Conservation Biology: Ethical Foundations

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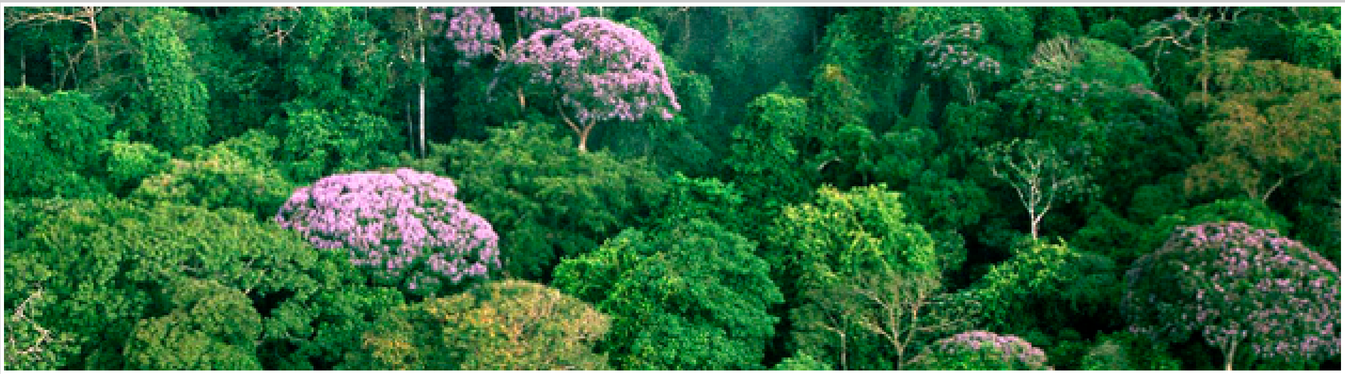
This article discusses the normative foundations of biodiversity conservation, and describes ethical issues that arise in systematic conservation planning.



In the wake of massive destruction of forests and other natural habitats, particularly in the tropics following World War II, conservation biology emerged in the 1980s as a multi-disciplinary, goal-directed enterprise dedicated to the conservation of biodiversity (Soulé 1985, Sarkar 2005). The justification of this goal (and why it should guide social policy) became a central question for the growing discipline of environmental ethics (Norton 1987). The question was important because biodiversity conservation requires the preferential allocation of limited social resources towards that end (Margules & Pressey 2000, Margules & Sarkar 2007). For instance, there are many legitimate uses of a landscape or seascape besides conservation, including human habitation, resource extraction, and recreation. A decision to use an area for conservation is a decision that these other uses are ethically less valuable than conservation in a given context. Thus, conservation biology makes the fundamental ethical supposition that biodiversity should be conserved, and this requires a philosophical justification.

Environmental ethicists have debated three types of justification. Some environmental ethicists, and many conservation biologists, have claimed that biodiversity has "intrinsic value" (Soulé 1985, Callicott 1986, Naess 1986). According to one interpretation of this claim, biodiversity is a property of systems that is intrinsically valuable and should therefore be conserved. The trouble with this interpretation is that the relevant property has never been practically specified (that is, operationalized) in a form to make it relevant to the practice of conservation biology. According to another — more plausible — interpretation, the claim is taken to mean that all biological entities (and not just human individuals), including higher taxonomic categories such as species and ecological communities, have value independent of all human interests. Consequently, all such entities are supposed to merit conservation even if it means that it will require the non-satisfaction of human interests. Such a view is typically motivated by the belief that it exhibits a suitably respectful attitude to nature that will prevent its destruction (McShane 2007).

The problem is that of showing why non-human entities, especially higher taxa, have intrinsic value. The typical move is to presume that it is non-problematic that human individuals have intrinsic value, and to suggest that there is a relevant similarity between these individuals and the other entities to which intrinsic value should be assigned. For instance, just like human beings, other biological entities are supposed to have a will to live or an interest in flourishing (Schweitzer 1976). The trouble is that these analogies at best lead to other individual organisms having intrinsic value but not to intrinsic value for composite entities such the higher taxa, which are more often the target of conservation efforts. For example, does it really make non-metaphorical sense to say that a species has a will to live? Problems such as this have led many environmental ethicists to abandon the project of basing conservation biology on intrinsic value attributions, though this near-consensus is not universal (McShane 2007).

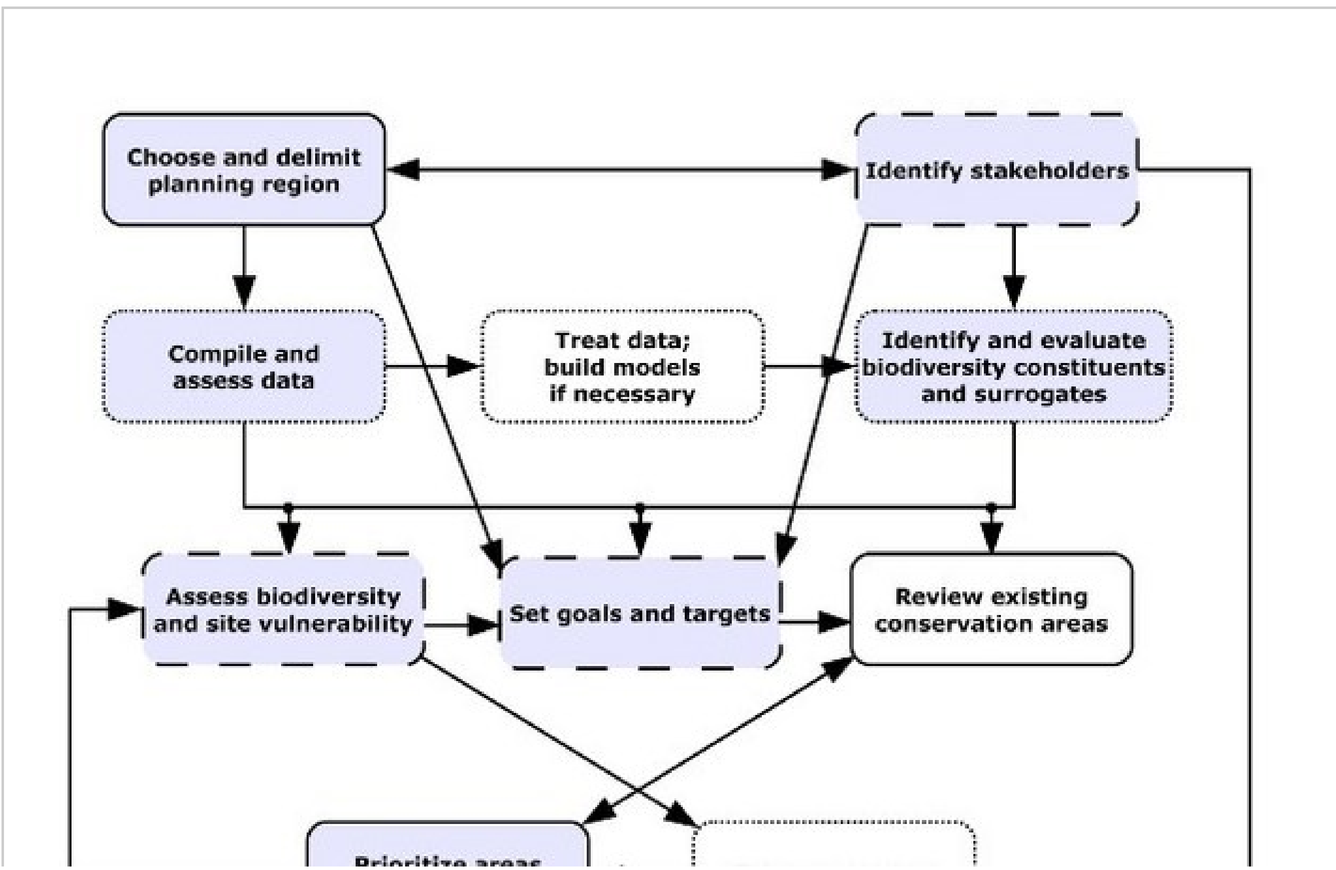
At the other end of the spectrum, some environmental ethicists and economists have argued that biodiversity should be conserved because of their demand value, that is, because of the tangible benefits to humans it provides, for instance, through the maintenance of ecosystem services (Costanza *et al.* 1997), or through the provision of useful resources such as food, building materials, medicine, or opportunities for recreation (Sarkar 2005). Thus, biodiversity should be conserved because it has a "demand value" which can (at least to some extent) be estimated through standard economic valuation techniques such as individuals' willingness to pay for conservation measures. However, this argument is probably even more difficult to sustain than the one from intrinsic value if the aim is to justify the conservation of all of biodiversity. Many features of biodiversity do have obvious demand value, for instance, rare plants such as the Madagascar periwinkle that have proved to be the source of important medicine. Nevertheless, it is hard to imagine what (positive) demand value every species of lichen — or, for that mater, of hantavirus — can have.

Figure 1: Biodiversity of Rio Frio, Costa Rica.

Both the basilisk lizard and the darter are potential components of biodiversity that can be targeted for conservation, as can any other biotic entity in the photograph.

An alternative to both these positions is one that accepts that the conservation of biodiversity is ultimately based on human interests, but conceives these interests much more broadly than those that can be traded in the marketplace (that is, those that have current demand value). These interests may incorporate spiritual and intellectual needs rather than the material needs of survival. One way this proposal has been worked out is by attributing "transformative value" to biodiversity (Norton 1987, Sarkar 2005): biodiversity should be conserved because it has the potential to transform our demand values. According to this position, biodiversity conservation reflects some of the most profound and deepest aspirations of humanity as it makes choices for the future of the planet and future opportunities available for human life on it. This position also has problems. For one thing, not all transformations of demand values may be desirable; for instance, not all transformative drug experiences are positive. This is known as the "directionality" problem (Sarkar 2005). Moreover, in some situations, even trivial objects can have transformative value. For instance, a mystic may potentially be transformed by a blade of grass. This is known as the "boundary" problem (Sarkar 2005).

Arguments such as those from demand value and transformative value endorse "anthropocentrism," that is, the position that affirms that all values are ultimately dependent on human interests: the contrast here is with versions of biocentrism and ecocentrism, which endorse broader bases, including non-human interests, for value attributions. Anthropocentrism is assumed by one of the central disciplines within conservation biology, namely, systematic conservation planning (SCP) for the prioritization of areas to be put under conservation management (Margules & Pressey 2000, Cowling & Pressey 2003, Margules & Sarkar 2007). Depending on the mode of management, such areas can be traditional parks and reserves, or areas in which humans continue to reside but manage the biological community for its continued persistence. Thus, the prioritized areas form "conservation area networks" and SCP consists of a stage-wise process for the selection of such networks and devising an appropriate management plan (see Figure 2). The general goals of SCP are the adequate representation of biodiversity, ensuring its indefinite persistence into the future, and to achieve these goals while minimizing social costs (including economic costs). The most significant innovation of SCP is the routine development and use of computer-based decision support tools for planning purposes (Sarkar *et al.* 2006).



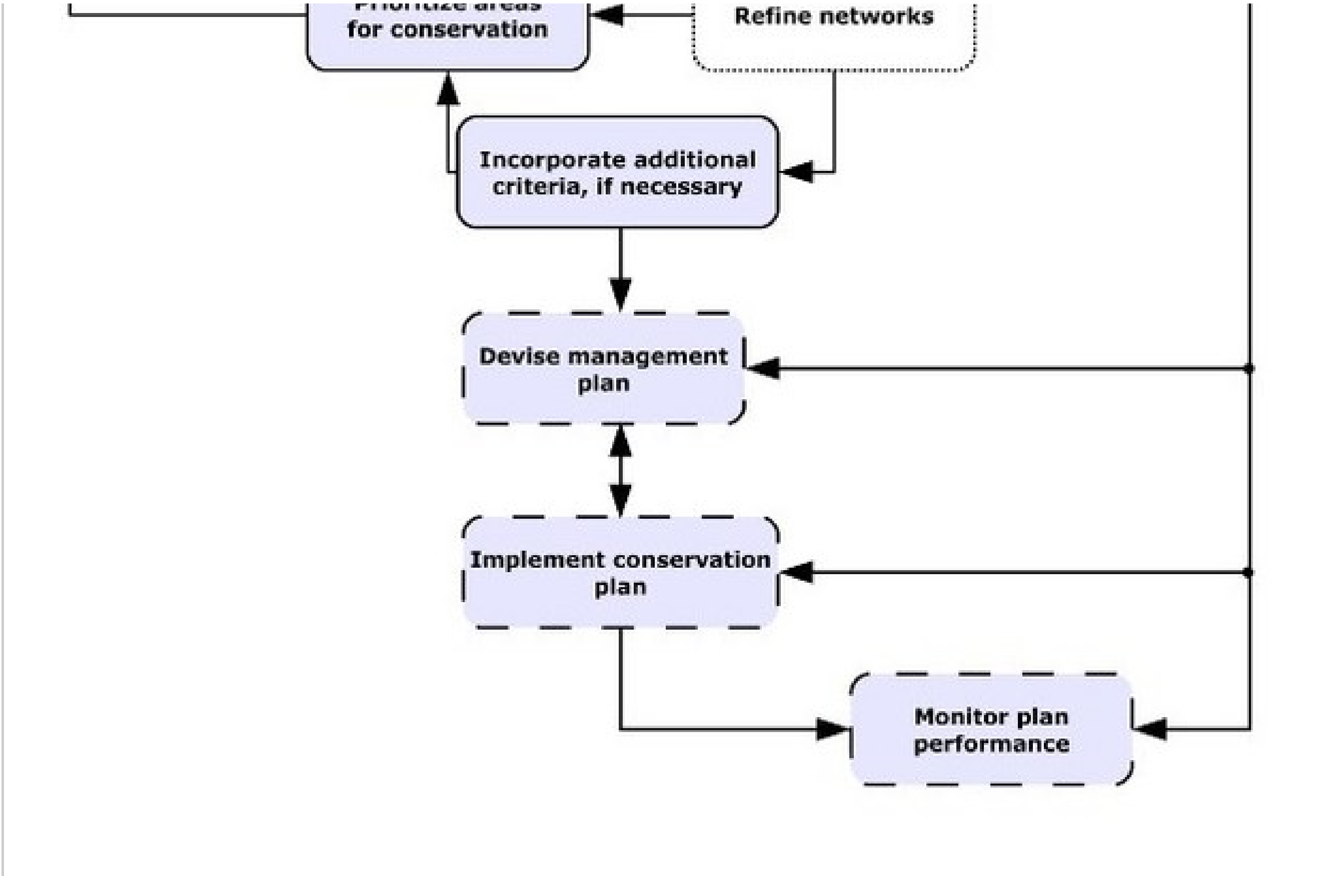


Figure 2: Stages of systematic conservation planning (SCP).

Figure 2 Legend: Arrows indicate which stages directly influence others. A bidirectional arrow indicates interaction between stages. Only major influences are shown as there is potential for feedback between almost any two stages. Boxes with solid borders indicate that a stage is relatively well understood; dotted borders indicate those that are fairly well understood; and dashed borders indicate the least understood stages. Blue shading indicates stages that raise significant ethical issues.

Choose and delimit planning region: Precise geographical boundaries of the planning region should be explicitly discussed and chosen-how boundaries should be drawn (e.g., whether they are based on political or ecological criteria) may raise ethical issues.

Identify stakeholders: Stakeholders include those who significantly affect or are affected by conservation plans-they have a legitimate stake in what happens (see the text). Determining legitimacy poses many ethical challenges, as discussed in the text. There could be feedback between this stage and almost any other stage.

Compile and assess data: Relevant biological, ecological, and sociopolitical data must be collected in a cost-effective manner. Collection of sociopolitical data can raise ethical issues about the treatment of human subjects.

Treat data; build models if necessary: Data treatment through statistical analysis is often required. Modeling is needed when treatment is insufficient to produce spatial data on relevant biological and sociopolitical factors.

Identify and evaluate biodiversity constituents and surrogates: As discussed in the text, stakeholders identify biodiversity constituents, which requires discussion of normative commitments as discussed in the text. Surrogates consist of quantitative estimators of biodiversity constituents.

Set goals and targets: Quantitative targets for biodiversity representation must be set; other goals include spatial configuration of the conservation areas to enhance likelihood of persistence.

Review existing conservation areas: Any existing conservation area network must be analyzed to determine the extent to which it already satisfies the specified goals and targets.

Prioritize areas for conservation: New areas must be prioritized to meet the goals and targets that were set earlier. The objective is to achieve adequate representation of all biodiversity features while satisfying other desired goals.

Assess biodiversity and site vulnerability: Prioritized areas and relevant biodiversity features must be assessed for vulnerability due to all factors. As discussed in the text, the amount of risk deemed acceptable is a social choice.

Refine networks: If areas are vulnerable, they may be excluded from nominal conservation area networks, and the selection process may be reiterated.

Incorporate additional criteria, if necessary: Additional criteria (biological, economic, cultural, etc.) may need to be incorporated using multi-criteria analysis to evaluate trade-offs between them.

Devise management plan: Management plans must be developed taking into account local context, resource availability, etc. Ethical issues that must be tackled include the satisfaction of all human interests.

Implement conservation plan: The management plan must be implemented for conservation to work. Consultation with local stakeholders is imperative for both ethical and practical reasons.

Monitor plan performance: Plan performance must be monitored to devise responses as necessary for adaptive management into the future.

SCP simply assumes that biodiversity conservation has the required ethical justification. Nevertheless, most stages of systematic conservation planning raise interesting — and sometimes difficult — practical ethical issues. These have lately become an important focus of environmental ethics, and also of the new discipline of ecological ethics (Minteer & Collins 2008). Eleven of the stages of SCP are particularly important in this regard (see Figure 2), of which the following four are most important:

1. The SCP process begins with the identification of stakeholders who have to decide what to conserve and which areas to prioritize for conservation. Yet, who is a legitimate stakeholder? Consider conflicts between local residents and trans-national non-governmental organizations (NGOs) such as the WorldWide Fund for Nature/ World Wildlife Fund (WWF), or Conservational International (CI), which have often (unintentionally) promoted the displacement of people to set up protected areas (Dowie 2009). Why are these NGOs legitimate stakeholders, especially when compared to local groups that have been residing and caring for a place for generations? Worse, consider the disputes between Shell Oil and local residents in the Niger Delta (Okonta & Douglas 2003). Do economic resources and political power make Shell a legitimate stakeholder? The question of stakeholder legitimacy is yet to be adequately addressed in discussions of ethics in conservation biology.
2. An important feature that distinguishes conservation biology from earlier practices of wildlife protection was that it aims to protect all of biodiversity rather than some subset such as large mammals, birds, or other charismatic species. The trouble is that biodiversity has never been adequately defined (Takacs 1996, Sarkar 2002, 2009, Norton 2003). Typically, conservation biologists have regarded it as diversity at all level of taxonomic, structural, and functional organization of biological entities. The problem with such a definition is that it is far too inclusive: biodiversity becomes the entire biological world (Takacs 1996, Sarkar 2002). If biodiversity is conceived in this way, conservation becomes a hopeless task: it would require the cessation of all human activity. Consequently, conservation biologists must choose biodiversity "constituents" (sometimes called "true surrogates" [Sarkar 2002]), which are the features that merit direct conservation. This choice is not biological; rather, it reflects what a community regards as the most important features of the biological world (Sarkar 2008). For instance, in the United States, the focus is on at-risk species because much of conservation planning is based on the legal requirements of the 1973 Endangered Species Act, which remains perhaps the most powerful piece of conservation legislation in the world. In contrast, in the European Union, the focus is on representative habitat (or ecological community) types. NGOs often reflect these differences, with Conservation International endorsing the former choice, and The Nature Conservancy the latter. These choices, based on values, are ultimately ethical or aesthetic, not scientific.
3. When potential conservation area networks are selected, SCP typically requires the incorporation of multiple criteria including biological criteria (such as the adequate representation of all biological constituents, and appropriate spatial configuration of networks to ensure persistence of biodiversity) and socio-political criteria (such as socio-economic costs and social goals [including aesthetic ones such as wildernesses or scenic areas]). For example, a conservation plan for Papua New Guinea proposed by Faith and colleagues in 2001 (Faith *et al*. 2001) incorporated economic opportunity costs using indices of timber volume and agricultural potential. The inclusion of such costs as criteria reflects normative judgments about desirable land use. Formulating these criteria requires systematic analysis of normative goals and their ethical basis, for instance, through the

elicitation and elaboration of a hierarchy of objectives reflecting all relevant values (Keeney 1992). Moreover, methods to integrate multiple criteria draw on economic and other theories that make a wide variety of ethical presuppositions, many of which have not been adequately addressed (Nussbaum 1997). At the most general level, they assume that what should be preferred is adequately captured by the maximization of a utility function which incorporates all values.

4. In vulnerability assessment, SCP must determine what level of risk is acceptable for the adequate conservation of a species. For instance, is a probability of extinction of a species of less than 0.01 over 10 000 years (a common stringent criterion) an adequate standard? Or should some other numbers be used as benchmarks? Not only SCP, but other fields within conservation biology such as population viability analysis (Boyce 1992) must make these choices. However, these are not scientific choices; rather, they reflect social values about what constitutes acceptable risk, in the same way as choices about the permissible level of pollution in air and water. Like other value judgments, their debate and justification are ultimately a matter of ethics.

Thus, conservation biology embodies ethical choices in two ways. At the fundamental level it presumes that biodiversity should be conserved. This claim requires justification and the major strategies that environmental ethicists have used were briefly discussed above. At the practical level, developing conservation policies (for instance, through systematic conservation planning but also using other protocols) requires significant ethical choices, from deciding which parts of the biological world are worth conserving, to deciding the kind and amounts of costs that are acceptable, to deciding who should be involved in making such decisions in the first place.

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