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Executive Summary

Protecting Biodiversity: A Guide to Criteria Used by Global Conservation Organizations

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Executive Summary

The worldwide decline of forest habitat, and related loss of biodiversity, is one of the most urgent environmental issues of our time. Human activities – such as clearing forests for agriculture and settlement, unsound forest management, and unsustainable hunting – are becoming even more threatening as human populations increase and place more and more demands on forest ecosystems. Habitat decline contributes more than any other factor to the current extinctioin rate, which exceeds the "background" natural rate by 100-1,00 times (Baillie et al. 2004). Beyond perpetuating high extinction rates, the loss and fragmentation of forested ecosystems impairs critical ecosystem services, such as purifying the air and water, stabilizing the soil, providing renewable timber and non-timber forest products, and providing homes for human communities.

In response to high worldwide deforestation rates and dramatic species decline, conservationists have been joined by a broad array of stakeholders in stressing the importance of protecting habitats, including forests, to maintain biological diversity, preserve ecological functions, and ensure sustainable forest management. The forest products industry in particular has taken a growing interest in integrating ecological factors into management decisions, and placing increasing emphasis on scientifically-based and ecologically-sensitive forest management.

Meanwhile, there is growing emphasis on the importance of *conservation planning* – which identifies areas of highest priority and directs limited conservation resources in a strategic manner – to help address spreading urbanization and other challenges to biological diversity. Articulated via an assortment of approaches, conservation planning has evolved over the past few decades from focusing mainly on species to encompassing broader aspects of biodiversity. A number of systemized conservation planning approaches have emerged, each with unique methodologies and priorities.

With so many different conservation planning approaches being promoted by ENGOs (Environmental Non-Governmental Organizations), it is sometimes difficult for landowners and other stakeholders to grasp a clear and concise message on how to make land management decisions while incorporating environmental concerns. Someone not closely involved in the process may be left wondering what core principles inspire these different approaches and whether they can work in tandem or are inherently incompatible.

The purpose of this study is to clarify how eight conservation planning approaches, promoted by five prominent scientifically-based conservation ENGOs, guide decisions about which areas to prioritize for conservation. Our focus is primarily on approaches that are global in scale — those that apply certain criteria to the global landscape and often prioritize relatively large areas for conservation.

We sought to obtain and organize this information, not to critique the scientific validity, usefulness, and thoroughness of each approach, nor to endorse a particular methodology. We hope this analysis will be a useful first step in enabling industry, policy makers, ENGOs, professionals, scientists, and other to work together with greater understanding.

We compared and contrasted approaches with specific reference to organizational or partnership missions, planning principles, conservation targets, scientific criteria, and thresholds. Detailed profiles of each global approach are included in the body of the report. In addition, cursory review is given to approaches that work at a regional or landscape level, and two regional approaches employed by The Nature Conservancy and Ducks Unlimited - Canada are profiled in detail in the Appendices.

Five main criteria were used to determine which conservation approaches to include:

(1) **Approach relies primarily on scientifically-based criteria.** For example, we did not include organizations or partnerships that based global priorities on political relevance, local opportunity, or other factors.

(2) **Approach sets conservation priorities.** We focused on approaches that utilize criteria to set global priorities, rather than collecting data or implementing conservation on-the-ground at local levels (although some organizations or partnerships included here do engage in these activities during other phases.

(3) **Approach applies at a global scale and identifies "where" to conserve.** We emphasized approaches that apply criteria to most of or the entire world in setting conservation priorities. Such approaches typically identify "where" to conserve b selecting large areas for protection, whereas approaches that work at a regional, landscape, or local level often address "how" to conserve. Although global approaches are our main focus, we did give some attention to approaches that work at regional or landscape levels (e.g., within ecoregions or hotspots) as this ties into implementation of global priorities.

(4) **Approach emphasizes a variety of taxa**, i.e., approach does not focus on the conservation of just one type of organism. We made an exception for BirdLife International because, although they ostensibly focus on birds, birds are used as an indicator for broader biodiversity.

(5) Organizational or partnership representatives were willing to participate and share details about their conservation priority setting processes at the level needed for this project.

Table E-1 includes the final list of organizations and respective approaches selected. Some of the organizations utilize additional approaches that are not discussed in this study.

TABLE E-1: Organizations and Approaches included in the Study

ORGANIZATIONAL OR PARTNERSHIP	APPROACHES STUDIED
Alliance for Zero Extinction (AZE)	• AZE Sites (epicenters of imminent extinction)
BirdLife International	• Endemic Bird Areas • Important Bird Areas
Conservation International (CI)	• Biodiversity Hotspots • High Biodiversity Wilderness Areas
Wildlife Conservation Society (WCS)	• Range-wide Priority Setting • Last of the Wild
World Wildlife Fund (WWF)	• Global 200

*** In addition to the eight global approaches indicated above, cursory review is given to six regional approaches utilized by the African Wildlife Foundation, Conservation International, Ducks Unlimited-Canada, The Nature Conservancy (TNC), the World Wildlife Fund, and the Wildlife Conservation Society.**

We relied on a literature search, Internet research, and material review of each approach's criteria and system structure to develop a framework in which to analyze and present information. We then conducted phone or in-person interviews or e-mail exchanges with at least one representative from each ENGO to obtain the necessary level of detail, clarify information in written materials, and provide the opportunity for the ENGOs to present their methodologies in the context of their conservation objectives. Finally, we had individuals from each organization or partnership review their profiles for accuracy.

COMPARING AND CONTRASTING APPROACHES

APPROACH FUNDAMENTALS

Organizational Missions

The approaches in this analysis have very similar missions – to conserve broadly the world's biodiversity. Some organizations or partnerships focus their efforts primarily on preventing imminent species extinction (e.g., Alliance for Zero Extinction), others on conserving biodiversity more broadly (e.g., Conservation International and World Wildlife Fund), and still others on protecting wildlife and wild places (e.g., WCS's Last of the Wild). Most approaches also include discussion of the human relationship with nature in their mission statement, sometimes with explicit reference to the goal of providing sustainable use of natural resources.

Approach Objectives

The primary or immediate objective of most of the conservation planning approaches is to set internal priorities for conservation action. However, a secondary objective is to educate others about a particular methodology and guide general conservation action and attention toward particular areas.

Conservation Planning Principles

The eight conservation planning principles identified on an *a priori* basis and listed by frequency of use by the eight conservation approaches are: intrinsic value of nature/wildlife (8); functionality (6); efficiency (6); international recognition and cooperation (4); representation (3); sustainable development (2); engaging local stakeholders (1); and utilitarian or sustainable use of wildlife (0).

Issues of Scale

We considered three main aspects in order to understand the spatial and geographical characteristics of any biodiversity conservation approach. We refer to *scale* as the level at which scientific priority-setting decisions are made, including three broad categories: global, regional, and local. *Global scale* approaches are those that apply a set of scientific criteria to most or the entire world, often prioritizing relatively large areas (i.e., ecoregions, hotspots, intact forest landscapes) for conservation. All eight approaches emphasized in the main body of the report are global in scale. The term *extent* refers to the entire geographic area brought under consideration by a given approach, (e.g., the terrestrial earth, or certain regions, e.g. Latin America) (Redford et al. 2003). Approaches varied with respect to their extent, particularly in their inclusion of aquatic and marine ecosystems. Finally, the *planning unit* (called "grain") by Redford *op. cit.*), refers to the main unit in which planning will take place (e.g. ecoregion, hotspot, Endemic Bird Area). The term is synonymous with "planning region" which is also sometimes used to describe units within which conservation planning occurs. Planning units vary in size from smaller local sites identified by the

Alliance for Zero Extinction and Birdlife International's Important Bird Areas, to larger areas such as World Wildlife Fund's Ecoregions and Conservation International's Biodiversity Hotspots and High-Biodiversity Wilderness Areas.

Data Sources

ENGOs use a wide variety of data to inform their conservation planning activities. Much of their work incorporates national and local place-based knowledge development including species lists, vegetation maps, range atlases, field studies, and expert knowledge. Species status data come largely from the IUCN Red List of Threatened Species, the Centers of Plant Diversity data (WWF and IUCN (1994-1997)), and regional data sets such as NatureServe. GIS mapping is heavily relied upon as both an analytical planning tool and a communication strategy. All approaches rely heavily on expert opinion to refine vegetation and habitat mapping, to identify threats, to review data and data compilation, and in some cases, to evaluate species status.

TARGETS

We use the term *target* to refer to the actual "entity of biodiversity, ecosystem dynamic, landscape feature, and/or human relationship with nature that the approach seeks to conserve" (TNC et al. 2003). The ultimate target of many global approaches is biodiversity conservation in general or endangered species protection. At a global level this is manifested in immediate targets that are generally large spatial areas, such as entire ecoregions (WWF's Global 200 Approach), Biodiversity Hotspots (CI), or Endemic Bird Areas (BirdLife International). When these global approaches are *implemented* at a regional or local level, targets switch to include species, populations of species, or particular elements of biodiversity. Common species targets are those that have been listed as threatened (e.g., endangered, critically endangered) by one of a few key authorities in designating these species (e.g., IUCN Red List and NatureServe). Beyond threatened species, a variety of other *focal species* are identified by conservation approaches, including indicator species, umbrella species, keystone species, and wide-ranging species. There is a tendency to set targets at multiple levels in order to capture the various levels of biodiversity.

CRITERIA

We identified a total of thirteen criteria. Six relate to the biological value of the target being considered (e.g., the number of endemic species in a particular area, or the natural rarity of a particular ecosystem) and seven refer to the conservation value (e.g., the level of protection associated with an area, or the degree of fragmentation). Approaches often rely on a combination of several criteria in setting priorities. Endemism emerged as the most-often cited scientific criterion among approaches. By definition, endemic species are found nowhere else on the planet; therefore, by focusing attention on these areas, conservationists are ensuring that their resources are directed to the most central/urgent location. Intactness – or the existence of large

areas of land undisturbed by human influence or fragmentation – was the second most prevalent criterion. The presence of a particular species or taxon and a focus on threatened species in particular is less common among these approaches, but their importance becomes more apparent in regional and local approaches.

MONITORING AND ADAPTIVE MANAGEMENT

Most of the approaches incorporate some sort of effectiveness monitoring into their processes. We found that developing an approach was often an iterative exercise in which initial criteria and thresholds were first drafted and then provided to local experts and practitioners for further refinement. Beyond initial methodologies, BirdLife has a systematic method of monitoring that uses a two-tier system to obtain both breadth (coverage of the entire IBA network) and depth (more intensive effort at a sample of sites).

REGIONAL APPROACHES

The report provides a very brief overview of six approaches that prioritize and implement conservation planning at either the regional or landscape scale. Generally, we consider approaches *regional* if they prioritize and plan within relatively large sub-continental areas such as ecoregions, hotspots, or heartlands (e.g., WWF's Ecoregion-Based Conservation). In contrast, *landscape-level* approaches work at an even smaller scale often incorporating a network of local sites. The six approaches summarized include: Africa Wildlife Foundation's African Heartlands program; Conservation International's Conservation Corridors and a collaborative initiative called Key Biodiversity Areas; Ducks Unlimited - Canada's Boreal Forest; TNC's Ecoregional Conservation Planning; World Wildlife Fund's Ecoregion-Based Conservation; and Wildlife Conservation Society's Living Landscapes Program. These sub-global approaches consider a variety of economic, social, and political factors in addition to scientific criteria.

LOCAL IMPLEMENTATION

Once global and regional priorities have been established, many conservation organizations and partnerships work with in-country experts and local partners to implement priorities at the *site* or *local* level. This step involves a broad range of activities, from direct acquisition and lobbying for protected areas to encouraging sustainable development, abating hunting, and promoting ecotourism operations. Options vary considerably among locales, and there is generally not a systemized approach even within organizations. Although social, economic, and political factors often dictate what conservation looks like on the ground, ENGOs use scientific theories or methodologies to implement conservation at the site level. We discuss very briefly some conservation biology principles relevant to this local level, including biosphere reserves, the use of corridors, patch dynamics, GAP analysis, minimum viable population, and reserve networks. It is difficult to quantify to what

extent these theories are incorporated as they are implemented on-the-ground in various local contexts. In addition, these concepts may not be stated explicitly; rather, they are part of the background knowledge guiding implementation.

KEY FINDINGS

All the approaches share many fundamental elements, such as data collection methods, planning principles, and objectives, as well as significant overlap on more specific measures, including methodology, criteria, and thresholds used in setting conservation priorities. A few apparent trends are:

- **Efficiency and functionality among top priorities.**
  Of the eight planning principles identified, the most common principle is recognition of the intrinsic value of nature or wildlife, which is either explicitly stated or directly implied in all eight approaches studied. Beyond that fundamental principle, *functionality* (the importance of retaining functionality of conservation targets and the ecosystems that support them, not just their structure or number) and the *efficiency* of resource expenditure were both emphasized in 75% of the approaches examined (six of eight).
- **Importance of expert opinion.**
  All approaches rely heavily on expert opinion, which includes field experts, scientists, and local knowledge. It is obvious that much needed information, particularly about species, local conditions, habitat requirements, and ecosystems is not available in the published data. All approaches use some sort of expert input and review of their priority setting.
- **Emphasis on supra-organismal units.**
  Most conservation planning schemes were based on supra-organismal planning units that incorporate the boundaries of ecoregions or specific populations rather than the entire range of a particular species. WCS's Range-wide Priority Setting stands alone as the single approach entirely based on an organismal planning unit: the range of a wide-ranging species.
- **A focus on habitat.**
  Although biodiversity is the ultimate target for most approaches, the more immediate or concrete targets are either geographic areas or particular species (no approach sets targets at the genetic level). Almost all approaches include some sort of geographic unit as an immediate target for conservation. At the regional and local level, species are often the target, and the most common species targets are those that have been listed as threatened by one of the few key authorities. *Focal species*, including indicator species, umbrella species, keystone species, and wide-ranging species, are often identified as targets. All approaches assume that

implementation of biodiversity conservation at the global level is best accomplished by protecting habitat (and often entire ecosystems), even for those that ultimately target species for conservation.

- **Endemism as a top scientific criterion.**
  Among the thirteen scientific criteria we identified – six of which related to biological value (e.g., natural rarity, species richness) and seven of which related to conservation value (e.g., habitat loss, high future threat) – endemism stood out as the most frequently cited, used in all except WCS's approaches.

- **Emphasis on both threatened/degraded landscapes and intact/low-threatened areas.**
  Approaches are relatively varied with respect to the level of threat and intactness emphasized. Often applied in tandem with other criteria (such as requiring high levels of biodiversity), approaches tend to prioritize areas that are either highly degraded and/or threatened (e.g., CI's hotspots, which are highly threatened and characterized by a high level of endemism), or intact with minimal pressure from human population (e.g., WCS's Last of the Wild; and CI's High Biodiversity Wilderness Areas). Areas with moderate degradation and threat are not prioritized.

- **Emphasis on vulnerable and irreplaceable targets.**
  A second key combination of criteria is targets that are both highly vulnerable and irreplaceable. Vulnerability could encompass criteria such as low future protection or high past decline; irreplaceability could refer to endemic species, or threatened species. Conservation targets that rank highly both in vulnerability and irreplaceability are the areas most likely to be lost and with the fewest replacements. Conservation International's Biodiversity Hotspots are a key example of this combination of criteria, as they are areas with high levels of endemic species (irreplaceable) and high past decline (vulnerable).

- **Being practical in a complicated world.**
  The reliability of sources can affect the selection of criteria. For example, approaches commonly use focal species or taxa as a practical, realistic target on which to concentrate efforts to protect broader biodiversity. Another example is in developing thresholds. ENGOs have had to establish specific thresholds even where there is not enough scientific research to provide a definitive value. This happens to some extent because thresholds are arbitrary by nature, and are more a necessity of the decision-making process than a feature of nature itself.

CONCLUSION

Although there are many subtle, and some significant, distinctions among approaches examined in this study, the similarities seem more prominent than the differences. When different approaches work at the same scale (e.g. global), the same areas are consistently prioritized, among them the Tropical Andes, Madagascar, the Atlantic forest region of eastern Brazil, the Mesoamerican forests, the Philippines, most of Indonesia, the Cape Floristic Region of South Africa, and New Caledonia. When working at a smaller scale, approaches often (but not always) prioritize areas that are nested within the larger areas targeted for conservation by global approaches.

There is also an increasing propensity for organizations to collaborate, including sharing information, utilizing the same methodologies, and relying on the same thresholds. For example, we found a considerable amount of overlap in planning units, a consequence of the increasing level of collaboration and complementary research among these organizations. TNC uses WWF's ecoregions in the work they carry on outside the United States. Similarly, CI has adjusted the boundaries of its hotspots to match the WWF ecoregions so hotspots now represent an amalgamation of extremely high priority ecoregions. In addition to sharing thresholds and planning units, there is also a growing tendency to work together on specific partnerships and projects. An exemplary case of collaboration is the Alliance for Zero Extinction initiative, which bridges nearly forty biodiversity conservation organizations in a streamlined and systematic effort to prevent the most imminent extinctions.

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