CellPress

Opinion

Reasons to Conserve Nature

Richard G. Pearson[1,*]

Is it sufficient to base arguments for conservation on the intrinsic value of nature, regardless of the services and economic benefits that biodiversity provides for humans? This question underlies much recent debate that has been at times acrimonious and has led to calls for a more inclusive approach to conservation. Yet melding different ideologies within a unified conceptual framework has proven difficult. Here I describe an approach that recognizes the importance of the level of biological organization and spatial extent in determining the strength of alternative arguments for why we should conserve nature. I argue that the framework helps reconcile contrasting viewpoints and brings clarity to when different conservation management approaches (for instance, regulation versus monetary valuation) are most appropriate.

Trends

A framework is presented that can help unify diverse reasons for conserving nature.

Recognizing the utilitarian value of nature does not deny its intrinsic value.

Reconciling different viewpoints will result in better conservation practice.

A 'New Conservation'

As biodiversity continues to decline globally [1], there has been much renewed debate about the strength of different arguments for why we should do more to conserve nature. Much of this debate has centred on the perception of a 'New Conservation', which puts emphasis on the services that biodiversity provides for humans rather than only on the value that nature possesses regardless of human use [2–5]. This shift in emphasis, driven for example by the Millennium Ecosystem Assessment [6], is having a substantial impact on the approach of environmental nongovernmental organizations, businesses, grant making bodies, and intergovernmental institutions.

Behind the debate lie alternative ideologies that value nature in very different ways (Box 1). To some, the intrinsic value of nature is of overriding importance. Nature conservation is seen as a moral imperative, akin to not committing murder or selling human organs [7]. In this viewpoint, any talk of utilitarian value plays into the hands of those that want to destroy nature – it implies monetization and thus that nature can be bought and sold to the highest bidder [2,7,8]. To others, values are human constructs and focusing on the 'intrinsic' value of nature sets apart the interests of nature as separate from – or even conflicting with – the interests of humans. In this viewpoint, arguments for nature conservation must include utilitarian values so as to avoid the perception that nature conservation is at odds with human progress and that conservationists value nature above human needs [3,4].

The contrasting ideologies can be characterized as 'nature for itself' versus 'nature for people' [9]. Too often these different perspectives are regarded as conflicting, yet they need not be [9]. Conservation is now moving toward a more nuanced framing that recognizes the complexity of the relationship between humans and biodiversity, and incorporates different ways of valuing nature. This 'people and nature' ideology [9] is in line with recent calls for a more inclusive approach to conservation and an end to infighting that risks harming efforts to protect nature [10].

However, conceptualizing this complex relationship between people and nature is difficult. We need to meld different viewpoints and understand when different arguments and management practices are most appropriate for supporting conservation. When should monetary valuation

[1]Centre for Biodiversity and Environment Research, Department of Genetics, Evolution and Environment, University College London, London WC1E 6BT, UK

*Correspondence: richard.pearson@ucl.ac.uk (R.G. Pearson).

Box 1. Alternative Values Assigned to Nature

Nature tends to be valued for multiple different reasons. There is little agreement over terminology, but we can distinguish at least three different types of value:

(i) Utilitarian value (or instrumental value): refers to the many uses that humans derive from nature. These uses include services such as decomposition, pollination, climate regulation, water purification, and recreation [21]. Here it is the function of nature that is valued [22]. Utilitarian value is often associated with monetary valuation [7].

(ii) Intrinsic value (or inherent value): refers to the perceived value of nature irrespective of humans. The view is that nature has a right to exist regardless of function ('existence value') and that it is morally right to conserve nature aside from human interests [22]. People commonly object to converting intrinsic value into monetary value: nature is valued for what it is, rather than for what it does, so its value is not open to quantification or monetary transaction [2,5,22].

(iii) Non-use value: refers to the value of nature to humans even when there is no direct use. Humans place non-use value on knowing that nature continues to exist and can be bequeathed to future generations, possibly for future use [21]. There are similarities between intrinsic and non-use values in that both value nature irrespective of human use (e.g., existence value), but non-use value is distinguished in that the value is regarded as being to humans rather than regardless of human interests. Since non-use value is based on human interests (like utilitarian value) it is open to quantification (unlike intrinsic value) and has been used in assessments of ecosystem services, including the UK National Ecosystem Assessment [21].

and market mechanisms be employed, and when is regulation necessary? Here I describe a conceptual framework that recognizes the importance of the level of biological organization and spatial extent in affecting how we view and manage our relationship with nature (Figure 1). My aim is to show how different arguments for conservation are suited to different spatial extents and levels of biological organization, such that seemingly opposing viewpoints are not necessarily in conflict.

Levels of Biological Organization

Biodiversity exists at multiple levels of organization, including at the levels of genes, populations, species, and ecosystems [11]. Although it might be argued that intrinsic value is associated with all levels of biological organization, this interpretation is of no practical use for planning and decision-making. If all levels of biological organization have equal intrinsic value, and if all species are regarded as having equal intrinsic value, then the implication is that no harm can be done in any way to any component of biodiversity. The concept of intrinsic value applied equally to all of nature therefore offers no way to prioritize and points only toward a halt to human progress because most human developments impact on nature to some degree. In practice, then, intrinsic value is commonly associated with certain species and ecosystems.

Conservation is most commonly thought of at the species level: endangered species conservation is central to the missions of environmental organizations such as WWF and is the basis for the IUCN Red List of Threatened Species; icons of conservation are often at the species level – pandas, tigers, whales; and the threat of a sixth species-level mass extinction is widely associated with the current biodiversity crisis [12]. Reasons that species are so highly valued include their aesthetic qualities (especially large, colourful, and intelligent species) and a perceived moral obligation to preserve the existence of different life forms. The upshot is that we tend to assign higher value to an individual or population of an endangered species than to those of a common species.

Arguments for conservation are also commonly associated with ecosystems, particularly the natural beauty of wilderness. A great deal of conservation action, including establishment of the first national parks in the USA, has been influenced by the idea of conserving wild nature, natural landscapes, and the communities of animals and plants that live there without human influence [13].

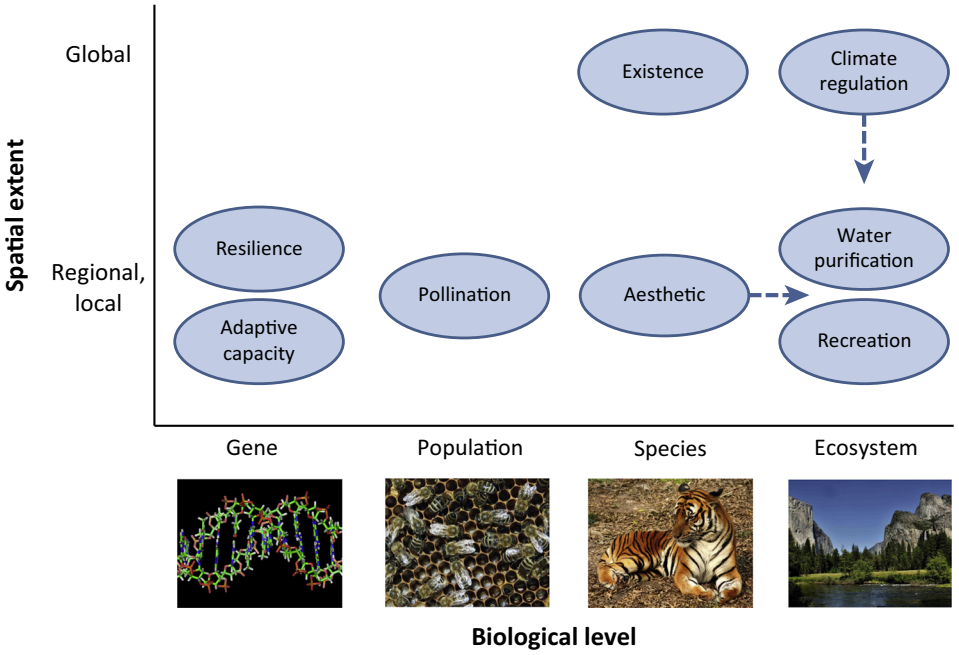

Figure 1. Example Reasons for Conserving Nature Divided along Axes Defined by the Biological Level of Organization and Spatial Extent. The reasons included are examples to illustrate how this conceptual space can help harmonize different aspects of the relationship between people and nature. For example, endangered species conservation, pertaining to the value of maintaining the existence of species threatened with extinction, makes sense only at the species level and at a global extent. By contrast, most of the ecosystem services used by humans – such as water purification and pollination – rely on genetic, population, and ecosystem levels of biological organization at regional and local extents where the benefits are gained. Some reasons span multiple levels of biological organization or spatial extents (illustrated by the arrows); for example, species and ecosystems might be judged to have aesthetic value [21], and climate regulation is a global phenomenon but local climate can be affected by the biosphere [23]. Different conservation management practices, including regulation and monetary valuation, are most appropriate for different parts of the conceptual space. For example, the local benefits of healthy ecosystems for providing clean water and recreation might be amenable to monetary valuation, whereas the protection of globally endangered species requires enforceable international regulation. Photographs (left to right) from Wikimedia Commons: Zephyris (Richard Wheeler), Waugsberg, J. Patrick Fischer, Guy Francis.

Species conservation and the beauty of nature are reasons for conservation commonly associated with intrinsic and non-use values. For instance, it can be regarded as morally right to maintain the existence of tigers in the wild, and to conserve the beauty of Yosemite Valley, regardless of human use. But accepting this should not preclude accepting arguments for conservation that are based on utilitarian value, particularly when we consider different levels of biological organization. For instance, populations of species provide vital ecosystem services such as pollination, such that loss of a population can cause loss of an ecosystem service that has utilitarian value. If the continued existence of populations of the species elsewhere means that the species itself is not threatened, or if the population lives in a human-dominated, non-wild landscape, then arguments for the intrinsic value of species and ecosystems are inadequate. Given that population declines are perhaps the most prevalent aspect of biodiversity loss [14], failure to recognize the utilitarian value of populations does a disservice to conservation.

Viewing reasons for conserving nature at different levels of biological organization thus clarifies when alternative arguments are most relevant, in particular that arguments based on intrinsic value are most commonly associated with species and ecosystem levels. This takes us some way toward melding utilitarian and intrinsic reasons for conservation, enabling both to be included within a multifaceted approach.

Spatial Extent

It is also important to consider spatial extent when weighing up alternative arguments for conservation. The existence value of a species makes sense only in a global context. A species might become locally extinct, but its presence elsewhere in the wild (or possibly in captivity) avoids permanent extinction. This is why, for instance, the IUCN Red List reports global conservation threat. Climate regulation is also a global phenomenon (although local regulatory processes operate, see Figure 1). Regulation of the global climate system within safe bounds for all will require global-scale action, which is a challenge faced by the Intergovernmental Panel on Climate Change (IPCC).

Yet by contrast, most ecosystem services are provided regionally and locally [15]. For instance, water purification is provided by ecosystems within the local catchment; the recreational value of ecosystems and the aesthetic value of species are largely experienced in a regional park or one's own back garden (with the exception of international nature tourism); and pollination is provided locally (although the food produced might be later distributed worldwide). One implication of this is that the Intergovernmental Science–Policy Platform for Biodiversity and Ecosystem Services (IPBES) is more focused on local and regional extents than is the IPCC.

Biodiversity conservation becomes especially localized when we consider the genetic level. Whenever a local planning decision is made – to build a supermarket, hospital, or farm – the destruction of habitat will contribute to loss of genetic diversity. This loss might not be for a globally threatened species, and perhaps will be for only small, non-charismatic species – earthworms, wasps, or snails – but loss of just a few individuals will have an impact on genetic diversity, however small.

The distinction between global and local diversity is especially important when we consider that, although global species diversity is in decline, the number of species in many of the world's regions has increased over recent decades and centuries. For example, Britain has gained over 1800 non-native species in recent decades, due largely to the arrival of introduced species, new mosaics of diverse habitats, climate change (diversity tends to increase with temperature), and hybridization [16,17]. This regional diversification could potentially support improved ecosystem services for local communities, even though the existence value of species continues to be eroded globally.

Regulation and Monetary Valuation

We have multiple management tools available for conserving nature, including direct regulation and laws, international targets, economic incentives, and market forces. Most controversial are approaches that put a monetary value on nature. Monetization is central to the 'nature for people' argument for conservation because many ecosystem services are commonly considered public goods – they are available to everyone for free – yet most decisions that affect the environment are made on the basis of cost–benefit analyses that consider economic arguments. If the services provided by nature for human societies are not assigned a monetary value then biodiversity is prone to be excluded from decision-making [18]. By contrast, the 'nature for itself' ideology rejects monetization because putting a monetary value on nature implies that it can be destroyed for the right price, and makes the market value of nature subject to market processes and fluctuations [7,8].

Dividing reasons for conservation along axes of biological level and spatial extent can help inform when different management practices are appropriate. For instance, the existence value of species is most amenable to protection through regulation and laws: if society deems extinction of species to be unacceptable, then actions that harm threatened species can be made illegal (consider, for example, the US Endangered Species Act). The fact that global trade in wildlife

threatens species (for instance, black rhino) is evidence that creating markets for endangered species is not an effective way to save them and that regulation (e.g., through the Convention on International Trade in Endangered Species, CITES) is necessary to avoid extinction [7].

Recognizing that existence value is most commonly associated with the species level and is defined at the global extent makes us focus on the particularly difficult problem of enacting regulations that are effective internationally. The target of the Convention on Biological Diversity to substantially reduce global biodiversity loss at the species level by 2010 (part of the '2010 Target') was missed [19], and it seems we are on course to also miss the revised target for 2020 ('Aichi Target' number 12) [1]. Turning this around will require combining expertise in biology, politics, diplomacy, and international law to devise policies that are more enforceable than targets.

Yet recognizing that regulation is the best way to address species-level extinction does not mean that the use of market forces is at odds with other reasons for conservation. For instance, the role of forests in regulating climate is an ecosystem service with global reach that might be best protected in part through market forces. REDD+ (Reducing Emissions from Deforestation and Forest Degradation) is a mechanism under the UN Framework Convention on Climate Change to financially reward developing countries for forest management that reduces emissions and enhances removal of greenhouse gases. One option for implementing REDD+ is to allow forest carbon to be traded in carbon markets through carbon credits, which put an economic cost on releasing carbon into the atmosphere. Carbon emissions trading schemes around the world were worth around US$30 billion in 2014 [20]; thus, including forest carbon within these markets has potential to greatly enhance the weight given to conserving forests in decision-making.

At regional and local extents, non-market monetary valuation holds great potential for conservation across all biological levels. For instance, in the UK estimates have been made of the monetary value of urban green spaces, calculated based on house prices at varying distance from city parks. Incorporating non-market monetary valuations in economic decision-making supports implementation of strong environmental regulation and market-based incentives for conservation, giving rise to land use decisions that increase the overall net benefit for society [18]. Thus, local decisions that take into account the utilitarian value of ecosystem services – the price per unit area – are likely to result in better conservation, including of local populations and genetic diversity.

Inclusive Conservation

By recognizing the importance of the level of biological organization and spatial extent, the debate over whether we value biodiversity for its utilitarian or intrinsic value becomes more nuanced and the potential role of different management approaches at different levels and extents becomes apparent (see Outstanding Questions). It might be wrong to put a monetary value on the existence of tigers, but that does not mean the economic value of local pollinators should not be quantified and used to justify conservation.

Ultimately, conservation is about both people and nature. This is not some sort of New Conservation – all societies throughout human history have tackled the dual goals of conserving nature because of the services provided for their benefit (for instance, hunter–gatherer societies are directly reliant on local nature) and because of intrinsic values (often manifesting as 'spiritual' or 'divine' reasons for conservation, as reflected in the world's major religions). But for the first time in human history we are faced with a human population size and consumption rate that fundamentally challenge the well-being of both people and nature at a planetary scale. To turn this around, we need to urgently, cleverly, and on a large scale apply all the arguments and management tools we have – including both intrinsic and utilitarian reasons for conservation, and

both regulation and monetary valuation – in a less divided and more inclusive approach to conservation.

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Outstanding Questions

Intrinsic Value

Terminology commonly used to describe the intrinsic value of nature is problematic. Values are constructed by humans and cannot really be defined outside of human preferences, thus use of the term 'value' is inadequate in this context. Can a better way of expressing this concept be developed and agreed upon? And if so, must equal intrinsic value be applied to all levels of biological organization or can the concept be used to help prioritize and thus be of practical use in decision-making?

Filling the Conceptual Space Presented in Figure 1

I have argued that alternative reasons for conserving nature are best suited to different spatial extents and levels of biological organization. I provide some examples of how reasons to conserve may fit within this framework (Figure 1), but these examples are intended to be illustrative and by no means exhaustive. Where do other reasons to conserve – for example, relating to pest and disease control – fit within this conceptual space? And should additional levels of biological organization (say, individual organisms) or spatial extents (such as micro or continental) also be considered?