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The Living Landscapes Program is a Wildlife Conservation Society initiative that identifies, tests, and implements wildlife-based strategies for the conservation of large, wild ecosystems integrated within wider landscapes of human influence.

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THE ROLES OF LANDSCAPE SPECIES IN SITE-BASED CONSERVATION

The Landscape Species Approach

The Landscape Species Approach is a wildlife-based strategy used to define ecologically meaningful conservation areas, identify where and why human-wildlife conflicts occur, design and undertake conservation efforts to curb or halt such conflicts, monitor program effectiveness, and adapt conservation efforts in light of these results. We believe that by looking at the complexity of landscapes through the eyes of wildlife – by understanding the varied and extensive needs of landscape species – we can define conservation lands and management priorities that will ensure a future for diverse and abundant wildlife communities in an increasingly human-dominated world.

Characteristics of Landscape Species

Landscape species use large, ecologically diverse areas and have significant impacts on the structure and function of natural ecosystems. Their habitat requirements in time and space make them particularly vulnerable to the land-use and resource-harvesting practices of people. Identifying the ecological requirements of landscape species informs the design and management of large landscapes for biodiversity conservation. They also help us assess whether actions to mitigate threats to biodiversity are successful. Meeting the habitat needs of, and removing threats to, landscape species builds a strong foundation to conserve the biodiversity and ecological integrity of the world's great wildlands.

Management Roles of Landscape Species

Landscape species, either individually or when combined in a complementary set, are a powerful conservation planning tool. They play multiple roles in the design and implementation of conservation strategies. To be characterized as a landscape species, a wildlife species must serve one or more of the following roles:
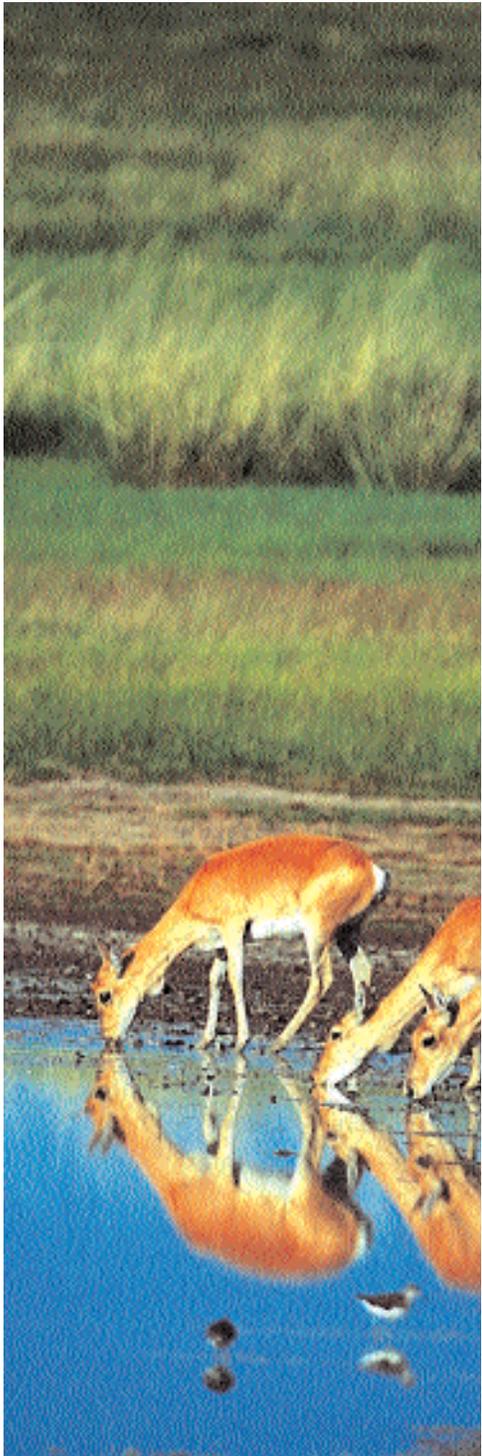
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Conservation umbrella role

The best umbrella species are those that have the largest area requirements and the most diverse habitat requirements (i.e., the greatest variety of habitat types). For example, in Asia, the greatest diversity and biomass of ungulates is found in heterogeneous areas composed of grasslands and forests. These landscapes are also where tiger densities are highest. Since a healthy population of tigers requires vast areas and adequate numbers of prey, an effective conservation plan for tigers alone should protect most of these ungulates and the habitat they need for survival. Tigers thereby play the role of an umbrella species, protecting many others with smaller ranges or lesser resource requirements.

Recognizing the needs of wildlife is an essential step in setting conservation priorities, but no single species' requirements are likely to meet the needs of all species in a diverse wildlife community. The most comprehensive, robust conservation umbrella is therefore a suite of species that have different, complementary habitat requirements.

Landscape scale role

All wildlife must have access to areas where food, shelter, and mates can be found. The size, composition, and spatial pattern of habitats that a species requires are all functions of diet, body-size, and the spatial and temporal patchiness of resource availability. Understanding the habitat requirements of a landscape species in time and space helps us to characterize the landscape that is biologically meaningful to that species. By mapping the composition, quantity, and spatial configuration of habitat patches required by a healthy, functioning population of a landscape species, we explicitly define the landscape necessary for its long-term survival, and thus determine the appropriate scale for conservation management.

Threats assessment role

Humans affect wildlife populations by harvesting them, by destroying or depleting important habitat or resources, and by killing individuals perceived as a hazard to life and livelihood. For landscape species to serve as effective tools for ranking the intensity and patterning of threats to wildlife and their habitat, they must themselves be sensitive to the human land-use and resource-use practices that constitute the threats. Small, edge-adapted, "weedy" generalists that are rarely a menace to human welfare, often thrive in human-dominated landscapes and consequently do not make good threat assessors. In contrast, large-bodied birds, mammals, and reptiles are particularly at risk, because they are often sought after as a source of food and income, can be acute crop pests and livestock predators, have large habitat and nutritional requirements, are seldom found in high densities, and tend to have relatively low reproductive rates. As such, their populations tend to interact and clash with people more often and are more significantly affected by human disturbance. Seldom will a single landscape species be susceptible to all human land-use and resource-use practices. Thus, selecting a suite of complementary landscape species is central to identifying and ranking key threats to wildlife and wildlands conservation at a given site.

Wilderness conservation role

Few wildlife species "need" wilderness to survive. Many are tolerant of certain degrees of human disturbance. That said, people are often unwilling to live with wildlife that stray out of the areas set aside for them. This is particularly true of large herbivores that destroy farmers' crops, and carnivores that prey on livestock or pets and are dependent on many of the same species sought by human hunters. Only when wildlands are sufficiently large do species such as elephant, grizzly bear, jaguar, and leopard find refuge from humans. A focus on species such as these, which often conflict with humans or human land use, requires safeguarding large, wild core areas.

Ecological function role

Within ecosystems, seed dispersers, seed predators, ecological engineers (e.g., beavers, elephants), nutrient monopolists (e.g., anadromous salmon, fig trees), predators, and pollinators often play significant roles in ecosystem structure, productivity and resilience. The movements of these ecologically pivotal species can functionally link different habitat types or regions within a landscape. Elimination of landscape species may undermine these functional links and lead to cascading changes in ecological communities or even the loss of habitats and ecosystem functions critical to the persistence of other species, communities, and the larger landscape.

Progress monitoring role

Monitoring the effectiveness of conservation efforts is possible only if we have explicit targets against which we can track progress. Focusing conservation investments on reducing direct and indirect threats to individual landscape species and their habitats provides us with the explicit objectives that we need to monitor progress. For example, by documenting changes in the frequency that spectacled bears kill livestock in ranch lands adjacent to national parks, as well as changes in the relative abundance of bears themselves, managers can monitor progress toward the target of 70% fewer livestock predations, assess the effectiveness of corralling cows in the center of pastures, and judge the impacts of reduced conflict on the recovery of a bear population. In this way, we develop specific conservation objectives and monitoring targets that allow us to clearly evaluate the success or failure of our conservation actions.
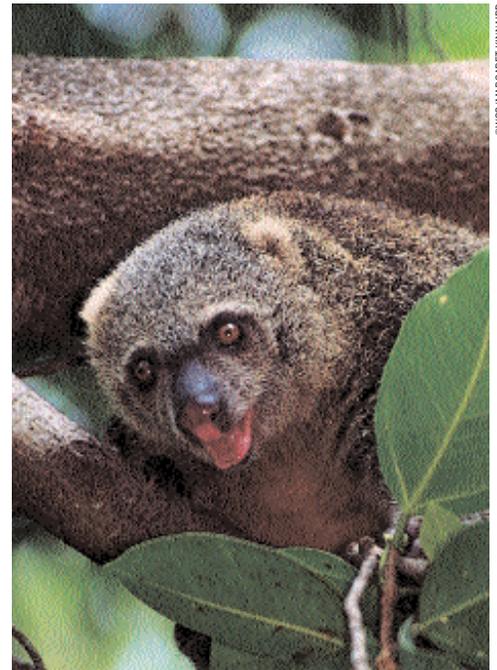
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Conservation Umbrella Role	Conservation of landscape species that have diverse and extensive habitat requirements results in the conservation of most other plants and animals that occupy the same habitats or rely on the same ecological processes.
Landscape Scale Role	Habitat requirements of landscape species' populations explicitly define a large, diverse landscape that requires conservation management coordinated at that scale.
Threats Assessment Role	The Landscape Species Approach provides a transparent and spatially explicit framework for evaluating potential threats in and near wild landscapes.
Wilderness Conservation Role	Landscape species' reliance on wildlands helps guide conservation efforts toward critical wild areas.
Ecological Function Role	Landscape species create or maintain habitat condition, configuration, and/or structure for other species.
Progress Monitoring Role	The Landscape Species Approach allows us to develop explicit conservation objectives and monitoring targets that allow us to clearly evaluate the success or failure of our conservation actions.

Management Roles of Landscape Species

Roles Not Served by Landscape Species

Almost as important as knowing what roles landscape species play is knowing what roles landscape species do not serve. First, though landscape species can help us identify and rank threats to wildlife and wildlife habitats, they are rarely useful as indicators of change in the level of such threats. Landscape species are not usually good indicators of habitat change. For a wildlife species to be a good indicator of habitat quality and quantity, its abundance must be tightly tied to the availability of that habitat. By definition, landscape species use a variety of habitats, so loss or degradation of one habitat type is unlikely to influence their abundance - making them poor indicators. Similarly, some wildlife species are useful indicators of changes in the level of a direct threat such as hunting, given that their numbers correspond with the degree of threat and can be estimated reliably and inexpensively. Landscape species, however, tend to be relatively scarce and wide-ranging: thus it is typically difficult to estimate their numbers. Given these two sets of factors, landscape species rarely make good indicators.

Next, though the life history attributes of landscape species make them prone to local extinction, they are seldom globally threatened. Many globally endangered species are endemics with highly restricted ranges and specialized habitat requirements. Landscape species, in contrast, are typically wide-ranging species with correspondingly large geographic ranges. Though we might choose to protect a globally-threatened or endemic species, meeting the restricted area and resource requirements for that species may not be sufficient to protect sympatric species. Selecting a suite of area demanding landscape species provides a robust strategy for protecting large functional landscapes.

Finally, landscape species are not a "blank check" for justifying larger protected areas. In fact, a central tenet of the approach is to specify the area requirements of ecologically functional populations. Thus, the landscape species approach may lead conservationists to work in key areas outside reserves, or surprisingly, to consolidate conservation efforts within a protected area. Landscape species, therefore, help focus actions specifically where conservation needs and benefits exist, based on strong biological rationale.

Upcoming Bulletins:

Selecting Landscape Species

Using Conceptual Models to Set Priorities

Monitoring Project Effectiveness

Setting Priorities: Threats Reduction or Monitoring Effectiveness?

Managing Wildlife Use

NGO-Private Sector Partnerships

Community-based Wildlife Conservation

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