg/2021/1767/oj/eng>](<http://data.europa.eu/eli/reg/2021/1767/oj/eng>) --

Richardson, B. J., & Hamaski, N. (2021). Rights of Nature Versus Conventional Nature Conservation: International Lessons from Australia's Tarkine Wilderness. *Environmental Policy and Law*, *51*(3), 159–173. [<https://doi.org/10.3233/EPL-201066>](<https://doi.org/10.3233/EPL-201066>)

Rockström, J., Steffen, W., Noone, K., Persson, A., Chapin, F. S. I. I., Lambin, L., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., ... Foley, J. (2009). Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society*, *14*(2), 32.

Selin, H. (Ed.). (2003). *Nature Across Cultures* (Vol. 4). Springer Netherlands. <https://doi.org/10.1007/978-94-017-0149-5>

Shanahan (2022) Happy the Elephant Isn't Legally a Person, Top New York Court Rules. *New York Times*. Available at: <https://www.nytimes.com/2022/06/14/nyregion/happy-elephant-animal-rights.html?smid=em-share>

Sheehan, L. (2015). Implementing Rights of Nature through Sustainability Bills of Rights. 18.

Stone, C. D., 1972, Should Trees Have Standing? - Toward Legal Rights For Natural Objects, *Southern California Law Review* *45*, 450-501.

Townend, R. (2022). What are the key issues at COP27? Chatham House – International Affairs Think Tank. <https://www.chathamhouse.org/2022/08/what-cop27>