BioOne COMPLETE

Building Consensus on Biological Corridors in the Venezuelan Andes

Authors: Yerena, Edgard, Padrón, Jorge, Vera, Rolando, Martínez, Zoyla, and Bigio, Deborah

Source: Mountain Research and Development, 23(3) : 215-218

Published By: International Mountain Society

URL: https://doi.org/10.1659/0276-4741(2003)023[0215:BCOBCI]2.0.CO;2

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://complete.bioone.org/journals/Mountain-Research-and-Development on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

Mountain Research and Development Vol 23 No 3 August 2003: 215–218

Building Consensus on Biological Corridors in the Venezuelan Andes

Edgard Yerena
Jorge Padrón
Rolando Vera
Zoyla Martínez
Deborah Bigio

The Sierra de Portuguesa is an Andean mountain system with important biodiversity associated with montane vegetation types. Human use existed well before European colonization. Coffee plantations and slash-and-burn agriculture have been predominant in the last 200 years. Three distinct national parks—Yacambú, Terepaima, and Guache—were designated there at different times, according to different criteria. None is large enough to preserve entire montane ecosystems or a viable population of large mammals like the Andean bear. We propose maintenance and restoration of forest interconnections—or corridors—between the parks. Different approaches are considered to implement corridors, on the basis of consensus building among key social and political actors, with top-down and bottom-up approaches that we consider ecologically, socially, and politically sustainable.



The problem of fragmentation

Habitat fragmentation is widely recognized as a major threat to biodiversity conservation. In mountains, fragmentation affects single-ecosystem types as well as continuity between habitats or ecosystems along altitude gradients. Fragmentation implies habitat and species loss, change in the composition of fauna, changes in ecological processes, and hence less biodiversity.

The Sierra de Portuguesa is the northeast portion of the Venezuelan Andes, located between 9°00' and 10°00'N and 69°00' and 70°00'W. Five major rivers of regional importance have their sources there. Evergreen forests and cloud forests predominate above 1600–1800 m along the sierra ridge. Before the 15th century European colonization, indigenous peoples probably practiced extensive and scattered shifting cultivation. With the decline of the 19th century coffee economy and the arrival of new European immigrants, pressure on forests increased, leading to new forest-free agricultural techniques, including traditional shifting cultivation.

Today the rural population consists mostly of small farmers growing coffee, tomatoes, or potatoes and practicing mixed cultivation. Coffee probably can no longer be considered ecologically sound because more productive new varieties have been introduced that require direct sunlight instead of shade. Despite this, industrial fertilizers are rarely used. The recent collapse of coffee prices might force a shift to other open-cultivation systems, although higher prices for organic coffee could be an incentive that prevents this. Dairy cattle are also significant. This pattern leaves cloud forests along the sierra ridge, strips of forest along the natural drainage system, and some forest pockets on humid and steep slopes largely untouched, resulting in a fragmented landscape (Figure 1). Small towns and villages, which provide services for farmers, are located strategically on midslopes and terraces, serving as nodes for dirt roads that provide access to the interior of the sierra.



FIGURE 1 Landscape in the Sierra de Portuguesa, with characteristic cloud forest on the ridge, coffee plantations lower down, and open cultivation in the foreground. (Photo by E. Yerena)

In 1962, the 29,580-ha Yacambú National Park was established on a significant portion of public land in the Yacambú River watershed to ensure water quality and supply for the future Yacambú Dam, which was essential to an ambitious hydraulic system on adjacent semiarid lowlands. A second National Park, Terepaima, 18,650 ha in size, was designated just 21 km to the northeast in 1976 for

Downloaded From: https://complete.bioone.org/journals/Mountain-Research-and-Development on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

watershed protection and conservation of biodiversity. Finally, in 1993, 7 km south of Yacambú, the 12,200-ha Guache National Park was established to protect biodiversity and another watershed important to foothill towns. Is it possible to link three parks so close together, with forests fragmented along the sierra? And could the long-term survival of bears be enhanced?

What is the role of bears in all this? Corridors are generally thought of as benefiting animals. The Sierra de Portuguesa is an Andean bear (*Tremarctos ornatus*) habitat, and bears are still present here (Figure 2). But a fragmented habitat is bad news for their survival, even more so when there is significant pressure from hunting. No field-confirmed data are available, but estimates suggest that there is room for about 16 bears within the parks—about 5 in each park. This is a very small number, and if these isolated populations cannot interact, the situation is even worse. Any means of interconnecting these populations will increase the bears' long-term survival chances.

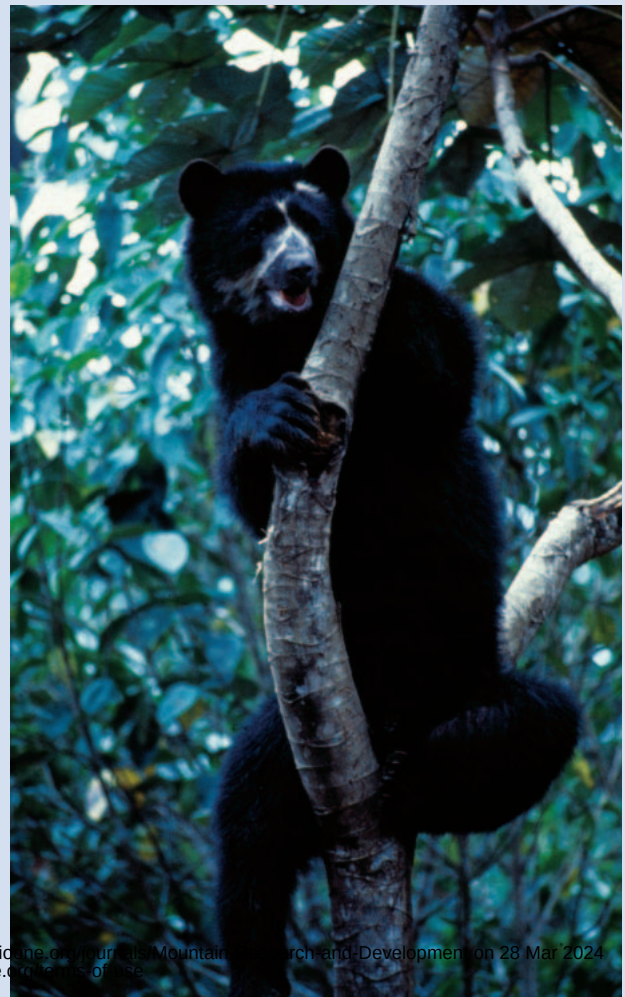


FIGURE 2 An Andean bear, a rare and charismatic focal species whose habitat needs require establishment of a biological corridor. (Photo by J. Orejuela)

Alternatives for interconnection

Landsat TM images showing vegetal cover in 2000 were used to map vegetation in the sierra. A geographic information system (GIS) was very useful for handling spatial information—elevation, vegetation, soil types, etc—and selecting options. The results showed that a long, continuous narrow forest strip still existed along the sierra ridge between the Terepaima and Yacambú Parks, about 11,400 ha in size, mostly above 1400 m (Figure 3). The predominant land use around this forest strip is small-size coffee groves. This confirmed that a corridor was feasible and that deforestation had not been severe in the last 10 years. It also showed a lack of forest continuity between the Yacambú and Guache Parks. If we hope to maintain or restore forest continuity, the options are to keep forest as it is between Yacambú and Terepaima (Corridor A) and to restore forest between Yacambú and Guache (Corridor B). We decided to work first on Corridor A because we estimate that this is more cost-effective. Corridor B involves restoration techniques applied on private or occupied land, which probably requires a different approach. Corridor implementation involves formal legal protection and agreements among local populations on practices that promote sustainable use of natural resources. Formally protected areas may be criticized by those who argue that there are already too many protected areas that impede rural development. On the other hand, it can be argued that sustainable practices take too long to render results when forests are cut and fragmentation occurs.

Building consensus

Our strategy for reaching consensus was to present only facts and alternatives and discuss the positive and negative consequences of such alternatives, or any other new position, freely and openly, without bias. Discussion was promoted among those called upon to give political approval to the concept and those directly affected

Downloaded From: https://complete.bioone.org/journals/Mountain-Research-and-Development on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

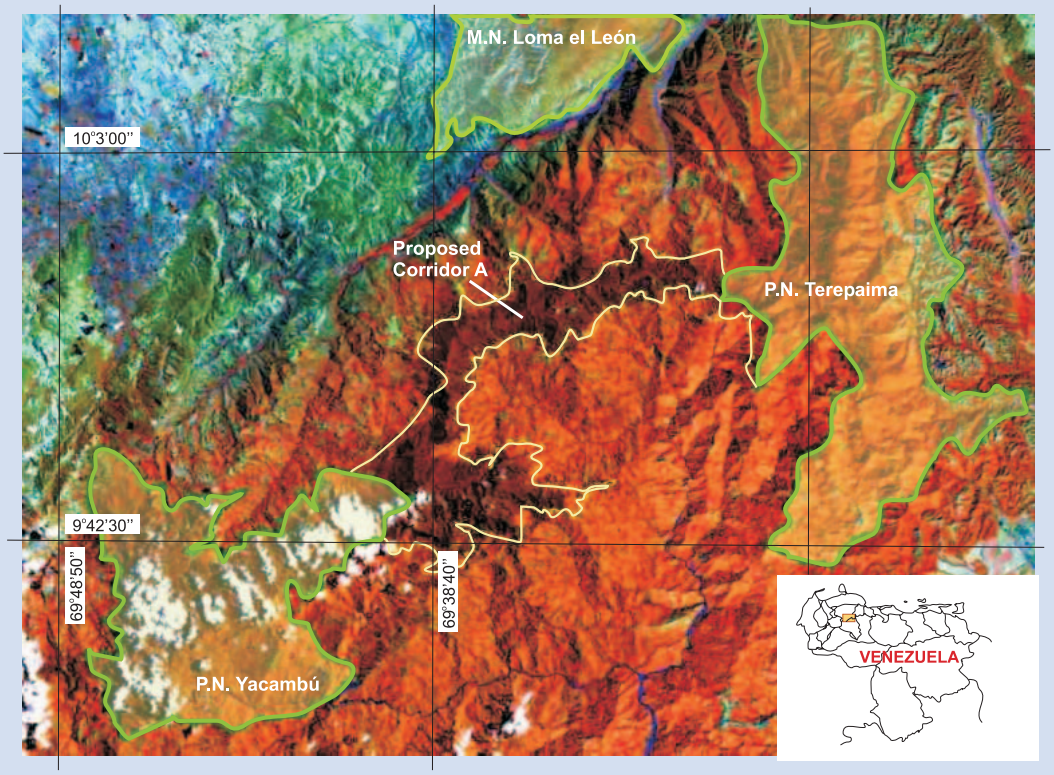


FIGURE 3 Satellite Landsat image showing the extent of the proposed forest corridor between 2 of the 3 national parks in the area under discussion. Dark red: cloud forest and other little disturbed forest; light red: secondary montane forests and coffee plantations; shades of blue: semiarid scrub; shades of green: savanna. (Map by Rolando Vera)

by the decision. Among the first group were the representatives of the federal Parks Service; the Environment Ministry; and state, local, and municipal governments. The second group consisted of farmers who live within or around the corridor areas, organized in associations, and different interested regional and local nongovernmental organizations concerned with the environment and social development, as well as water management concessionaires and universities. Discussions were held in 6 general workshops, one of which focused only on technical aspects with Ministry of Environment personnel, with all the above groups in attendance (Figure 4). An additional 15 focal meetings were held with local farmer leaders.

To our surprise there was consensus about the urgent need to stop deforestation on the upper watersheds. Most enthusiastic were the small farmers living on the edge of the forest, who feared a lack of water for their groves, as experienced by those who live down-slope and in the foothills. Some actors were particularly worried about loss of biodiversity, but most were worried about the disappearance of water sources. Another surprise was the consensus on designating the corridor as an expansion of Terepaima National Park. The farmers' leaders proposed this idea themselves because they believed that there must be an authority with the legal power and local presence to enforce the law.

It is interesting to note the favorable attitude farmers have toward any initiative regarding conservation of forest and water sources. They are rarely contacted by groups promoting such ideas, which they consider vital, along with medical assistance, education, maintenance of rural roads, and agricultural extension.

As a consequence of the workshops and meetings, more than 400 farmers have already signed a letter asking government agencies to take steps to designate the corridor forest as part of the Terepaima National Park, and the number is increasing. This is also good news for the Andean

Downloaded From: https://complete.bioone.org/journals/Mountain-Research-and-Development on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

FURTHER READING

Bennett A. 1998. *Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation.* Gland, Switzerland, and Cambridge, UK: The World Conservation Union (IUCN).
Yerena E, Torres D. 1994. *Spectacled Bear Conservation and Dispersal Corridors in Venezuela.* International Conference on Bear Research and Management. Volume 9(1), pp 169–172.

ACKNOWLEDGMENTS

Funding for this project is provided by the US World Wide Fund for Nature (WWF US) as part of the Northern Andes Ecoregional Program. Fundación para la Defensa de la Naturaleza (FUDENA) is the Venezuelan associate of WWF. The authors are grateful to the National Parks Service of Venezuela (Inparques) and Universidad Simon Bolivar for institutional and professional support for this project, particularly to Oscar Perez and Mirady Sebastiani, respectively.

AUTHORS

Edgard Yerena
Dpt. Estudios Ambientales, Universidad Simon Bolivar, Apdo. 68409, Altamira, Caracas 1062, Venezuela.
eyerena@usb.ve

Edgard Yerena has an MSc in biology and has specialized in planning and policy for protected areas since 1985. He is currently an assistant professor at Simon Bolivar University and coordinator of the Sierra de Portuguesa Corridors Project.

Jorge Padrón
Asociación Civil Ecológica Chunikai.
jorgepadronc@cantv.net

Jorge Padrón is a geographer and has been working in rural community development and environmental conservation since 1988. He is currently in charge of the socioeconomic component of the Sierra de Portuguesa Corridors Project.

Rolando Vera, Zoyla Martínez, and Deborah Bigio
Fundación para la Defensa de la Naturaleza (FUDENA), Apdo. 70376, Caracas 1071-A, Venezuela.

Rolando Vera is a geographer specializing in geographic information systems (GIS) and in GIS applications to conservation. He is in charge of GIS services for the Sierra de Portuguesa Corridors Project.
rvera@fudena.org.ve

Zoyla Martínez is a biologist specializing in management of projects concerned with sustainable uses of biodiversity. She is FUDENA's Chief Project Manager.
zmartinez@fudena.org.ve

Deborah Bigio is a biologist who specializes in conservation programs, planning, and development. She is FUDENA's Chief Executive.
dbigio@fudena.org.ve



FIGURE 4 Leaders of farmers' associations participating in a workshop to discuss options for maintaining a forest corridor to ensure water supply. (Photo by J. Padrón)

bear. Hunting is common among local people, but there is great concern about the fate of bears, even among farmers; farmers' livelihoods do not depend on hunting. The Andean bear is the symbol of Sanare, the largest town of the sierra. Farmers' associations are enthusiastic about ecotourism as a new activity because bears are a perfect tourist attraction, even though it is difficult to observe them in their habitat.

Future steps

Corridor A is not likely to become part of Terepaima National Park soon. The national political agenda in Venezuela is too focused on broader problems, such as the legitimacy of the government. Nevertheless, the consensus achieved is the basis for a "gentlemen's agreement" among all actors on keeping the corridor unaltered until a high-level political decision is made.

A preliminary-impact assessment of Corridor B (not visible on Figure 3, south of Yacambú National Park) was conducted by geographer Mirady Sebastiani of Simon Bolivar University. She recommends conducting a more detailed analysis of the expectations of the rural population to determine exactly where and how to restore vegetation between the Guache and Yacambú Parks.

What has been achieved until now, even for Corridor A, is only a first step toward corridor implementation. The next step is to continue promoting the concept at all political levels and among the rural community. But examples of sustainable use are urgently needed. For instance, some farmers have started producing mountain mahogany saplings (*Cedrela* sp.) for commercial purposes, which shows long-term commercial vision. Expectations for ecotourism are also growing. Extension is urgently needed to promote production of quality organic coffee because coffee production is the predominant land use. Farmers do not have mechanisms for promoting their products in such quality markets. Fostering approaches and initiatives such as these will be a key issue in the future.

Downloaded From: https://complete.bioone.org/journals/Mountain-Research-and-Development on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use