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Abstract

Nature is declining at unprecedented rates. We posit that the external effects of ecosystem degradation can be understood as a lack of property rights of stakeholders advocating on behalf of future generations and the intrinsic value of natural systems. The attempt to capture such property rights represents a transaction cost that is borne by environmental, indigenous and climate change movements. A number of environments worldwide have now been accorded Environmental Personhood (EP). We link the evolution of EP as nature's equivalent of the firm to the history of corporations as legal entities. An economic case can be made for EPs to allow for 1) the objective of capturing total economic value subject to protecting the environment's intrinsic value which is represented by the capability of the natural system to maintain its ecosystem functions; 2) a property rights structure opening for ecosystem trade-offs among stakeholders, including those advocating on behalf of the environment and future generations; and 3) interactions among stakeholders that mediate transaction costs.

Keywords: Environmental Personhood; Intrinsic Value; Stakeholder Trade-offs; Transaction Cost;

Introduction

Many of the world's ecosystems are in decline. Scientists warn of 'biological annihilation' to the extent that the Earth's sixth mass extinction is under way (Ceballos et al. 2017; Wake & Vredenburg 2008). A recent report by the UN estimates that nature is declining at rates unprecedented in human history (IPBES 2019). This matters because nature is essential for human existence and well-being, and to some extent, irreplaceable (IPBES 2019). The 'produce' of natural environments, often involving human input to greater or lesser extent, are the constituents of human well-being, such as security, materials, health and social relations, all providing for human freedom of choice and action (MEA 2005). Well-being emanates from provisioning, regulating and cultural services, all standing on the shoulders of supporting services that feed into the former three. These ecosystem services are connected within natural environments, and interact with society via a multitude of complex interlinkages and stakeholders¹. A recent report by the Parliamentary Commissioner for the Environment in New Zealand, for example, highlights the many pressures on estuaries from urban wastewater treatment plants, farms, forests, fishing, aquaculture and shipping, exacerbated by overlapping jurisdiction and changing policy documents (PCE 2020). The IPBES (2019) summarizes the many stressors on nature as changes in land and sea use; direct exploitation of organisms; climate change; pollution; and invasion of alien species, driven by production and consumption patterns, population growth, trade, technological innovations and governance.

¹ The ecosystem service framework has been well expounded in the literature and is now the most widely adopted framework for understanding how nature produces benefits for humans, how to quantify the rate and value of these services and how to model the interconnections between human wellbeing and ecological systems (e.g. Villamagna et al. 2013; Daily and Matson 2008; Nahlik et al. 2012; Tallis et al. 2008).

Maintaining ecosystem services and restoring degraded ecosystems has become an important goal for intergenerational wellbeing, a thought that is echoed by Pearce et al.'s (1989) argument for strong sustainability and recently by climate change movements such as Generation Zero and Greta Thunberg. Ecosystem services that provide for 'the benefits people obtain from ecosystems' (MEA 2005) are anthropocentric, and the case for conservation is often made using Pearce et al.'s (1989) total economic value (TEV) framework that distinguishes use values from non-use values (e.g. Richardson and Loomis 2009; Tietenberg and Lewis 2018)². At the center of the economic approach lies the application of regulation, taxes and property rights to manage natural resource utilization.

However, this worldview is at odds with many indigenous peoples, such as Māori in New Zealand, who have long negated the notion of ownership of natural resources, emphasizing the protection of environments through stewardship or guardianship (e.g. Harmsworth and Awatere 2013; Kahui and Cullinane 2019). Similarly, the deep ecology movement has argued for an inherent worth of nature, a long-standing debate that has centered on the dichotomy between whether nature has instrumental value and should be protected for humans' sake, or whether it has intrinsic value and should be protected for its own sake (see e.g. Chan et al. 2016; Arias-Arevalo et al. 2017). More recently, the concept of intrinsic value has been augmented by relational values, which pertain to all manner of relationships between humans and nature, including human-human relationships facilitated by natural environments (e.g. Chan et al. 2018).

² The total economic value (TEV) framework has been used extensively in the environmental economics literature and is now the most commonly adapted framework in valuation studies (see e.g. Costanza et al. 1997).

In this paper, we take the anthropocentric worldview where arguments for conservation center on the provision of benefits to humans, subject to the capability of the natural system to maintain its ecosystem functions. This capability is embodied by the view of resource management by many indigenous peoples, such as by Māori, who focus on the importance of utilizing resources in a fashion that does not compromise the 'mauri' (vital essence; life force) and integrity of the system (Williams 2006). It aligns with the concept of intrinsic value to encourage responsible action, but can also be understood as a safe minimum standard "or the minimum quantity of ecosystem structure and process (including diversity, populations, interactions, etc.), that is required to maintain a well-functioning ecosystem capable of supplying services" (Fisher et al. 2008, p. 2053).

The continued degradation of ecosystems poses an externality to society and we posit that this externality can be understood as a lack of property rights of stakeholders advocating on behalf of the intrinsic value of natural systems and the sustainable utilization of natural resources for future generations³. The attempt to capture and protect such property rights legally and publicly represents a transaction cost that is experienced by environmental, indigenous and climate change movements⁴, highlighting the insurmountable task of efficiently sorting the many ecosystem service trade-offs connected to human activity. In 1972 Stone proposed the 'unthinkable' of awarding nature legal rights to allow legal action at *its*

³ Barzel (1997) differentiates between legal and economic property rights – the first is what a state assigns to a 'person' (*de jure*), while the second is the ability to enjoy a piece of property (*de facto*). Here we understand property rights to mean a combination of these two, as legal personhood is assigned by the state, but the focus is on the enjoyment or utility of property, and how the ability to make choices in relation to this utility is organized by stakeholders.

⁴ The MEA (2005) connects ecosystem services to well-being, and as such advocacy to avoid nature loss may extend to all socio-economic aspects of society. We focus on environmental, indigenous and climate change movements to represent targeted advocacy for nature.

behest, that in determining damages, courts would have to take *injury to* the environment into account and that any damages awarded would benefit the environment itself. At the time, the idea was radical, not too dissimilar to the lengthy conceptualization of legal personhood for corporations since the medieval times. In 2008, Ecuador was the first country to explicitly recognize the rights of nature, followed by Bolivia in 2010 and smaller grassroots movements in the USA (O'Donnell and Talbot-Jones 2018). More recently, in 2014, the New Zealand parliament declared that Te Urewera, a forested, sparsely populated hill country region in the North Island, "is a legal entity, and has all the rights, powers, duties, and liabilities of a legal person" (Te Urewera Act 2014). Three rivers were to follow in 2017, including the Ganges and Yamuna rivers in India, and the Whanganui River in New Zealand, which was recognized as "an indivisible and living whole comprising the Whanganui River from the mountains to the sea, incorporating all its physical and metaphysical elements" (Te Awa Tupua Act 2017); and most recently, in 2021, Quebec's Magpie River has become the first in Canada to be granted environmental personhood (EP). Since Stone (1972; 2010) the literature on EP for natural objects has been growing rapidly ranging from the analysis of case studies (Talbot-Jones 2017; O'Donnell and Talbot-Jones 2018), EP as a new property rights system (Talbot-Jones and Bennett 2019), EP as a way to address the tragedy of the ecosystem commons in line with a Maori indigenous view (Kahui and Cullinane 2019), and EP as a legal concept (Gindis 2016; Gordon 2018; Naffine 2009; Naffine 2012; Hutchison 2014).

In this paper we lay out how the concept of EP, can, in a somewhat heterodox fashion, be understood within a neo-classical economic paradigm applying the frameworks of ecosystem services (MEA 2005), or nature's contribution to people (IPBES 2017), potentially providing a

structure for incorporating and internalising ecosystem service trade-offs. We provide a summary of the history of the emergence of corporations as legal entities (i.e. corporate personhood) and the theory of the firm, which provides the necessary background knowledge to explore the evolution of EP to allow for ecosystem service trade-offs in competing uses and benefits of multiple stakeholders within and across generations. We find that an economic case can be made for the evolution of EP to allow for 1) the objective of capturing the total economic value, subject to its intrinsic value which is represented by the capability of the natural system to maintain its ecosystem functions; 2) a property rights structure opening for the organization of relevant stakeholders, including those advocating on behalf of the environment and future generations; and 3) interactions and trade-offs among stakeholders that mediate transaction costs, thereby creating a price mechanism that includes the cost of externalities.

The following sections provide an outline of the evolution of the legal personhood of corporations and of natural environments, an economic analysis, and a discussion and conclusion of our arguments.

The evolution of legal personhood for non-human entities

Black's Law Dictionary (2019) defines a legal person or entity as "a lawful or legally standing association, corporation, partnership, proprietorship, trust, or individual, which has legal capacity to (1) enter into agreements or contracts, (2) assume obligations, (3) incur and pay debts, (4) sue and be sued in its own right, and (5) to be accountable for illegal activities". In general terms, a 'person' is understood to refer to a natural human being, but in Black's Law Dictionary, a legal person more accurately reflects its original Latin *persona* meaning of an

actor's mask which is worn in the legal domain (Gindis 2016). The concept of a legal person is a cluster of rights and duties, which can be assigned to both human and non-human entities (Naffine 2009). For human entities, the evolution of basic human rights reaches back to the 19th century, when the abolition of slavery and coverture of married women entailed a process of transformation from property to separate legal personality (Gindis 2016). Dawson (1994) observes that "[c]hildren, married women, bankrupts, lunatics, Jews and foreigners have all been assigned a distinct legal status within the history of common law, distinguishing their legal position from the norm of the adult, male, solvent, sane, Christian citizen." (quoted in Naffine (2009), p. 12).

For non-human entities, the concept of legal personhood for corporations stretches back to medieval scholars who spent hundreds of years struggling to understand how the Church and the State could, as public entities, transcend the living pope and king (Gierke 1900; Stone 1972). The fundamental idea emerged that 'bodies corporate', including towns, religious groups, universities and guilds, had a life beyond that of their members which came to be codified by medieval law (Truitt 2006; Micklethwait & Wooldridge 2018). These corporate persons started to represent permanent organizational structures that preserved the customs of groups, generated wealth and passed it intact to future generations. The immortal status of these bodies is best illustrated by the Church (Allen 1995), or corporations such as the Corporation of London and the Aberdeen Harbour Board in Scotland, which date back to the 12th century and exist to this day (Truitt 2006).

It is somewhat inconceivable to the modern eye that medieval scholars spent hundreds of years struggling with the legitimacy of private property and the notion that corporate entities could exist in law. Yet once conceptualized and legitimized, it provided a catalyst for business

activities that allowed individuals to share risks and rewards. Merchants, bankers, guilds and companies formed associations that allowed them to pool funds and finance the shipment of goods to distant ports, and in the 16th and 17th century, the business idea of the 'chartered company' was born (Truitt 2006). Wealthy merchants and members of the aristocracy were given a charter by European monarchs as a vehicle for imperial expansion, leading to the establishment of well-known companies such as the British East India Company, the Virginia Company and the Hudson's Bay Company.

The economic success of these chartered companies was built on the two fundamental ideas of joint-stock ownership and limited-liability (Truitt 2006)⁵. In 1862, the British Parliament passed the Companies Act which furnished the limited-liability joint-stock company with a new feature: anyone, at any time, for any purpose, could form a company, i.e. it was no longer necessary to seek a charter from parliament to set up a company and limit its operation to a worthy aim (Truitt 2006). The Companies Act was rapidly copied by most of Europe and the US and gave birth to the modern corporation as we know it.

The limited-liability joint-stock company as a distinct legal entity has provided a vehicle for entrepreneurship and wealth creation. The ability to vest control in the corporation itself has given rise to the metaphor 'corporate personality' or 'corporate personhood' (CP). As Farrar (2007) observes, the corporation is a fictitious person representing a group of shareholders, but is not identical with that group in the sense that it is treated as a separate 'person' in law.

⁵ For example, the Muscovy Company of 1555, chartered by the English Crown to have exclusive trading rights between England and Russia, raised money to finance voyages by selling shares that could be traded, with the liability of shareholders limited to the amount of their investment.

The evolution of CP has provided the legal structure for people to interact efficiently and reach individual and collective economic goals⁶ (Milgrom and Roberts 1992). Transaction, the transfer of goods and services from one individual to another, is the fundamental unit of analysis in the theory of economic organization. In his seminal article entitled “The nature of the firm” (which we play on in the title of this paper) (1937) Ronald Coase explains the existence of the firm, as opposed to ‘being one’s own master’, as emanating from the transaction cost of using the price mechanism: “The most obvious cost of “organizing” production through the price mechanism is that of discovering what the relevant prices are” (op cit., p.83). The price mechanism ensures the efficient allocation of resources, but in order to secure this allocation, transaction costs, i.e., the costs of search and negotiation, and monitoring and enforcement, are incurred (Griffin 1991; Challan 2000). The organization of firms is therefore structured such as to maximize value net transaction costs, and hence secure the efficient function of the price mechanism (Allen 1998).

The evolution of environmental personhood (EP)

In 1972, the Supreme Court of the United States rejected a lawsuit by an environmental organization that sought to block the development of a ski resort in the Sierra Nevada Mountains (*Sierra Club v. Morton* 405 U.S. 727). The case is well known because Justice

⁶ According to Truitt (2006; p. 73); (1) the corporation provides a centralized management structure for organizations to conduct business (buying and selling property, signing contracts, borrowing money, etc.); (2) capital can be raised through the issuance of stocks and bonds; (3) the corporation mitigates risk (shareholders, directors and managers are protected from personal liability for the actions of the corporation by limiting the extent of the risk to the amount of investment); (4) ownership can be easily transferred by buying and selling shares in an open market; and (5) the corporation asserts its own entity separate to that of stakeholders, which provides the ability to own assets, capital and land in the corporation’s name and allows continued existence (bar dissolution by stakeholders or bankruptcy).

William O. Douglas famously dissented arguing that environmental objects should be granted legal personhood. The idea to give legal rights to 'natural objects' within the environment, or environmental personhood (EP), in the same way to how corporate entities legitimately act as legal personhoods, started with Stone's (1972) publication "Should trees have standing? – Legal rights towards natural objects" in the Southern Californian Law Review. In his increasingly famous paper (now published as a book – Stone 2010), Stone argues that without EP natural objects in the environment rely entirely on affected parties to take legal action and that compensation accrues to the affected parties rather than the natural object itself.

To date, many of the cases in which natural entities have been assigned legal personhood came as a response to stakeholder conflicts and continued environmental degradation. The history of ownership over the Whanganui River in New Zealand between the indigenous Māori tribe, the Whanganui iwi, and the British Crown, is a case in point⁷. In 1848 the Crown jurisdiction had asserted ownership over the greater Whanganui area, which included the river, allowing over time for economic activities such as gravel abstraction, steamer operations and other river works. These activities impacted on navigability, scenic preservation, fisheries and eel weirs leading to ongoing protest and legal challenges by the Whanganui iwi who raised concerns for the river's health and the desire to preserve the resource for future generations (Whanganui River Māori Trust Board 2010).

Short of two centuries later, the conflict was legally resolved with the signing of the Whanganui River Deed of Settlement (Ruruka Whakatupua) in 2014. As part of the settlement negotiations, Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 (from here on

⁷ Detailed accounts of the history of conflicts about the Whanganui River can be found in Hutchison (2014), Talbot-Jones (2017), O'Donnell and Talbot-Jones (2018), Talbot-Jones and Bennett (2019) and Kahui and Cullinane (2019).

referred to as the 2017 Act) was passed granting legal personhood status to the Whanganui River. The property right is vested in the natural object itself, something Talbot-Jones and Bennett (2019) call resource self-determination, and is to be treated as a charitable entity and public body.

Specifically, the 2017 Act gives legal recognition to the intrinsic values of the river (2017 Act; p.15); i.e., (a) the River is the source of spiritual and physical sustenance (“Te Awa Tupua is a spiritual and physical entity that supports and sustains both the life and natural resources within the Whanganui River and the health and well-being of the iwi, hapū and other communities of the River”); (b) the great River flows from the mountain to the sea (“Te Awa Tupua is an indivisible and living whole, comprising the Whanganui River from the mountains to the sea, incorporating all its physical and meta-physical elements”); (c) I am the River and the River is me (“The iwi and hapū of the Whanganui River have an inalienable connection with, and responsibility to, Te Awa Tupua and its health and well-being”); and (d) the small and large streams that flow into one another form one River (“The Awa Tupua is a singular entity comprised of many elements and communities, working collaboratively for the common purpose of the health and well-being of Te Awa Tupua”)⁸.

Last but not least, the 2017 Act gives effect to the provision that the human face of the river, the decision makers, must recognize and provide for the Te Awa Tupua status and the intrinsic value; i.e. in the case of the Whanganui River two persons are nominated; one by the Whanganui iwi and one on behalf of the Crown; an advisory group is established comprising

⁸ Similarly, Quebec’s Magpie River has been granted, in accordance with Innu customs, the right to flow; the right to respect for its cycles; the right for its natural evolution to be protected and preserved; the right maintain its natural biodiversity; the right to fulfil its essential functions within its ecosystem; the right to maintain its integrity; the right to be safe from pollution; the right to regenerate and be restored; and the right to sue.

representatives of persons or organizations with interest in the Whanganui River, including iwi, relevant local authorities, departments of State, commercial and recreational users, and environmental groups. The purpose of the nominated persons and the advisory group is to “act collaboratively to advance the health and well-being of Te Awa Tupua” (2017 Act; p. 22).

The economic case for environmental personhood (EP)

The conceptualization of the EP has, until recently, been unthinkable, very much like the reluctant evolution and acceptance of CP through time. The explicit aim of an EP such as the Whanganui River is to uphold the intrinsic value of the natural object and promote and protect its health and wellbeing. The Whanganui EP is represented by a ‘human face’ whose aim it is to act collaboratively, thereby providing for an anthropocentric perspective of stakeholder interactions. Talbot-Jones (2017) uses experimental game theory to predict that transaction costs are likely to increase for stakeholders when re-negotiating water use in the Whanganui River after the institutional transition to EP. The experiment focuses on bargaining costs as a measure of transaction costs, noting that the transaction costs associated with designing, implementing, and operating EP for the Whanganui River are extensive and will further add to the bargaining costs explored in the experiment. The experiment also finds that these negotiations may change the proportion of flow allocated to consumptive use to more sustainable levels, thereby addressing concerns of overuse.

We posit that in the case of the Whanganui River, the lack of property rights by stakeholders whose access to navigation, fisheries and eel weirs was diminished and who promoted the intrinsic value of the natural entity as well as those of future generations, constitutes a transaction cost in addition to the costs of EP establishment and negotiation. In his second seminal article “The problem of social cost” (1960) Coase illustrates how agents, in the

presence of external effects, will find optimal allocations, regardless of who possesses the property rights, if transaction costs are negligible. Allen (1991) clarifies that when externalities are present, transaction costs are in fact the costs of establishing, maintaining and securing property rights, such that zero transaction costs imply perfect property rights.⁹ One of Coase's insights was that in the presence of external effects, where the price mechanism is societally inefficient, transaction costs provide a powerful reason to consider alternative institutional arrangements to approximate "the unattainable ideal of the (mythical) world of zero transaction costs" (Merrill & Smith 2017; p. 38). Williamson (1971) extends the argument of transaction costs to consider any governance structure as a distribution of property rights that maximizes the gains from trade net of all costs, both within and outside firms.

In the case of the Whanganui River, the continued degradation of the river's health due to economic development imposed an externality on the Whanganui iwi who had, unsuccessfully, spent nearly two centuries trying to establish a property right on behalf of the intrinsic value of the river and the sustainable consumptive and non-consumptive use of the river for future generations. The iwi's grievances, and their continued legal efforts to secure the right of decision making represented a real cost to the iwi, including court costs, time, effort and emotional and spiritual harm.

These type of transaction costs are mirrored, to some degree, by the climate change crisis, showing that the transaction costs involved in efficiently sorting the many ecosystem service trade-offs connected to human activity across generations have become insurmountable. Within generation, the loss and degradation of natural environments worldwide is seen as one of our planet's most serious challenges, leading to massive ecosystem service trade-offs

⁹ However, the reverse is not necessarily true, see Allen (1991, p. 899).

seldom taken into account (MEA 2005, IPBES 2017). As Coase (1937 p. 83) puts it, there is “a cost of using the price mechanism”, but this cost is even higher and increasingly untenable when the societal price mechanism for ecosystem services is plagued by externalities. The societal price mechanism is not well-functioning because many of the ecosystem services we lose do not exist directly in commercial markets and have largely been unknown. This explains why EP has largely not appeared earlier. I.e., EP or the nature equivalent of the firm, has not had a clear *raison d’être*, as much of its ‘produce’ is enjoyed outside commercial markets; was earlier not affected by scarcity; is part of local or global commons; or is far removed in time and space from current ‘consumers’. This is changing with the growing awareness of the enormous non-market values connected to natural environments (Costanza et al. 1997; 2014), making EP a structure of increasing relevance.

The school of new institutional economics posits that new institutions emerge when the benefits they confer are greater than the transaction costs involved in creating and sustaining them (Teraji 2018). In the case of the Whanganui River, the continued conflicts between the iwi and the Crown imposed a cost sufficiently larger than the cost involved in transitioning to a new institutional arrangement. EP can be seen as a property rights structure opening for the organization of relevant stakeholders, including those advocating on behalf of the environment and future generations, and allowing for interactions that mediate transaction costs, thereby creating a price mechanism that includes the cost of externalities. In the discipline of neoclassical economics, externalities are potentially internalized by public regulation in the shape of economic incentive mechanisms, such as environmental taxes. However, as the extent of externalities has become increasingly complex, involving a range of human interactions, including private firms, communities, social groups, the general public, youth movements and indigenous communities representing future generation, public

regulation via controls or taxes becomes highly demanding, and potentially impossible. In the EP setting, these externalities, i.e. societal costs of human economic activity, are costs appropriated directly by stakeholders within the 'nature firm', and thus internalized, thereby reducing transaction costs.

Bar the few examples mentioned in this paper, EPs are largely non-existent. However, analogously to the legal structure of CP mediating transaction costs among economic agents, we posit that EP *might be expected* to reduce the overall transaction costs related to human interaction with natural environments by defining the property right in the resource itself and allowing for negotiation among all relevant stakeholders. In Table 1 we try to simplistically illustrate the logical differences between CP, governance bodies and EP, focusing on objectives, the mediation of transaction costs and the stakeholders involved.

Table 1 shows that the central objectives vary according to entity and type of personhood. CPs are commonly understood to maximize profits, but stakeholder models in the business ethics and management literature show corporations to pursue much broader perspectives than just value maximization (Hart 2011; Blanc 2016). Transaction cost theories for firms have been well expounded in the literature and augmented by organizational capabilities theories, asset specificity and modern contract theory (see e.g. Cheung 1983; Williamson 1979; 1981). The stakeholders of CP include stakeholders such as shareholders, employees, customers and the government.

Table 1. Transaction cost mediators according to type of personhood.

Type of personhood	Objectives	Transaction cost mediators	Stakeholders
Corporate Personhood (CP)	-Profits (Shareholder model) -Some weighted function of profits or company value, employee welfare, and customer welfare (Stakeholder model)	Contracts or incentive mechanisms within firms with employees, etc.	Shareholders, employees, customers, government
Local, regional and national governance entities	Social welfare	Legal, structural and practical systems of governance (e.g. elections, laws, health, educational and social security systems, etc.)	The above + General public + NGOs
Environmental Personhood (EP)	Total Economic value (use and non-use; relational), subject to intrinsic value	Contracts/incentives between different ecosystem service users, and nature/future generation representatives in the EP	The above + stakeholders advocating on behalf of the intrinsic value of nature and future generations

Though society, in its representation by local, regional and national governance entities, has a broader objective than corporations, the organization of society, and how it includes transaction costs, may not necessarily incorporate the objectives of EP. I.e., legal recognition

is awarded to the intrinsic value of the Whanganui River, the capability to sustain its ecosystem functions, while allowing for the sustainable utilization of water for consumptive and non-consumptive stakeholders. As such, one can envisage EP to focus on the total economic value (TEV) of an ecosystem, as encompassing all ecosystem service use, non-use and relational values, subject to intrinsic value of the river. In other words, the maximization of values that are not compatible with conservation is constrained by the environment's inherent worth and capability to maintain its ecosystem functions. Clearly there may be overlap between EP and societal objectives, but the EP's focus on intrinsic value, as well as inclusion of nature and future generations as stakeholders, is broader and more inclusive than most national, regional and local governance.

What might determine the extent of an EP in future, i.e. how large should the ecosystem included in the EP be, and what stakeholders or rights holders might be incorporated in the objective of the EP? The size and vertical integration of firms, or the integration and interdependence of at least two single-output production processes within a single firm, is determined by technological economies, transaction economies and market imperfections (Perry, 1989). We may consider the 'production' of ecosystem services within the 'nature firm' in a similar fashion. Rather than corporate vertical integration, however, *social horizontal integration* is a better term for EP. The extent, or horizontal integration of ecosystem service production, may be determined by the natural equivalent of technological economies, transaction costs and externalities outside the EP. For instance, commercial and recreational fisheries, provisioning and cultural services, respectively, are both dependent on the effective management of fish stocks. Management may, in turn, be impacted by other services in the coastal zone, such as aquaculture and the externalities of emissions therefrom. Transaction costs and externalities may therefore delineate the extent of EP entities, both in

environmental and stakeholder terms. The cost of contractual and governance exchange within an EP versus without an EP can be expected to determine the optimal level of horizontal integration, or the societal and environmental extent of an EP. Geographically, based on the relevant ecosystem extent, an EP may cross jurisdictional lines, be transboundary and transnational, or even multinational.

Clearly there are governance complexities connected to EPs, but these challenges do not necessarily differ substantially from those surrounding the governance of corporations and other entities. All organizations must determine what they aim to accomplish, as well as how they can keep score and measure performance (Jensen 2010). This will also apply to EPs. Discussions around corporate governance span stakeholder versus shareholder models for management (Jones et al. 2002), utilitarian versus more egalitarian business models and whether a single-valued objective function is required (Jensen 2010). Problematic issues relating to the lack of future generation stakeholders and uncertainties such as currently unknown externalities, both positive and negative, remain. These latter issues will, however, be a challenge for all types of environmental governance, and at a minimum, the explicit focus on intrinsic value puts these unknowns in the forefront, making EPs potentially more effective than other types of governance structures.

Discussion and Conclusion

It may seem inconceivable to award legal rights to natural objects, but the call to maintain and restore ecosystem services for intergenerational wellbeing is growing. Management of economic activity in natural environments worldwide is largely sectoral, with limited capacity to address the inter-dependent and cumulative effects of resource uses, and often ignoring non-commercial interests. The continued degradation of ecosystems poses an externality to

society and can be understood as a lack of property rights of stakeholders advocating on behalf of the intrinsic value of natural systems and future generations. The attempt to delineate and capture such property rights represent a transaction cost that is borne and voiced by climate change movements and indigenous communities, as well as local, regional and national environmental conflicts that are carried out in court and the public domain. In practice, these costs are borne by anyone who supports efforts to preserve natural systems, in-kind, financially or in any other tangible way. The introduction of EP provides an innovative way of addressing these issues. We link to the history of the emergence of corporations as legal entities and the theory of the firm, in order to explore the evolution of EP to allow for ecosystem service trade-offs in competing uses and benefits of multiple stakeholders, including those representing intrinsic value and future generations.

However, there are fundamental differences. Firstly, the property right is vested in the natural object itself under EP, which stands in contrast to the private or public ownership of CPs by shareholders; and secondly, the primary objective of EP is to uphold the intrinsic value of the natural object and promote and protect its health and wellbeing. This can be interpreted as the inherent value of the environment to maintain itself and its capacity to provide ecosystem services. One can envisage the evolution of EP, as an anthropocentric construct, to focus on the total economic value (TEV) of a system, subject to or constrained by the bottom line to uphold the integrity of a natural system, the measurement of which may include key environmental indicators and/or indigenous local knowledge. This may bridge the unease between instrumental and intrinsic worldviews that have plagued the environmental valuation literature to date.

Naffine (2012) points out that secular rationalists and conservative Christians have been the two influential families of thinkers that have sustained anthropocentrism in that “they focus almost exclusively on the human species and the perceived limits of its interests” (p. 69). Animals and the environment have traditionally fallen outside the borders of legal personhood. Stone (1972) and O’Donell and Talbot-Jones (2018) argue that there are elements of nature that are not captured by the existing anthropocentric paradigms of natural capital or ecosystem services, alluding to the intrinsic value of nature¹⁰. The valuation of intrinsic value is, by definition, outside of neoclassic, anthropocentric economic methods, but within a TEV setting, studies have shown the public acceptance of and willingness to pay to protect ecosystem components due to their existence *per se* (see e.g. Aanesen et al, 2015)¹¹. Furthermore, the understanding of how natural environments are important to foster both inter- and intra-generational relationships has grown but is not easily captured by traditional economic methods. Increasingly, studies are starting to verify the presence of such values in terms of relational values (see e.g. Ashbulby et al. 2013; Ruiz-Frau et al. 2013; Arias-Arevola et al. 2017; Uehara et al. 2020).

Whether EP will end up playing as important a role in society as CP has over the last centuries, remains to be seen, but it provides an innovative governance framework to meet some of the pressing challenges of our time in relation to how humans interact with nature. Limited liability, argued to be one of humanities’ great inventions (Mahoney 2000), may translate into

¹⁰ Stone (1972) makes point that injury inflicted upon a natural entity is not the same as harm to human interests in the resource.

¹¹ Methods to value non-commercial ecosystem services are well accepted and are often categorized into stated (hypothetical) and revealed preferences techniques to elicit individuals’ or households’ willingness to pay to conserve the services, the aggregate of which is often represented in the TEV framework.

risk mitigation for the EP 'board of directors', who are organized around the representation of current and future stakeholders. How exactly such representation is enacted remains to be seen but will likely follow established organizational structures of community and local government representation. Some of the questions surrounding CP, such as whether a corporation is a real entity with its own will or whether it is a mere association of individuals forming a contract among themselves (Iwai 1999), may not be as relevant for EP given its physical nature; but in the specific aspect of transaction costs, EP solves many of the same problems CP does. The EP enables a natural system to own its own assets, separate and distinct from those constituting the stakeholders. Stakeholders may sign contracts with the EP delineating rights of utilization, appropriation and conservation, thereby simplifying the network of contractual agreements between stakeholders and reducing transaction costs.

However, when taking the functions and powers of an EP to their limit, possible apprehensions may arise, such as whether EPs should be allowed to sue and be sued in the same way as CPs. An argument can be made that EPs should be suable entities in the same way that firms are. If an employee in a firm is injured by an earthquake while at work, the company can only be sued for damages if it is guilty of negligence in relation to mandatory employee security within the company's control, as opposed to the effects of a disaster outside the company's control. In a similar way, a river EP could be sued for flood damages if the EP has allowed for activities that actively contributed to the diminished ability of the natural system to regulate flooding (such as by the removal of flood-absorptive wetlands or the building of hydro-dams), but not if the flooding has occurred as a natural consequence of excessive rain that pushed the ecosystem beyond its carrying capacity. This of course also raises the issue of how EPs will be able to cover damages when decisions are made that require monetary reparations. Clearly an EP does supply biotic and abiotic ecosystem services that could involve possible payments

from recipients. There may also be resource rents created, that could be extracted. Indeed, these potential revenues could even be taxed by local, regional or national entities. This illustrates the possibility of the EP structure turning into a commercial form of corporate unit, opening for many critical issues (Donyets-Kedar 2017), underlining the importance of how stakeholders connected to non-monetary and potential future benefits are represented in the EP. Indeed, this illustrates that if EPs do emerge as a potential way of organizing the meeting point between humans and nature, then these and many other aspects will be discussed and analyzed intensely in centuries to come, in the same way that corporate legal personhood has been debated since the middle ages.

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