The Condor Bioreserve in Ecuador

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Use of the Functional Landscape Approach to Conservation of Montane Ecosystems

The tropical Andes region has extraordinary biological diversity with considerable endemism. The complex topography, climate, geology, and biogeographic history of the Andes have helped create a high turnover in species over distance and along steep environmental gradients. The humid montane and premontane forests of the tropical Andes compete with the lowland Amazonian forests in species richness. Long-term maintenance of diversity in the tropical Andes requires a management strategy that takes account of landscape patterns. Especially in heterogeneous regions such as Andean forests, management of the landscape is more appropriate for biodiversity conservation than management of local sites.

The concept of functional landscapes

A conservation strategy that takes account of the complex and dynamic nature of natural systems in tropical mountain regions needs to be adapted to face the challenge of maintaining ecological processes that sustain biodiversity. The Nature Conservancy (TNC) has developed the concept of "functional landscapes"—an approach to biodiversity conservation that takes account of multiple scales in the ecosystem and the landscape. "Functional" refers to the capacity of an area to maintain healthy, viable targets and to sustain key ecological processes within natural ranges of variability over the long term. Functional landscapes typically provide more habitat, greater habitat diversity, and larger populations of known and unknown species.

Applying the concept of functional landscapes is particularly challenging in tropical countries with extraordinary biodiversity that also face increasing threats to biological richness. These countries are also disadvantaged by a lack of information about their biodiversity that would be helpful in making decisions on the best strategies for safeguarding it in the long term (Figure 1). TNC and 3 local partners, Fundación Antisana, EcoCiencia, and Fundación Ecológica Rumicocha, have been developing this concept for several years at a site known as the Condor Bioreserve. This area is a functional landscape, where it will be possible to conserve a large number of ecological systems, ecological communities, and species at all scales, from local to regional.

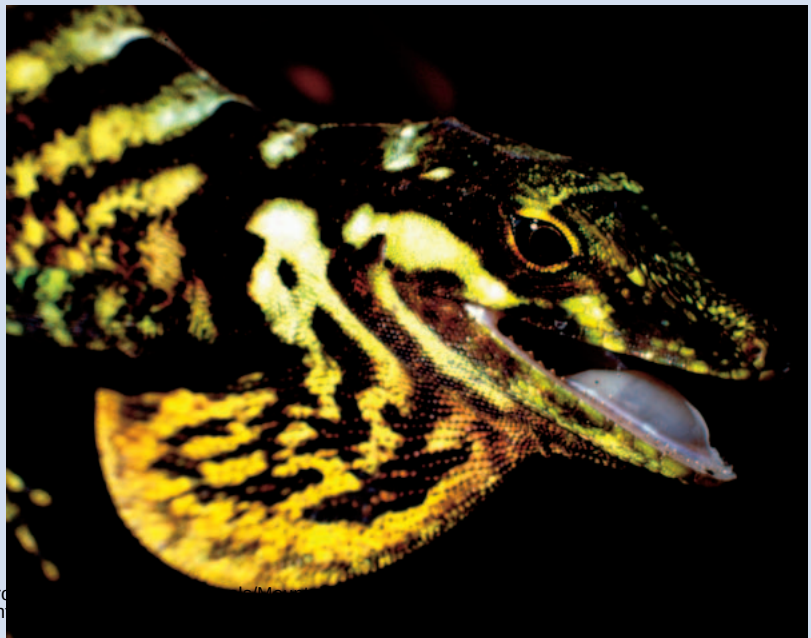


FIGURE 1 New species of anole discovered in the Condor Bioreserve. Information about such species is necessary for planning conservation. (Photo by Felipe Campos)

Biodiversity and human diversity

The Condor Bioreserve (CBR) covers more than 21,000 km^2 and is located between 400 and 5810 m in the northeastern Andes of Ecuador. Sixteen different vegetation types, more than 760 bird species, 150 mammal species, and 110 amphibian species have been recorded. The area is a very important habitat for several threatened species, such as the Andean bear (*Tremarctos ornatus*) and the mountain or woolly tapir (*Tapirus pinchaque*, Figure 2), which require extensive intact habitats for survival. The functional landscape concept is implemented through an innovative conservation approach that seeks to link 6 protected areas and their buffer zones under 1 management unit. This concept goes beyond the borders of protected areas to capture biodiversity patterns. The areas under this unit comprise the upper watershed of the Napo River, one of the main tributaries of the Amazon, and they share common environmental characteristics. The intervening land that links these protected areas constitutes natural corridors that

maintain connectivity of large mammal umbrella species such as the mountain tapir and the Andean spectacled bear.

The CBR is a fascinating place, not only in terms of biodiversity but also in terms of diversity of people and cultures. Communities range from the peasant communities on the highlands to 2 ancestral communities—Oyacachi and Sinangoé—whose territory is within one of the protected areas of the CBR and the *colonos* living in the lower part of the CBR. In the land between the protected areas, several towns, villages, and small communities are found, comprising approximately 120,000 people. In addition to the people living inside the CBR, about 20% of the population of the country (2 million) depend on environmental services and natural resources from this area, which makes it important to the welfare of the people and the economic development of the country. Although the CBR still has large tracts of natural habitat, it faces significant threats. Chief among these are habitat conversion to agriculture or pastures, infrastructure projects being built inside the protected areas (especially water extraction projects and roads), logging, hunting, and fire.

Identifying conservation targets

The CBR has been designated as a "Parks in Peril" site, as part of a conservation program supported by the US Agency for International Development (USAID) and TNC. Under this program, TNC and its local partners have defined a common goal for this area for the next 5 years, in close collaboration with the Ministry of the Environment: "To achieve a biodiversity conservation model based upon participatory strategies that promote the sustainable development of the human population." A methodology for strategic conservation planning that analyzes biodiversity at different scales, "Conservation Area Planning," has been adopted. Through this conservation planning approach, we have identified conservation targets at several scales, analyzed the biological needs of the conservation targets, and analyzed threats and stakeholders in the area. The purpose was to identify and design priority strategies to maintain healthy biodiversity, reduce threats, and increase conservation capacity.

FIGURE 2 Mountain tapir. (Photo by Felipe Campos)

We identified an array of conservation targets focusing on biodiversity and threats to the area. The targets were chosen at different scales, with care being taken to include terrestrial as well as freshwater systems. Different scales of biological organization were included by choosing ecosystems such as the humid *páramo* and species such as the mountain tapir. Also, different spatial scales were used to include such wide-range species as the Andean bear and locally distributed species such as endemic frogs that depend on montane rivers (Figure 3). We believe that this approach provides a more ecologically integrated conservation strategy that conserves biodiversity at multiple scales within a single intact landscape.

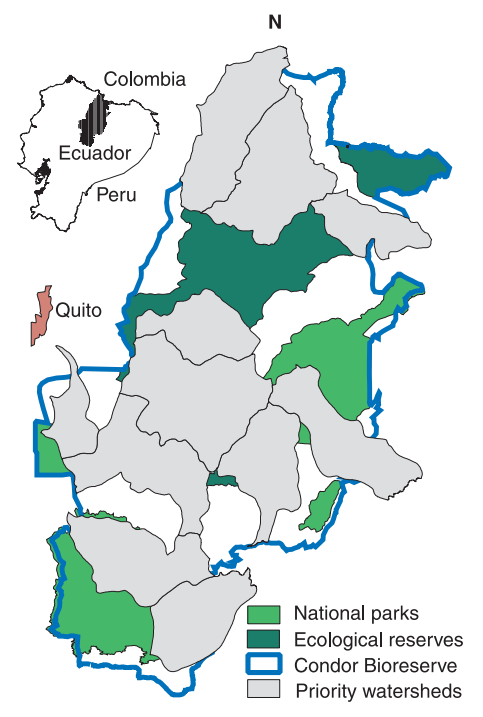
The strategic planning approach still left us with 1 main question unanswered. How can we have an impact on such a large area with limited resources? We recognized the need to take action broadly as well as locally. But we did not have the capacity to work locally throughout an area of more than 21,000 km^2. Our analysis showed that we needed to identify key areas as part of the planning process, where conservation impacts must occur to maintain the functionality of the entire area. In this way we prioritized the focus of local action.

The criteria used to identify key areas were based on core areas as conservation targets; environmental gradients that

FIGURE 3 Tree frog. (Photo by Felipe Campos)

included different vegetation types; large tracts of natural habitat; existing protected areas; and areas important for connectivity, using landscape-level species (eg, the Andean bear) as indicators. In addition to these criteria, threats and institutional presence were taken as criteria of selection between 2 areas of similar importance. Different areas were delineated using a watershed approach. The CBR was divided into 29 watersheds, of which 11 were chosen as key sites for the project to focus its impact (Figure 4). It is important to note that the watersheds do not necessarily indicate places of action but places of impact. For example, to have an impact on certain areas, work with local governments outside the areas may be needed. As a result of the process of identifying key areas, a regional approach is implemented through local action.

FIGURE 4 Priority watersheds for conservation within the Condor Bioreserve. (Map by Silvia Benítez P.)



Future challenges

What is our next challenge? TNC and its partners have learned much from the experience of several years of work in this area, which have been difficult and full of challenges but also rewarding. We believe that we are making important advances in biodiversity conservation, by proposing work through functional landscapes. But this approach needs to be tested, and the impact on biodiversity conservation needs to be measured. This step, in addition to closing the strategic conservation circle, has also opened up a new process of deep thinking and analysis. However, in the face of new planning challenges, we have resolved to be careful not to sacrifice conservation activity for the sake of too much conservation planning.

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Silvia Benítez has been collaborating with The Nature Conservancy since February 2000, with an emphasis on the Condor Bioreserve project. In November 2001, she was appointed Conservation Projects Director for the Ecuador Country Program. She has a Masters in Environmental Management from Yale University and specializes in natural resources management and biodiversity conservation. She is particularly interested in integrating science in conservation planning and management decisions.

FURTHER READING

Churchill S, Balslev H, Forero E, Luteyn J. 1995. *Biodiversity and Conservation of Neotropical Montane Forests.* New York: The New York Botanical Garden.

Dinerstein E, Olson DM, Graham DH, Webster AL, Primm SA, Bookbinder MP, Ledec G. 1995. *A Conservation Assessment of the Terrestrial Ecoregions of Latin America and the Caribbean.* Washington, DC: World Wildlife Fund and World Bank.

Lambeck RJ. 1997. Focal species: A multispecies umbrella for nature conservation. *Conservation Biology* 11(4):849–856.

Poiani KA, Richter BD. 2000. *Functional Landscapes and the Conservation of Biodiversity.* Working Papers in Conservation Science 1. The Nature Conservancy. Available at www.conserveonline.org/2000/11/b/en/WP1.pdf. Accessed 16 May 2003.

Poiani KA, Richter BD, Anderson M. 2000. Biodiversity conservation at multiple scales. *Bioscience* 50(2):133–146.

The Nature Conservancy. 2000. *The Five-S Framework for Site Conservation: A Practitioner's Handbook for Site Conservation Planning and Measuring Conservation Success.* The Nature Conservancy. Available at www.consci.org/scp/5S-v1.pdf. Accessed 16 May 2003.