

Landscape Conservation in the Greater Madidi Landscape, Bolivia

Planning for Wildlife Across Different Scales and Jurisdictions

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The Greater Madidi Landscape

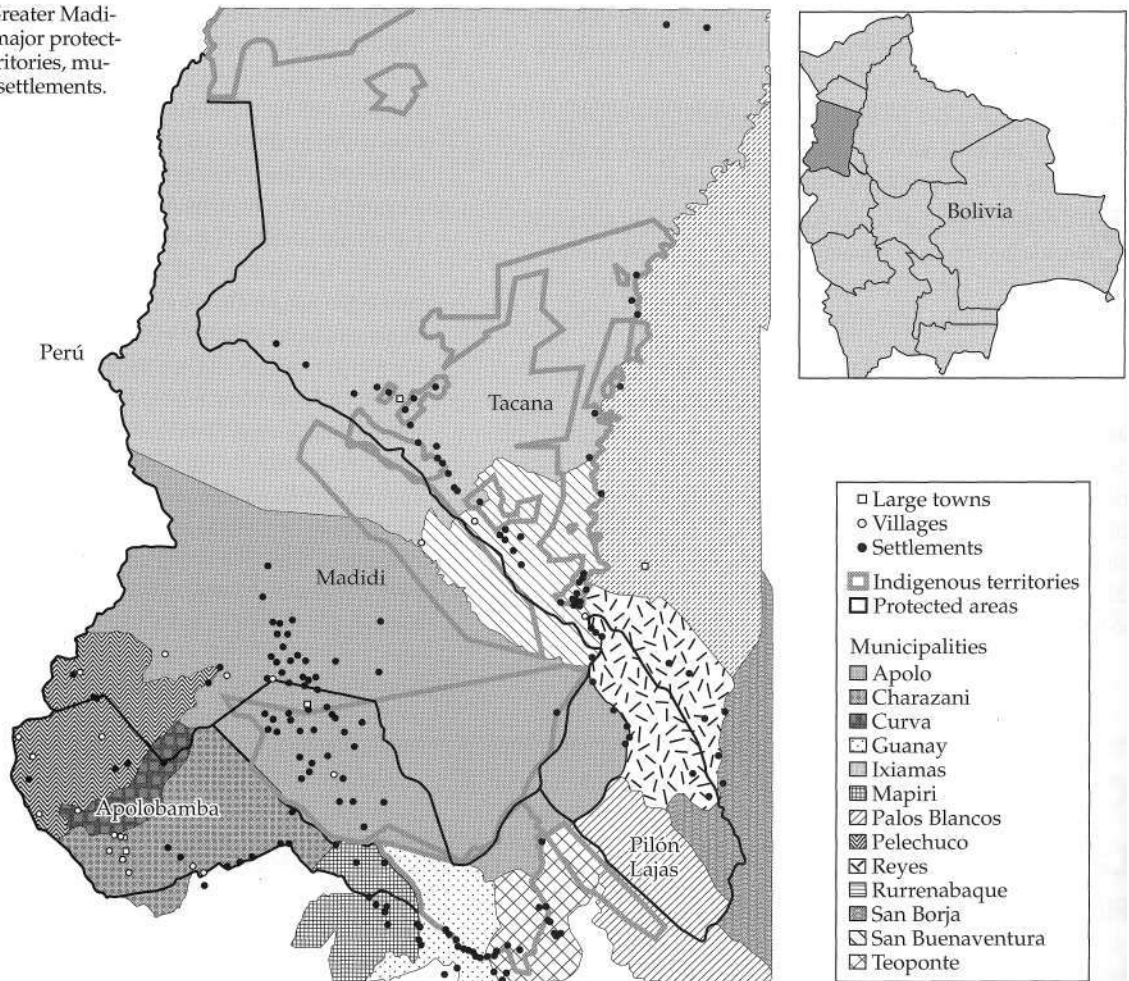
The Greater Madidi Landscape (GML) is found on the eastern flanks of the tropical Andes in northwestern Bolivia and has great elevational diversity (180-6100 meters above sea level; Figure A). The GML falls within the Tropical Andes Biodiversity Hotspot (Mittermeier et al. 1998), is designated as one of the Global 200 Ecoregions (Olson and Dinerstein 1998), and is also a region of great human cultural diversity. The topographical and climatic diversity is largely responsible for its exceptional species and ecosystem richness, with plant and animal representatives of both the Andean and Amazonian ecoregions and a high degree of endemism across a variety of habitats (Gentry 1992), from high Andean puna to lowland tropical forest. Lowland and montane humid forests dominate the area but a rain shadow effect in the Tuichi and Machariapo river valleys creates a swathe of regionally important montane dry forest. Patches of regionally threatened *Polylepis* forest are found at the cloud forest-páramo interface. This area also encompasses the best-remaining example of pristine savannas in South America.

Many ecological services, including watershed protection and microclimate regulation, are provided by the forests in the GML. Furthermore, this area maintains regionally important populations of many threatened species.

In response to the strategic conservation importance of this region, Bolivia established three protected areas (see Figure A): Madidi National Park and Natural Area of Integrated Management (1,895,750 ha), Apolobamba Natural Area of Integrated Management (483,744 ha), and Pilón Lajas Biosphere Reserve and Indigenous Territory (400,000 ha).

Conservation in the GML is complicated by a great variety of territorial jurisdictions, many of which are overlapping. Within the greater landscape a human population of 36,500 people living in 173 localities is spread over two departments, ten municipalities, and several indigenous territorial demands and titled territories (see Figure A). Rural communities are represented by six campesino federations, a mining federation, and four indigenous councils. Large expanses of land outside the protected areas are found within indigenous territories,

Figure A Map of the Greater Madidi landscape, denoting major protected areas, indigenous territories, municipalities, and towns/settlements.



forestry concessions, and to a lesser extent within private land. Thus, natural resource use and management in the GML is a complex institutional scenario characterized by a great diversity of local, regional, and national stakeholders whose use areas often overlap.

Landscape-Scale Conservation

Conceptually, we have followed the landscape species approach, which is based on the selection of focal species whose biological requirements in time and space make them particularly useful for identifying where different human activities may have the greatest impact on biological conservation. It represents a spatially explicit methodology for focusing conservation action through the intersection of values related to biological importance with those of human use. Landscape ecology and GIS techniques are used to map the needs of a healthy, functioning, and viable wildlife population, and at the same time map human activities and interests. The intersection of both allows the identification of areas of conflict, and hence areas where we need to focus conservation efforts while taking into account human interests (Sanderson et al. 2002; Figure B).

Landscape species are selected on the basis of area requirements, habitat heterogeneity requirements, ecological functionality, socio-cultural value, and vulnerability to threats (Coppolillo et al. 2004). These species represent a challenge for conservation because they often have the greatest spatial requirements to maintain minimum viable populations. Based on these criteria we selected a suite of species covering the elevational gradient: vicuna (*Vicugna vicugna*), Andean Condor (*Vultur gryphus*), spectacled bear (*Tremarctos ornatus*), jaguar (*Panthera onca*), and white-lipped peccary (*Tayassu pecari*).

Simultaneously, we initiated research on how human activities relate to form threats to species and biodiversity. Existing and planned human activities in the area include new and existing roads and resulting colonization and expansion of the agricultural frontier, mining and oil concessions, overgrazing, hunting, fishing, nontimber forest product extraction, and to a lesser extent, unmanaged tourism. Critically, direct threats are often accentuated by indirect threats, which include conflicting government policies and interventions, a lack of clarity in land tenure and natural resource access rights, a lack of vision for sustainable development related to

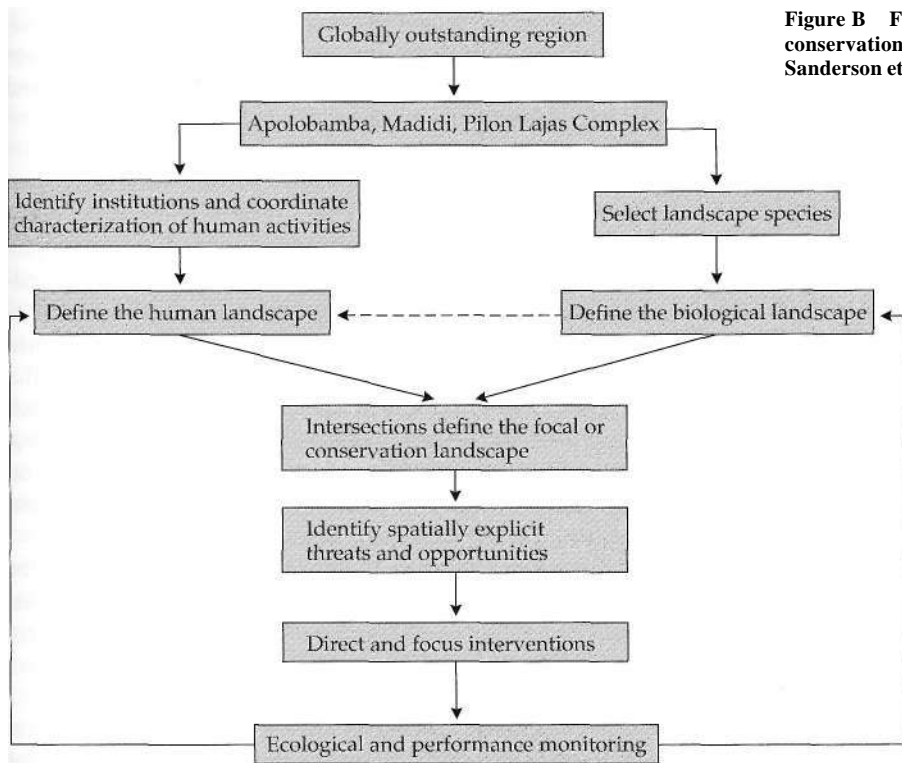


Figure B Flowchart of the landscape species approach to conservation planning, activities, and actions. (Modified from Sanderson et al. 2002.)

a poor appreciation of conservation and its benefits, a low capacity for natural resource and territorial management, a weak financial base for conservation and natural resource management programs, and information gaps and inefficient use of existing information.

A map of the key local factors involved both in conservation and in creating the most serious threats was used to describe the potential management units for landscape species. Protected areas are a logical starting point for starting to build a conservation landscape for a suite of landscape species and we made these core areas for our interventions. Other management units were identified by building out from the protected area cores, for example, indigenous territories, communal lands, and municipalities.

The Broader Socio-Political Context

The paradigm behind protected area management has changed drastically since the 1960s when local people were typically excluded from park management. Today, protected areas worldwide are increasingly run with social as well as conservation objectives in mind (see Chapter 14). The 2003 World's Park Congress (IUCN 2003) recognized that people who are struggling to meet the basic needs for survival should not be expected to make sacrifices for national and global interests. Thus, we focus on facilitating increased involvement of local stakeholders in protected area management (Jeanrenaud 2002).

In Bolivia, there has been an emphasis on promoting social and conservation objectives since the consolidation of the national park system in 1992. Primary principles guiding park

management today include respect for cultural as well as natural diversity, recognition of traditional rights over resource management, equitable distribution of benefits and participation, transference of management capacities to the local level, and integration into the regional context (SERNAP 2002). Bolivia's protected areas are large and therefore cannot be administered without the support of local populations found within and around them that have recognized traditional use rights, as well as the prohibitive costs of control and vigilance associated with patrolling extensive perimeters.

Clear definition of land tenure is an essential step for natural resource management. The Land Reform Law of 1996 in Bolivia permits the legal consolidation of indigenous collective land in the form of private and indivisible titles. This provides the necessary vehicle on which to build indigenous resource and territorial management models. Additionally, administrative decentralization, formalized in Bolivia in 1995 through the Popular Participation Law, grants municipal governments normative, operative, administrative, and technical functions over their territorial jurisdictions. However, most local governments are unable to fulfill these obligations because of technical and financial constraints, as well as an overwhelming domination of private interest groups. Participation should be a key aspect of municipal management and was a fundamental justification for government decentralization. Local people are more likely to identify and prioritize their problems accurately than central government, making resource allocation more efficient and information costs lower, while increasing the sense of ownership through local decision making.

Conservation Interventions at Differing Scales and across Jurisdictions

To be successful, conservation efforts must take place at different scales, and must link among communities and jurisdictions.

Engagement of local actors in the Madidi protected area management plan

The first five years of administration for the Madidi protected area (1995-2000) were spent establishing the park administration, and most interventions were focused on controlling illicit activities within the protected area, in particular selective logging. This led to initial conflicts with the local population because of a reduction in their access to natural resources. In addition, the territorial overlap between communities and the protected area clearly required the search for management options compatible with both the needs of the communities and the conservation objectives of the protected area.

In this context, and to ensure the social consolidation of Madidi, the development of a common vision with local stakeholders for protected area management was an essential component of the management plan process. In early 2002 we began developing the vision and strategic objectives through visits to all communities within Madidi and to those surrounding communities known or likely to have natural resource use areas within the park. During these visits the communities were informed about the protected area and the management plan process, and we learned about their community natural resource use areas, priority socioeconomic issues, and natural resource management problems. Although communities represented themselves as cohesive units they are not homogenous (Agrawal and Gibson 2001), and care was taken during the communal workshops to work separately with different user groups to obtain accurate maps of communal areas, as well as a fair prioritization of natural resource management issues.

In Bolivian protected areas, the Local Management Committee provides a forum for park authorities and local stakeholders, and for most protected areas it is the main vehicle for local participation in park management. Thus the Madidi Local Management Committee was considered a critical conduit for formalizing the vision statement, strategic objectives, and management priorities of the management plan, as well as gaining local approval of the final product. The Madidi Local Management Committee contains 23 members from local stakeholders including municipal governments, grass roots organizations, and the protected area administration.

In this light, results from the community assessments together with updated technical evaluations regarding the region's history, soil aptitude, biodiversity value, socioeconomic situation, extractive and non-extractive economic alternatives, land tenure, and park administration were presented to the Local Management Committee. Through these presentations, a revision and statement of the desired future situation for the protected area was agreed upon, including what needed to be

done, where, when, and by whom to achieve the desired situation. These determinations represent a social contract between the protected area and the human population living in and around it that is essential for successful conservation action.

Community mapping and participatory zoning Processes as key conservation planning tools

Participatory Rural Appraisals allow revision of existing protected area management categories and help define zoning categories to establish permitted land uses. All communities within and immediately adjacent to Madidi were consulted regarding their vision for land use in areas under their influence and these data were overlapped with a spatially explicit analysis of the biological and conservation value of the protected area. The technical analysis considered archaeological sites, tourism routes, protection camps, biodiversity value, endemism, and importance to landscape species.

Although most communities targeted areas close to the communities for future activities, which generally possessed low conservation value because of human intervention, negotiation was required when designating areas for extensive uses such as timber and nontimber forest product extraction.

Taken together these spatially explicit analyses have led to proposals to change the boundaries of the broad management categories within the protected area; for example, the current national park category, which implies strict protection, includes the agricultural areas of seven communities and has led to inconsistencies with existing and permitted uses. Furthermore, certain areas of high biodiversity value were included within the Natural Area of Integrated Management category

Supra-communal spatial planning and zoning in the Tacana indigenous territory

The eastern border of Madidi's protected area represents both a threat and an opportunity for conservation. The San Buenaventura-Ixiamas road is a spearhead for the colonization process. Conversely the alluvial plain between Madidi and the Beni River is an important stronghold for wildlife such as jaguar and white-lipped peccary since the majority of the area away from the colonized road is in good condition.

Less than 10% of this area is held by small landowners; the majority is held by long-term forestry concessions or by the collective indigenous territory. Given this situation we embarked on a partnership with the Tacana People's Indigenous Council (CIPTA) with two clear objectives: technical assistance for the legal consolidation of their indigenous territorial demand and a parallel participatory process to develop a natural resource management strategy for the indigenous territory once titled. In the longer term, forestry concessions will also need to be engaged in order to promote their contributions to the landscape scale management strategy.

The planning process in the indigenous territory followed a bottom-up approach, building from community Participatory Rural Appraisals up to the whole management unit level.

All 20 Tacana communities participating in the territorial demand were visited and strategic objectives, activities, as well as a zoning proposal were developed through community-level prioritization. Again, care was given to work separately with the different user groups, and during mapping of hunting areas it was sometimes necessary to work at the individual family level. Community-level zoning proposals were then combined in subregional workshops where inter-community disputes were resolved through participation of community leaders and finally these subregional proposals were combined at an Indigenous Territory scale workshop.

Community zoning proposals and maps also proved useful as a conflict resolution tool between CIPTA and other interest groups during the land titling process. Clear spatial indicators of the importance of different areas for various Tacana communities provided Tacana representatives more confidence for negotiation with neighboring properties, in particular colonist settlements. Thus a technical process of territorial planning reinforced the land titling efforts to return traditional rights over natural resources to the Tacana people.

Because management of the indigenous territory involves communities that are represented by the same indigenous organization, further advances such as development of natural resource use and access regulations have been possible. CIPTA holds the land title for the indigenous territory and therefore has some level of autonomy in developing access and harvesting rules, which makes them attractive partners to develop models of appropriate natural resource management (Barret et al. 2001; Varughese and Ostrom 2001). Natural resource regulations were initially developed at the community level, working separately with different user groups, and using the indigenous territory zoning proposal and previously defined sustainability principles broadly grouped into ecological, social, and economical sustainability considerations. Subsequently, community results were discussed in a general assembly of community authorities to develop a common regulation for the whole indigenous territory. This process requires constant communication efforts to reinforce the linkages between zoning, strategic objectives, and natural resource regulations since many of these concepts were previously unnecessary for the Tacana people.

Municipal land use planning and environmental management strategies

Although municipalities in the region have low financial resources, technical capacity, and democratic participation, they are essential for a lasting local institutional framework. Not only have they been key actors in environmental conflicts that have affected the region, but they potentially can support conservation through municipal development plans that should identify, include, and channel state support for conservation interventions identified in both protected area and indigenous territory management plans.

We have begun working with the San Buenaventura and Guanay municipalities to develop environmental management

strategies and provide support for updating municipal development plans and territorial plans. These processes have involved a self-diagnostic of the main environmental problems, including broad consultation with community representatives, municipal vigilance committee representatives, and grass root organizations. Strategic objectives include promoting sustainable natural resource use activities that respond to territorial planning exercises, to build the technical and administrative capacity of the municipal unit, to build capacity in the municipal population regarding environmental issues and civic participation and legislation, and finally, to strengthen mechanisms of local participation and control of municipal management. These strategies will begin to be implemented through the municipal annual work plans and supporting institutions. Establishing coherence between municipal annual work plans and those of the regions protected areas will be an important next step.

Community-Level Interventions

The community diagnostics carried out within the Madidi protected area and the Tacana indigenous community all identified the need for support of community natural resource management projects as a priority. Further, our threats analysis identified the lack of sustainable economic activities as a critical indirect threat. Hence, our interventions at the community level have centered on two aspects: improving the sustainability of existing activities and investigating the potential for new sustainable activities that would decrease the advancement of the agricultural frontier by providing additional utilitarian values to natural habitats.

Support of existing activities includes technical assistance to indigenous communities wishing to evaluate the sustainability of, and actively manage, their subsistence hunting. The two communities that began this activity recently made preliminary management decisions regarding the reduction in harvesting of locally threatened wildlife species: marsh deer (*Blastoceros dichotomus*), lowland tapir (*Tapirus terrestris*), black spider monkey (*Ateles chamek*), and red howler monkey (*Alouatta sard*). Four adjacent communities have recently begun to monitor subsistence hunting harvests and in this way we hope to move toward a hunting management plan for the entire Tacana indigenous territory based on source-sink management models.

Support of new natural resource use activities includes technical assistance to a native bee (family Meliponidae) honey production initiative targeted at the tourist market in Rurrenabaque, commercialization of wild chocolate, handicraft production, identification of wildlife and wilderness tourism attractions, fostering planning and community decision-making processes to ensure that the new natural resource use activity is integrated to other community activities, and assisting in the organizational processes related to the functioning of these fledgling natural resource use groups.

As an associated benefit the internal reflection process required in the implementation of communal projects—for example, to define benefit distribution and responsibilities—has

strengthened community organization. These projects have also promoted a more general internal analysis of natural resource use issues within participating communities. Community natural resource use projects can provide local user groups with the technical assistance required to develop management systems for natural resource use, to embark in new economic activities, and finally, to strengthen local governance over territory and natural resources. In many cases local user groups will need to be established, comprising members from several communities, either because of biological management considerations, as in the case of wildlife, or because of the need to achieve larger volumes of production in the case of commercial activities.

Lessons from Applying the Landscape Species Approach

As we have worked to apply the landscape species approach and associated population models for the selected landscapes species in the Greater Madidi landscape, our decision to work at a landscape scale and across jurisdictional boundaries is justified, particularly for spectacled bears and jaguars. We estimate that the current intervention landscape that stretches from the Tacana Indigenous Territory in the lowlands to the Apolobamba highlands would secure around 1800 jaguars and 2000 spectacled bears (see Plate 4). According to minimum viable population estimations based on simple models of genetic variability a population size of around 2000 is required to avoid the accumulation of deleterious alleles and permit beneficial mutations (Whitlock 2000). Hence conservation interventions must respond minimally to maintaining continuity within these populations.

Landscape-scale conservation efforts require the identification of appropriate territorial units with clear administrative and legal basis. National, municipal, and departmental protected areas, indigenous territories, and other forms of private property, as well as long-term natural resource use concessions over fiscal land such as forestry concessions, all allow territorial planning, administration of resources, and implementation of management actions oriented toward conservation and local development objectives.

To build a landscape conservation plan we have embarked on a process that first develops management instruments for individual jurisdictions. To work across different scales and in overlapping jurisdictions it was necessary to build alliances, taking into account the legality and legitimacy of the different actors to play a positive role in building a solid institutional

framework for conservation in the region. We began working with different stakeholders based on a variety of incentives that included resource tenure security, institutional strengthening, and direct economic returns.

The biggest challenge during this process is building participation and negotiation mechanisms between legitimate local stakeholders and different management units. These negotiation mechanisms will be the backbone of developing a landscape level of governance. Where conflicts about access to resources arise, the basis for their long-term resolution must be the existing legal framework. However, because of the weakness of the central government, respect for the rights of "others" established by law must be built at the local level in what could be described as the construction of a democratic culture.

Integrating communal planning with supra-communal management has been possible by carrying out bottom-up processes, during which community mapping has been a powerful tool to present community interests. Local stakeholders are slowly developing capabilities that may make them better stewards of local natural resources than the national government. However, if decentralization of this responsibility has a positive impact on landscape conservation it will be a result of the establishment of an appropriate control and cooperation framework, which will require integration mechanisms within and between the different planning levels. Institutional strengthening directed at improving communication and control mechanisms is therefore very important to maintain local accountability, particularly given that community interests are heard with difficulty outside local levels.

A critical next step will be influencing departmental and national-level plans, which can have huge impacts on local conservation plans through large infrastructure projects and granting of mining and hydrocarbon concessions. Nevertheless, without ignoring the importance of national and departmental interventions, we have prioritized building local constituencies for landscape conservation because of the difficulties that Bolivia's weak central government has in implementing and enforcing policy.

Although working with a wide range of actors is highly complex, we are privileged to be working in an area where integrating conservation and development is possible because there is still room for protected areas, extractive areas, and intensive use areas to coexist. The landscape species approach has allowed us to keep our focus on wildlife while working within this highly complex social and institutional challenge.