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Key Concepts:

- A new map of the human footprint produced by the WCS Living Landscapes Program shows that 83 percent of the total land surface and 98 percent of the areas where it is possible to grow the world's three main crops—rice, wheat, and maize—is directly influenced by human activities.

- Understanding how to prevent or minimize human-wildlife conflicts within and across land-use zones is essential to ensure the long-term survival of wildlife and wildlands.

- Planning conservation strategies to meet the needs of a suite of landscape species identifies the necessary area, condition, and configuration of habitats to meet the long-term ecological requirements for most species occurring in a given landscape.

In this way, we can hopefully reduce the human footprint and allow both wildlife and humans to persist and thrive in the same living landscapes.

*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
that are integrated
within wider
landscapes of
human influence.*

SHARING VALUED LANDSCAPES: CONSERVATION THROUGH THE EYES OF WILDLIFE

Conserving Living Landscapes for Wildlife and People

For well over 100 years, a major approach to wildlife conservation has been to set aside areas protected from human exploitation (Kramer et al. 1997; Dudley et al. 2004). These parks and reserves play a crucial role in saving the planet's plants and animals because it is in these landscapes alone that biodiversity conservation is the primary land-use objective. Unfortunately, strict protected areas have rarely been large enough to meet the ecological needs of wide-ranging or naturally scarce wildlife species. Consequently, focusing our efforts solely on national parks or reserves risks the progressive loss of these species and a failure to meet the underlying purpose of parks: conservation of healthy, functioning populations of the full array of flora and fauna representative of the larger landscape.

When few people lived in adjacent areas and our footprint was relatively light, the needs of people and wildlife seldom clashed. Thus, the inadequacy of protected areas for some species mattered little, as animals like elephants, tigers, lappet-faced vultures, and white-lipped peccaries moved freely in and out of surrounding areas in search of needed resources. For the most part, that reality no longer exists. Our human footprint on the planet is a clearly visible result of a perennial and largely unplanned transformation of land and water (Sanderson et al. 2002a).

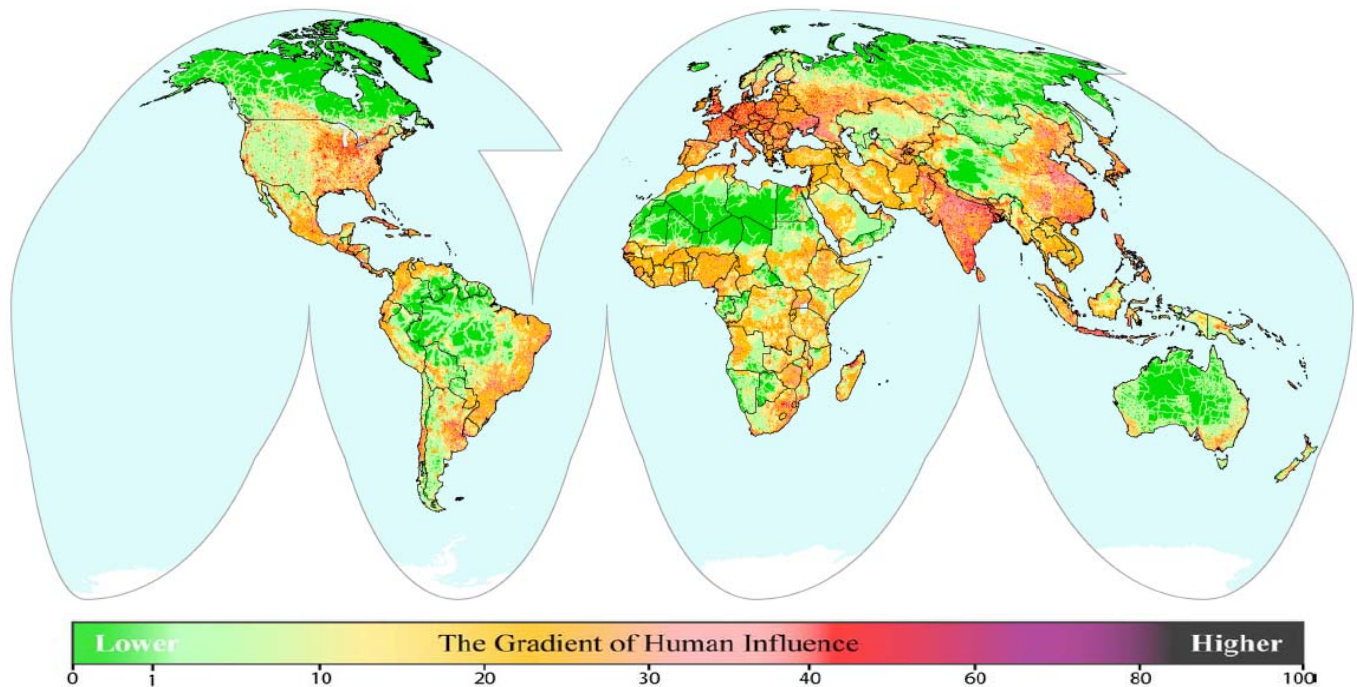


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Vast forests and seas of grass have been converted to farms and settlements, or carved into pieces by expanding networks of roads and railroads that connect growing towns and link people and products to markets. Over-fishing and pollution similarly have degraded seascapes. The increasing ecological and institutional fragmentation of natural landscapes and seascapes, and the increasing intensity of human use of much of the planet, is driving wildlife out of preferred habitats; hardening land-use boundaries; blocking access to important sources of food and shelter; and limiting movements necessary for healthy reproduction, adaptation to climatic variation, or establishment of new populations (Terborgh 1999). This progressively larger and heavier human footprint forces wildlife into competition or conflict with people for space and resources, and often places people in ‘uncomfortable’ proximity to wildlife. In the United States and across the planet, as people continue to expand into wild areas and as our conservation efforts successfully conserve and restore healthy wildlife populations, the needs of people and the needs of wildlife will increasingly clash. Such conflicts will continue unless we find new approaches that help people and wildlife share these same valued landscapes.

So how do we conserve wildlife species such as lions and tigers and bears (...and loons, whales, chimpanzees, and sharks...), whose ecological requirements cause them to venture outside of protected areas?

How do we conserve species that live in areas where economic development and not wildlife conservation is the primary goal? We need to think at a larger scale, and see functional connections (Redford et al. 2003). We need to plan for change and the unexpected. And we need to leave room for ‘margins of error’ – typically our own. Of course we need to think explicitly about our own human interests. But also we need to look at the same world through the eyes of wildlife. In other words, we need to create living landscapes and seascapes that address multiple, changing needs and concerns, as wildlife and people continue to spill over and across ecological and political borders. Not all human activities conflict with all wildlife in all locations, and not all wildlife are perceived as a threat to people in all places at all times. The challenge, then, is understanding where, when, and why the requirements of wildlife and the interests of people sometimes clash, and building a community committed to adopting management practices that help avoid or minimize these conflicts. The Living Landscapes Program of the



Wildlife Conservation Society is working with field conservationists to develop and implement innovative ways to conserve landscapes that are of a size and arrangement that meet the needs of both wildlife and people.



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A fisherman mapping human activities at Glover's Reef.

The Practice of Conservation in Living Landscapes

How can we create living landscapes that are large enough, that contain all the ecological and land-use elements needed to meet the needs of wildlife and of people, and that are configured to minimize wildlife-human conflict?

First we must believe that it is possible to create a living landscape that can generate desired economic, biodiversity and intrinsic values. Second, we must have a keen understanding of how and why people use the landscape and be able to map where over-use of natural resources risks the depletion of wildlife and the degradation or loss of their habitat. Third, we need to view the landscape through the eyes of wildlife so that we can understand and plan to meet their resource needs in space and time.

Lastly, we need to establish the most appropriate mix and arrangement of actors and institutions to effect conservation across these complex living landscapes, and to adapt to change over time.

Understanding the Human Footprint – Now and in the Future

A first step to designing strategies to reduce or halt clashes between people and wildlife is to understand clearly where human activities occur and document how they influence the productivity and diversity of ecological systems. The Living Landscapes Program takes two broad approaches to evaluate the impact of people on living landscapes. We rely on the knowledge of local people to map human activities in landscapes and seascapes. And we combine historical and contemporary information to predict from the past what our future impacts will likely be on the planet.

Using Local Knowledge to Map the Human Footprint within a Landscape or Seascape

To provide a detailed map of the distribution and impact of human activities within both terrestrial landscapes and marine seascapes the Living Landscapes Program has developed a simple one-day process that reaps the benefits of local knowledge. That said, nothing can ever replace the profound knowledge garnered by WCS field staff as they live, work, and study in an area. Presence on the ground is vital for understanding the ecology of a landscape, and the nuance of local social, economic and political systems. This knowledge is an essential first step before beginning a conservation project and an important barometer of change over time.

Our Assessment of Human Activities Workshops (Wildlife Conservation Society 2004) bring together a wide range of local, national and international stakeholders to map and prioritize those human activities that most seriously jeopardize the productivity and diversity of a particular landscape or seascape. These workshops are often the first time that these different actors have sat around the table together, and they provide a safe forum for openly airing views and getting to understand the needs and concerns of each party. Results of these workshops have helped refocus priorities and bring in new partners for more effective management of the Glover's Reef Atoll in Belize. They have convinced conservation managers in Rwanda, Uganda



and the Democratic Republic of Congo that they must work together if they are to preserve not only the biodiversity but also the local livelihoods of the Albertine Rift landscape in Central Africa. And they have allowed government officials and local pastoralists in the Eastern Steppe of Mongolia to see where they can stand on common ground.

These workshops are an efficient method for mapping the human footprint within a landscape and showing the location and severity of key human impacts on ecological systems. Of equal or greater importance, they often launch a process through which trusting communities, committed to sustainable resource management and conservation, are built.

Looking Into the Past to Glimpse the Future

Common sense tells us that human activities and the human footprint are not static but change over time in response to resource availability, economic policies and practices, demographic shifts, conflicts, and natural disasters. Many human activities are manifested as visible changes in land-use, vegetation cover, river flow regimes and sediment loads, and the loss or degradation of wildlife habitat. To assess these changes, we have available a set of powerful tools that are built around the collection and analysis of satellite imagery and aerial photographs.

Our remote sensing analysts and geographic information system specialists in the Living Landscapes Program are skilled at interpreting the differences between satellite images from different years. These analyses enable them to map the distribution and extent of forest loss over decades in the Bolivian Amazon, document the annual intensity and spread of fires burning forests in northwestern Guatemala, and track the monthly conversion of the Great Ruaha River in Tanzania to a waterless sand river.

Our work with the WCS-Indonesia program showed with startling clarity that if current deforestation trends in the Bukit Barisan National Park continue, only 30% of the original area of the park will remain, erasing 80% of tiger habitat and an appalling 95.5% of elephant habitat. Such projections have helped decision makers in Indonesia grasp the severity of the threat to wildlife, and has galvanized them into taking the necessary conservation actions.

The power of divining and making tangible the future from the past has encouraged the Living Landscapes Program to begin investing more of our staff time in developing a range of techniques to model and visualize future scenarios that can help us and



others clearly grasp the likely impacts of “business as usual” policies and practices and encourage us to make the best possible natural resource management and wildlife conservation decisions.

Using Focal Species to See Through the Complexity of Living Landscapes

For conservation investments to be strategic and effective we need to have a clear and unambiguous understanding of what we intend to conserve (Groves et al. 2002). Without identifying the specific biological elements of a landscape that we want to conserve it is almost impossible to decide what actions are priorities for minimizing human-wildlife conflicts, and we certainly cannot expect to measure whether or not we have been successful. Moreover, unless the targets of our conservation efforts are explicit, neither we nor our supporters can understand what we intend to achieve and how we will measure and demonstrate our conservation impact.

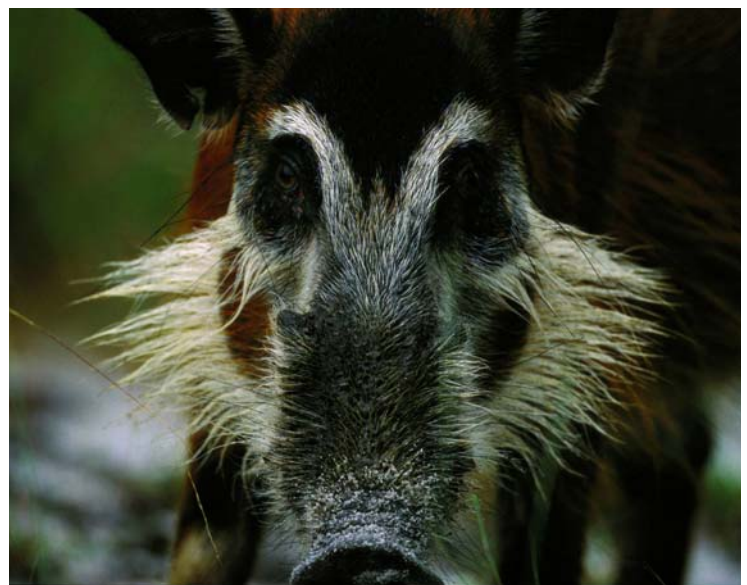
In the past too many conservation organizations have either focused their conservation actions on single species or declared simply that they were conserving biodiversity. The problem with the first approach is that single species make poor umbrellas and their effective conservation may not help conserve all plants and animals within living landscapes. The latter is problematic because it is impossible to define what exactly is being conserved as we are unlikely ever to enumerate all biodiversity in a landscape, let alone understand the ecological requirements and interactions of all species. If we are to conserve wildlife whose resource needs are not met solely from resources found within strict protected areas, our conservation targets need to reflect their ecological attributes (Sanderson et al. 2002b). If we are to ensure that parks fulfill their mission of conserving functional populations of the full complement of flora and fauna representative of an area, we need to pick a suite of



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conservation targets that have complementary habitat needs and that are, collectively, adversely affected by the full range of human activities that are threats to biodiversity within a landscape (Wildlife Conservation Society 2001).

By selecting a suite of wildlife species that, in combination, depend on the full range of major habitat types within a wild area, we provide the basis for a strong, focused, scientifically-based approach to biological conservation at a landscape level (Sanderson et al. 2002b). Moreover, by evaluating the complementary needs of these landscape species, we can explicitly assess threats to their long-term persistence and set priorities for conservation actions to avoid or mitigate key conflicts with people (Wildlife Conservation Society 2002). Focusing our conservation efforts on a complementary suite of landscape species creates a comprehensive and



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effective canopy for conservation that helps us protect critical habitat and reduce or remove key threats across the landscape. Moreover, it allows us to be explicit about what we expect to achieve, and provides clear targets for measuring our conservation success. Most importantly, by conserving a suite of landscape species we not only protect these unique icons of wild landscapes, we can save all the flora and fauna that are sheltered under their conservation canopy (Sanderson et al. 2001).

Deciding How Many Animals is Enough

Knowing how many animals we want to protect in a landscape is important because it conveys explicitly to others our objectives, makes us assess how big of an area we need to protect, and sets the bar for measuring our success. It is not a trivial question to ask. How many elephants are needed in the Ndoki-Likouala Landscape in the Republic of Congo so that there is a 90% chance that the population will survive for 200 years, at a density at which they can fulfill their ecological roles? Though population viability analysis can help us to estimate extinction probabilities, estimating functional densities of wildlife is a challenge as it assumes that we know a great deal about how the species contributes to the structure and function of the landscape. The Living Landscapes Program is working with our field sites to develop a scientifically defensible process for setting measurable objectives for wildlife numbers that reconciles ecological and cultural estimates of carrying capacity. This process of setting explicit numbers of a wildlife species has pushed us to look well beyond park and even country borders. For example, our field staff in Bolivia's Madidi National Park realized they needed to work with their Peruvian counterparts across the border to ensure the protection of sufficient contiguous habitat for the long-term survival of jaguar and Andean condor.

Seeing Living Landscapes Through the Eyes of Wildlife

After deciding how large each population of landscape species must be, the next step is to create habitat preference maps. These maps constitute the biological landscape as seen through the eyes of each landscape species. In practical terms, they represent potential carrying capacity in the absence of threats that can be avoided or mitigated, and reflect the present and future quality of habitat across the landscape. We are then able to create

a threats landscape derived from the human footprint. This represents the expected reduction in carrying capacity associated with the different types and severities of threat across the landscape. By combining the biological landscape for each species with the threats landscape we can, through the wonders of optimization software such as Marxan or C-plan, configure living landscapes that depict the highest priority areas for conservation.

Reducing the Human Footprint

With the information we glean from the biological, threats and conservation maps, we can more easily identify the key local, governmental and private sector actors that use natural resources within the landscape, and that should define and enforce resource use policies and practices. Engaging this mix of actors in discussions to reconcile the needs of people with the needs of wildlife will help characterize those areas focused on economic development, those areas where wildlife conservation is the primary objective, and those areas where land-use policies and practices allow wildlife and people shared use of natural resources over the long-term. In this way we can help establish the most appropriate mix and arrangement of actors and institutions to effect conservation and promote human welfare within each living landscape.

Living Landscapes as a Model for Effective Conservation

Regional planning is not a new idea. Neither is the use of zoning to attempt to capture a full range of economic, ecological and intrinsic values from different areas within the same region. What is different about the living landscapes approach to land management is that it explicitly takes into account the ecological needs of wildlife

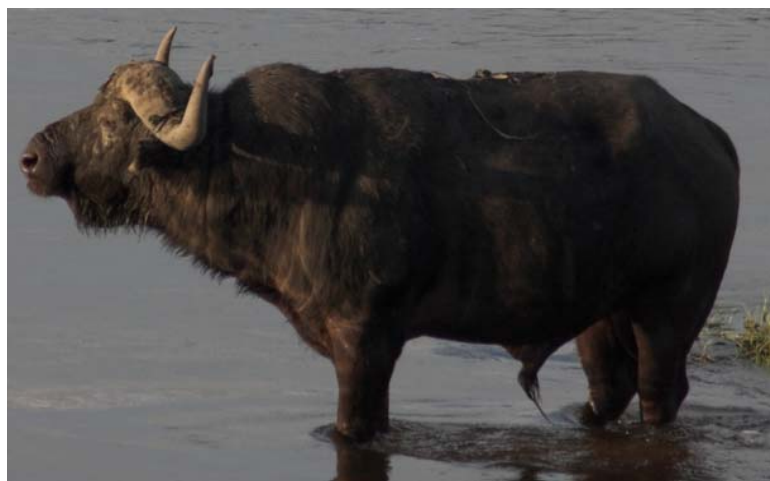
and the human activities that are direct or indirect threats to their long-term persistence. This counter-balances a history of land management that almost exclusively focused on meeting human needs for space and resources and provides for the first time a clear and rigorous assessment of how we might lessen the human footprint so that both people and wildlife can share the same living landscapes.



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Additional Reading

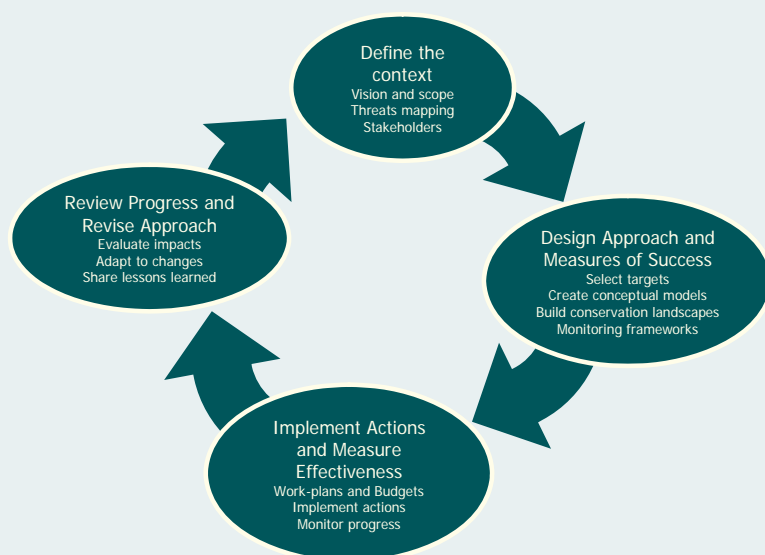
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Living Landscapes Program

WCS's Global Conservation Programs work to save wildlife and wildlands by understanding and resolving critical problems that threaten key species and large, wild ecosystems around the world. Simply put, our field staff make decisions about what causes the needs of wildlife and of people to clash, and take action with their partners to avoid or mitigate these conflicts that threaten wildlife and their habitat. Helping our field staff to make the best decisions is a core objective of the Living Landscapes Program.



We believe that if conservation projects are to be truly effective, we must: (1) be explicit about what we want to conserve, (2) identify the most important threats and where they occur within the landscape, (3) strategically plan our interventions so we are confident that they will help abate the most critical threats, and (4) put in place a process for measuring the effectiveness of our conservation actions, and use this information to guide our decisions. The Living Landscapes Program is developing and testing, with our field programs, a set of decision support tools designed to help field staff select targets, map key threats, prepare conservation strategies, and develop monitoring frameworks.

We describe the application of these tools in a series of brief technical manuals which are available by email from:
conservationsupport@wcs.org



This publication is made possible by the generous support of the American people through the United States Agency for International Development (USAID), under the terms of Cooperative Agreement No. LAG-A-00-99-00047-00. The contents are the responsibility of the Living Landscapes Program of WCS and do not necessarily reflect the views of USAID or the United States Government.



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