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Effective Conservation

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Effective altruism is a growing humanitarian movement with a track record of success in evaluating the effectiveness of charitable spending across a wide range of projects. We suggest ways in which the foundations of this movement can be applied to the complex world of conservation.

The Problem of Prioritization

We face a global biodiversity crisis. In this climate of pressing problems and scarce resources, how can conservationists decide what to prioritize? The triage challenge, determining one course of action at the expense of another, is not unique to conservation. Those involved in human aid similarly rely on scarce resources to solve serious and imminent problems concerning human life, health, and welfare. A recent approach to this problem employs a rational framework of guiding principles to help maximize the amount of lives saved per dollar spent. Effective altruism aims to dispassionately reduce suffering and preserve and extend life based on quantitative evidence of the effectiveness of charitable actions [1].

Effective promotion of altruistic values is captured in assessments of **quality-adjusted life-years (QALYs)** (see Glossary) per dollar spent on a charitable cause. Using this logic, proponents argue, for example, that the costs of deworming sub-Saharan children pay disproportionate dividends throughout their lives and are a superior investment [1].

Effective Altruism in Conservation

Recently, Freeling and Connell [2] identified effective altruism as a movement with relevance to biological conservation. In particular, they suggest that financial support can be garnered in cases where altruistic values like welfare coincide with conservation interests. For example, a reduction in fishing pressure not only prevents loss of fish lives and suffering, but reduces biodiversity loss.

We agree that this framework is fruitful for conservation scientists, although not only as a prospective source of financial support. We suggest that the principles underlying the effective altruism approach can be applied to help maximize effectiveness in conservation practice (see Figure I in Box 1). Where Freeling and Connell's application to conservation is constrained by the retention of welfare as a fundamental priority, we propose that conservationists use principles of effectiveness assessment to help maximize values important and unique to their field.

Comparing Causes

While the need to develop more evidence-based conservation is currently recognized [3], the emphasis is usually on the success of a prespecified conservation action and/or target [4]. Goals and objectives are set within the framework of a particular project, often defined by a geographical region or target species [5]. In a given project, there are usually multiple actions one could take that will differentially influence the target, such as protection, active management, legislative change, and education [5,6]. Useful tools have been developed to evaluate the degree of threat and the potential effectiveness of individual actions [5,7] and there has been some work toward evaluating the impacts of multiple actions for a common target [8]. However, conservation currently lacks tools that permit comparisons between different types of actions spanning vastly different projects and contexts.

Effective altruists are able to evaluate multiple disparate causes simultaneously. For example, the impact of funding eye surgery versus distributing bed nets versus educating young women can all be compared by evaluating the increase in QALYs that these actions bring about per dollar spent. Such comparisons can help organizations allocate resources and individuals decide where to donate and invest. Comparisons between conservation projects can be similarly valuable. They can help organizations decide where to allocate resources, researchers to decide which projects to pursue and develop, and individuals to decide which career path will have the greatest impact and where to donate their time and money.

Therefore, we propose that effectiveness evaluations that compare multiple actions across multiple diverse projects are an essential tool to determine the best way to allocate scarce resources in conservation.

To do this, stakeholders must: first, identify the value(s) they wish to conserve; second, develop quantifiable metric(s) for each value; and third, evaluate multiple actions for their ability to maximize or maximally conserve each measure

Glossary

Neglectedness: is this problem already being addressed or is it likely to be addressed by others? For instance, projects relating to less charismatic organisms are less likely to be funded by other agencies and hence supporting them might have a disproportionately large influence.
Quality-adjusted life-year (QALY): a quantitative measure of both the quality and the quantity of human lives; 1 QALY represents 1 year of life in perfect health.
Scale: what is the magnitude of the problem and the potential impact of success? For instance, changes to deforestation legislation would have a large impact, affecting many ecosystems and organisms. This argues that supporting legislation change might be an effective conservation action.
Tractability: how likely is it that a problem can be successfully addressed? For instance, if the whole world stopped eating seafood overnight, fish stocks would recover, creating an impact on an enormous scale. However, the total cessation of global seafood consumption is intractable and so attempts at this would be ineffective.

Box 1. Example of an Effectiveness Evaluation Based on Effective Altruism Principles

Imagine an organization involved in the conservation of endangered butterflies. They have resources to conserve just one of three rainforest habitats. Habitat A contains the greatest number of individuals, across four *Heliconius* species. Habitat B contains six species of *Pieridae*. Habitat C contains four species across two genera (*Heliconius* and *Pieridae*), representing the most phylogenetic variation (Figure I). If one values species richness, Habitat B should be conserved. If one values phylogenetic diversity, Habitat C should be selected. If conserving the greatest number of butterfly lives is of interest, one should conserve Habitat A, containing the greatest total number of individuals.

This evaluation takes into account only one of the three guiding principles of effective altruism: scale. Tractability and neglectedness must also be considered. If Habitat A is a site of interest for mining companies (likely to receive preferential government access over conservation groups), saving this habitat may not be possible. Habitat B may already be receiving a lot of conservation attention due to the presence of the southern cassowary (*Casuarius casuarius*), another endangered animal. This habitat is likely to be conserved or protected by another organization, making a more neglected conservation action the conservation of Habitat C.

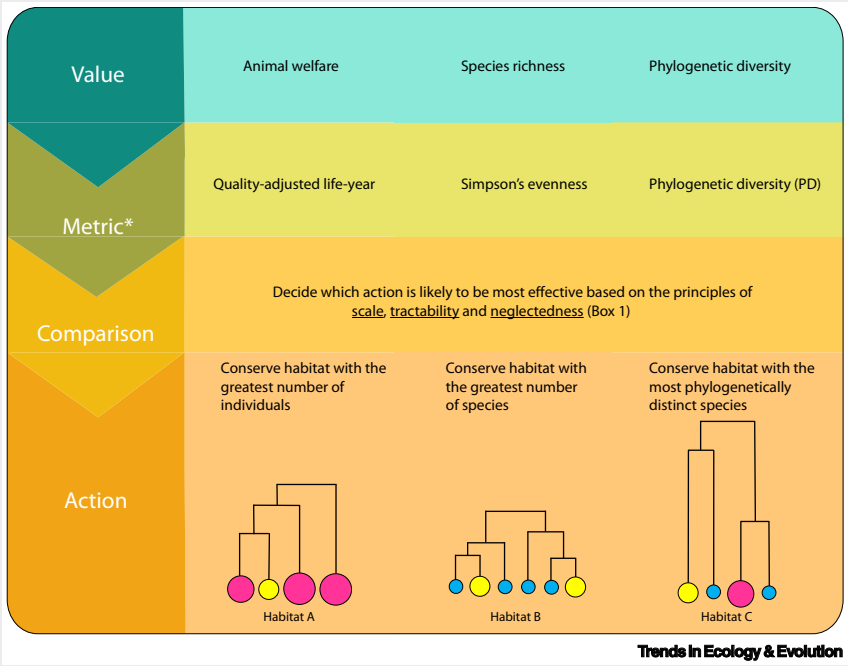

Figure I. Pathways to Effective Conservation. Different values translated into different metrics lead to different conservation actions. For example, when given a choice between habitats to conserve, those who value animal welfare should choose the one with the greatest total number of individuals (Habitat A) whereas those who value species richness should choose a habitat with the greatest number of species (Habitat B), compared with those valuing phylogenetic diversity (Habitat C). Colored nodes on phylogenetic trees indicate population size: pink, large; yellow, medium; blue, small.

(see Figure I in Box 1). Each step involves complex, nuanced decisions, which we address in turn.

A Plethora of Priorities

Developing effectiveness metrics to compare diverse projects may stimulate heated discussions because priorities in conservation often vary among stakeholders. While altruistic values, such as animal welfare, are a high priority for some [9], many conservationists have additional concerns; for example, the utility of species and ecosystems to human interests. Plants and fungi are an important resource for food, materials, and medicine. Ecosystem diversity is associated with greater human wellbeing and may help to mitigate health conditions [10]. Some stakeholders, such as foresters and fishers, may harvest the resources that other stakeholders, such as bird watchers and snorkelers, value, creating opportunity costs to consumptive uses.

Others argue that biodiversity is intrinsically valuable [11] and some have defended the conservation of particular species, ecosystems, and natural resources on aesthetic grounds [12]. Many also value endemic species, which may reflect a combination of aesthetic and instrumental motivations – including a consideration of their impact on the wider ecosystem. However, even those in agreement about the intrinsic value of biodiversity may disagree with how it should be conceptualized. Biodiversity can be characterized at multiple levels (genetic, behavioral, phylogenetic, community, phenotypic, and functional), which do not always covary [13].

Unlike in human aid, where general agreement can be reached about the importance of human health and wellbeing, conservationists face a prioritization problem amid a plethora of conflicting values and interests. Different conservation values will result in different assessments of the most effective conservation action (Box 1).

We do not suggest here which is the correct approach. Rather, we wish to highlight the complexity of the situation, which may implicitly underlie many existing conflicts about what to conserve. By making the values to be prioritized explicit and quantifiable, stakeholders are taking the first step to effectively maximize their impact on what they care about the most. By doing so, it is possible that new management actions are developed that better address multiple stakeholder's desires and needs.

Finding the Right Metric

Once values have been identified, they must be translated into measurable and quantifiable objectives. There are often multiple ways to characterize and measure values. For instance, animal welfare could

be evaluated by additively including each individual animal with a nervous system for consideration of QALY maximization. For some, this metric might be too simplistic, because each animal, from elephant to fly, is considered equally. A refinement could be to apply weightings to different kinds of animals based on their cognitive complexity or on their known capabilities for sentient experiences [14].

Complications also arise when measuring various characterizations of biodiversity, of which there are multiple metrics. For example, phylogenetic diversity can be estimated using multiple measures that differ in the degree to which they prioritize and characterize uniqueness [15]. Matters may be complicated by other factors valued in conservation, such as endemism, or the endangerment status of species and groups. Some work has begun on the explicit translation of values such as ecosystem services into quantifiable metrics [16].

While this may make the metrics related to conservation values more complex than those in human aid, complexity does not preclude their metrification. We believe that the process of identifying values in all of their complexity, sometimes requiring deep philosophical investigation, and translating these into metrics, will help stakeholders better appreciate and understand the things that they care about and wish to conserve, and may lead to better conservation outcomes.

Effectiveness Evaluation

Much has been written about effectiveness evaluation for conservation actions. Tools and frameworks are being employed to clarify types of threats, targets, and actions [5,7] and to better evaluate the causal links between action and outcome [8,17]. There has been an increased call for the use of scientific methodology to assess the effectiveness of conservation actions [18], with a few studies employing randomized controlled trials to test specific interventions [9,10].

An effective altruism perspective that focuses on conservation values changes the focus and broadens the scope of comparison. Once an established metric representative of a conservation value has been identified, evaluations of potential conservation actions can be made based on three guiding principles: **scale**, **tractability**, and **neglectedness**.

Effective Conservation Biology: A Way Forward

We suggest that elements of the effective altruism framework can be used by conservation scientists with interests beyond welfare preservation.

First, we recognize the complexity of applying the effectiveness framework to a field with a diverse range of potentially conflicting values. However, explicit definition of these values is a valuable first step in maximizing the effectiveness of conservation actions. Second, we suggest that identifying quantifiable metrics representing the values of interest is paramount for effective conservation, as this allows comparisons of different kinds of conservation actions that have previously been evaluated separately. Third, we suggest that conservationists apply the principles of scale, tractability, and neglectedness to help determine actions with the greatest potential for effectiveness.

An effective conservation approach not only identifies practical avenues for different interest groups, but illuminates the diverse and often conflicting priorities in conservation. However, by specifically focusing on underlying values and their quantification, we can develop ways to compare vastly different actions and, by doing so, better focus conservation efforts.

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