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PROPOSAL FOR THE CREATION OF THE VALLES CRUCEÑOS—RIO GRANDE—CAMINOS DEL CHE BIOSPHERE RESERVE

EXECUTIVE SUMMARY

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PROPOSAL FOR THE CREATION OF THE VALLES CRUCEÑOS—RIO GRANDE—CAMINOS DEL CHE BIOSPHERE RESERVE

A proposal to the Government of Santa Cruz from Fundación Natura Bolivia, Cruz Verde Bolivia, Gabriel Rene Moreno University, the Centre for Institutional, Human and Ecological Development, and PROMETA

Executive Summary

The Río Grande catchment, covering 57 000 km^2, is one of Bolivia's most important watersheds. The uplands of Chuquisaca and Cochabamba Departments, and the cloud-forested slopes of the Cruceño valleys, supply important irrigation water to the rice and soy growers of the lowlands of Santa Cruz. In recent years, though, catastrophic floods have decimated downstream agricultural production. Since 1992 floods have caused $250 M in damages: in 2005 the river's main channel changed course invading villages and 54 000 hectares of cropland. Protection of the remaining forests in the Mosqueros and Vilcas valleys will likely play an important role in reducing increases in flooding frequency and severity in the lower watershed. In addition, these valleys, a southern extension of the mega-diverse Vilcabamba-Amboró biological corridor, are home to highly diverse cloud and moist forests. The almost-pristine Piraipane and Pescas valleys, while much drier, are likely home to an equally impressive biodiversity, while the entire mesothermic valleys region is rich in cultural history, not least as the site of the last stand of revolutionary guerilla Ernesto "Che" Guevara.

There has long been interest in protection of the middle watersheds of the Rio Grande. In 2001 the Prefecture of Santa Cruz declared its intention to create a Rio Grande-Masicuri protected area, but the necessary funds were unavailable. After the catastrophic 2006 floods, the new Departmental Government of Santa Cruz decided to support protection of the Rio Grande's middle watershed. In order to further the creation of a Rio Grande protected area, a team of researchers led by Fundación Natura Bolivia compiled available literature and undertook site visits (July-August 2006) to assess the area's biological richness, socioeconomic status, and patterns of land use change (Vargas et al. 2007, Osinaga 2007, Guerra 2007, all enclosed). These studies provide concrete arguments for the creation of a new protected area.

Biological Justification

Species diversity in the Santa Cruz valleys is, as could be expected, as high as in the rest of the Andean piedmont. The neighboring 637 000 ha Amboró National Park supports 127 mammal species. While only 40 mammals species were recorded in the field, a literature reviews shows that 105 species of mammals inhabit the Cruceño valleys, while an analysis of biogeographical data suggests that the actual number could be ~130 species. Furthermore, the Cruceño Valleys do not share a similar mammal fauna with neighboring areas such as Amboró rather they appear to have their own unique mammal communities.

In terms of bird species the Cruceño Valleys are not as diverse as Amboró, supporting only 394 species (as compared to Amboró's 794 species). However, the fieldwork recorded a number of species of high conservation value: 12 species that occur neither in Amboró nor in the adjoining Parabanó Municipal Reserve, and another 8 species that in the Cruceño Valleys are at the extreme east or west of their ranges, and/or have severely restricted ranges. Not least of these species is the red-fronted macaw (*Ara rubrogenys*), one of the 20 bird species endemic to Bolivia, which is currently unprotected anywhere in the world, and occurs across the area.

The Cruceño Valleys support 1340 plant species and 22 vegetation types. This high botanical diversity can be explained by the altitudinal range with area—from 430-3900 masl, and the mixing of the elements of three biomes—the Andean, Chaqueño and Brasil-Paranense dry forests (and arguably, a fourth biome, the Amazon moist forests). There are at least 63 endemic plants in the region, including 16 cactus species.

We propose two core biological conservation zones in the protected area: 1) the 223,300 ha Vilcas/Mosqueras watersheds, an extension of the mega-diverse Vilcabamba-Amboró biological corridor which are home to highly diverse cloud and moist forests, and 2) the Piraipane/ Pesca watersheds, approximately 128,000 ha of little-known wilderness.

Hydrological Justification
Hydrological modeling and field data show that extensive cattle grazing and agricultural forest clearance exacerbates the naturally high rates of erosion and sedimentation in these tectonically young areas. Protection of vegetative cover is important to avoid increases in sediment load. Data from other watersheds suggests that protection of the Vilcas and Mosqueras cloud forests would play an important role in maintaining the dry season water flows that support agriculture in the lower Rio Grande. Loss of vegetative cover in these and other of the sub watersheds of the middle Rio Grande—especially if accompanied by activities that promote erosion such as livestock grazing—will likely reduce dry season flows and may increase the frequency and severity of wet season flooding events.

Cultural Justification
Amongst its many cultural treasures, the most significant site within the proposed protected area is the pre-Hispanic ruin of El Fuerte, a ceremonial centre close to Samaipata. UNESCO declared El Fuerte a World Heritage Site in 1998. The huge sculptured rock, dominating the town below, is a unique testimony to pre-Hispanic traditions and beliefs, and has no parallel anywhere in the Americas. Most importantly from a 20th century cultural perspective, the reserve will include most of the important Bolivian sites in the history of the revolutionary Ernesto (Che) Guevara. Che and his band of guerillas spent almost eleven months in the Santa Cruz valleys avoiding the Bolivian army while trying to foment support for a socialist revolution.

Given the biological, hydrological values of the Santa Cruz valleys, the research team[1] strongly recommends the creation of the long-proposed Rio Grande protected area. However, because of the current political sensitivity of the term “protected area” and the fact that the area is inhabited, we propose the creation of a *biosphere reserve* that will ensure conservation of key zones and promote sustainable development outside these core zones. Further, because the high cultural value, and enormous tourism and fund-raising potential of promoting the sites where Che Guevara fought his last battles, we propose naming the new area the **Valles Cruceños—Rio Grande—Caminos del Che Biosphere Reserve**. As shown in the enclosed maps, the research team proposes a total biosphere reserve of 734,000 ha, of which ~350,000 ha will comprise two core conservation zones (the Vilcas/Mosqueras and Piraipane/ Pescas watersheds). The other 384,000 ha will be reserved for sustainable development activities that promote economic development and job creation, with the condition that biological and hydrological integrity are maintained.

[1] Edil Osinga (Natura and Green Cross), German Delgadillo (CDIHE), Julio Fuentes, Dorys Mendez, and Wilma Salas Bautista (DIAP), Israel Vargas, Jose Rojas, Samuel Sangueza, Ana Guerra, Nigel Asquith and Maria Teresa Vargas (Natura).

Introduction

The Río Grande catchment, covering 57 000 km^2, is one of Bolivia's most important watersheds. Water from the forested uplands of Cochabamba and Chuquisaca Departments supplies the rice and soy growers of the lowlands of Santa Cruz. In recent years, though, catastrophic floods have decimated agricultural production. Since 1992 floods have caused $250 M in damages: in 2005 the river's main channel changed course invading villages and 54 000 hectares of cropland. Because deforestation in Cochabamba and Chuquisaca is widely implicated as the cause of increased flooding by the Rio Grande in the lowlands, the Departmental Government of Santa Cruz is trying to develop a conservation action plan for the section of the middle watershed within the Department's jurisdiction.

The Land Use Plan for Santa Cruz (PLUS) (Figure 1) declares that most of the middle watershed should be protected, or selectively harvested production forests. Under the PLUS, only a very small part of the middle watershed is designated for agriculture. In 2001 the Prefecture declared its intention to create the Río Grande–Masicuri protected area (Prefect. Resolution 075/01). There is thus local and regional support—and a legal mandate—for protection and management of the upstream forests of the Rio Grande watershed.

Many of the upstream municipalities are interested in forest management, and one, Cabezas, recently created the 39,000 ha Parabano Municipal Protected Area. Indeed, a large proportion of the Santa Cruz section of the middle Rio Grande watershed is still intact. The watersheds of Mosqueras and Vilcas are still 98% forested, while Piraipane and Piraimiry/Pescas are essentially intact (25 ha and 219 ha disturbed respectively), according to 2004 Landsat satellite images (Guerra 2007) (Figure 2). However, threats to these sub-watersheds are increasing exponentially. While only 440 ha of Vilcas was influenced by humans in 1986, by 2004, disturbed areas had increased to 2900 ha, virtually all of which was in the lower watershed. Similarly in Mosqueras human disturbance increased from 63 ha in 1986 to 1663 ha in 2004 (Guerra 2007). The rate of human influence in these watersheds will likely expand with planned improvements to the road from Vallegrande to Camiri that cuts across the middle watershed. Although forest clearance for agriculture is the land use change most apparent on satellite images, a far greater threat to the watershed is an increase in the extensive cattle grazing that decimates the forest understory and increases erosion and sedimentation. The planned road improvements that will facilitate access to the area will increase this threat. Current trends suggest that few middle watershed forests will be effectively protected unless local farmers are persuaded not convert forest to pasture or rangeland.

Four local institutions—Fundación Natura Bolivia, Cruz Verde Bolivia, Gabriel Rene Moreno University (UAGRM), and the Center for Institutional, Human and Ecological Development (CDIHE), along with PROMETA from Tarija—have recently been working with the Departmental Government of Santa Cruz to build support for the concept of upstream forest management and conservation in the upper watershed. In mid-July 2006, Fundación Natura commissioned three studies of the middle Rio Grande watershed: a rapid biological assessment (Vargas et al. 2007), an analysis of land use change between 1986 and 2004 (Guerra 2007), and a socioeconomic survey of the biologically important Mosqueras and Vilcas valleys (Osinga 2007). These studies were complemented by a CDIHE assessment of the tourism potential of the area (Delgadillo 2007)[2]. The goal of the studies was to provide the necessary technical justification for the creation of the Valles Cruceños—Rio Grande—Caminos del Che Biosphere Reserve. This document is a summary of, and builds upon, the results of the research.

[2] In addition PROMETA undertook a socioeconomic assessment of the southern portion of the proposed Biosphere Reserve, and produced a promotional video.

Biological Justification: the Valles Cruceños

Species diversity in the Santa Cruz valleys is, as could be expected, as high as in the rest of the Andean piedmont. The neighboring 637 000 ha Amboró National Park supports 127 mammal species. A literature reviews shows that 105 species of mammals have been recorded in the Cruceño valleys, while an analysis of biogeographical data suggests that the actual number could be ~130 species. While the area likely supports many more species, the July 2006 rapid biological assessment of the Cruceño valleys discovered 40 mammal species. By definition, these were the most obvious, easily found species (i.e. not the bats and small rodents that are most likely to be of restricted range or endemic to the zone). Nevertheless, the composition of even this small group of observed mammal species, clearly demonstrates the biological importance of the area.

Using Sorenson's index to compare the observed mammal diversity of the Cruceño Valleys and neighboring areas a clear pattern emerges. Of the 40 recorded mammals in the Cruceño Valleys only 22 are shared with Chuquisca and 26 with Pampagrande, despite these areas' close proximity. Even Parabanó, which shares a border with the Cruceño Valleys, has only 30 of its 54 mammal species in common. In summary, for mammal species, not only are the Cruceño Valleys as species rich as the mega diverse Amboró National Park, but also they do not share a similar mammal fauna with neighboring areas, and appear to have their own unique mammal communities.

Table 1. Comparison of Mammal and Bird species Diversity between the Cruceño Valleys and Neighboring Areas.

Species diversity	Cruceño Valleys	Chuquisaca	Pampagrande	Parabano	Amboró
Mammals	*40*	*64*	*80*	*54*	*127*
Common species		22	26	30	?
Sorenson's Index[3]		**0.42**	**0.43**	**0.64**	?
Birds	*394*			*297*	*794*
Common species				289	316
Sorenson's Index				**0.85**	**0.54**

In terms of bird species the Cruceño Valleys are not as diverse as Amboró, supporting only 394 species (as compared to Amboró's 794 species). However, the fieldwork recorded a number of species of high conservation value: 12 species[4] that occur neither in Amboró nor in Parabanó, and another 8 species[5] that in the Cruceño Valleys are at the extreme east or west of their ranges, and/or have severely restricted ranges. Not least of these species is the red-fronted

[3] The higher the Sorenson's index, the more similar the species composition of the compared areas, and so the less unique they are.

[4] *Sarkidiornis malanoto, Penelope dabbenei, Buteo poecilochrous, Theristicus caerulescens, Megascops hoyi, Bubo virginianus, Asio stygius, Colapses rupicola, Chlorospingus parvirostris, Poospiza citrina,* and *Caccius chrysopterus.*

[5] *Aramos guaruja, Fulica leucoptera, Amazona tucumana, Microstilbon burmeisteri, Celeus lugubris, Thamnophilus sticturus, Myrmorchilus striglatus,* and *Ara rubrogenys*

macaw (*Ara rubrogenys*), one of the 20 bird species endemic to Bolivia, which is currently unprotected anywhere in the world. Endemic to the Cruceño Valleys, the Red-fronted Macaw would be an ideal biological icon of the proposed Biosphere Reserve.

In terms of botanical diversity, a preliminary analysis shows that the Cruceño Valleys support 1340[6] plant species and 22 vegetation types, which can be grouped into eight vegetation zones (Figure 2). This high botanical diversity can be explained by the altitudinal range with Cruceño Valleys—from 430-3900 masl, and the mixing of the elements of three biomes—the Andean, Chaqueño and Brasil-Paranense dry forests (and arguably, a fourth biome, the Amazon moist forests). There are at least 63 endemic plant species in the region, including 16 cactus species in the drier valleys.

Of particular botanical importance is the north-south axis of the southern Cruceño Valleys. This axis, and the climatic patterns that follow from it means that elements of Chaqueño vegetation penetrate deep into the area's steep sided canyons. The result is that conservation of the Chaqueño forest ecosystem may actually be more feasible in the otherwise inaccessible Cruceño valleys than in the Chaco itself.

The proposed core biological conservation areas of the biosphere reserve are shown in Figure 3. The larger core conservation zone, comprising the Vilcas/Mosqueras watersheds comprises 223,300 ha. These pristine valleys, a southern extension of the mega-diverse Vilcabamba-Amboró biological corridor are home to highly diverse cloud and moist forests. The second core conservation zone comprises the Piraipane/Pesca watersheds, approximately 128,000 ha of little-known wilderness. The preliminary biological studies undertaken in 2006 identified these areas as likely the most important for conservation: more studies are needed to refine the limits of the conservation zones.

Hydrological Justification: the Rio Grande

A common perception worldwide is that protection of forests in the upper sections of watersheds can help maintain water flows and quality and reduce erosion. The prevailing perception is that deforestation leads to reduced dry season water flows, lower water quality and increased levels of erosion. However, as pointed out by Kaimowitz (2002), myths and misunderstandings underlie much of the discussion about how forest cover relates to sedimentation, rainfall, and water flows. Deforestation probably has only a slight effect on large-scale flooding and regional rainfall (Calder 1999). Although sediment does constitute a problem, in many places road construction, urbanization, and other non-agricultural activities generate as much or more sediment as do agricultural activities.

Few hydrological data are available for the Rio Grande watershed. A hydrological modeling exercise commissioned by Fundación Natura is underway, but until this is completed we must rely on data from other sources to predict the hydrological effect of land use change in the middle Rio Grande watershed.

Global experiences: the role of forest protection in the maintenance of dry season flows

The perception that forests act as "sponges" soaking up water and releasing it gradually over dryer periods is widespread. The reality is that forests have two opposing impacts on base level flows. Because of high transpiration, forest cover usually reduces annual water yields, leaving less total water available. On the other hand, any land use that improves water infiltration helps replenish groundwater reserves, and greater groundwater reserves imply more available water

[6] This compares with the ~2960 plant species recorded in the more intensively studied Amboró National Park

in the dry season. Whether the negative evapotranspiration effect or the positive infiltration effect dominates depends largely on the rainfall regime, soil type, and the land uses involved (Calder 1999, Bruijnzeel 2004). Burning, over-grazing, and completely eliminating scrub vegetation typically reduce water infiltration in the soil (Kaimowitz 2002). Bosch and Hewlett (quoted in Brown et al 1996) reviewed the results of 96 paired basin experiments throughout the world, to determine the effects of forest removal on water yield. They concluded "no experiments in deliberately reducing vegetation cover caused reductions in water yield, nor have any deliberate increases in cover caused increases in yield." However, montane cloud forests, such as those in Vilcas and Mosqueras constitute the exception to this rule. Cloud forests are known to intercept clouds or fog and channel some of the water to the forest floor as canopy drip. Thus, even though strictly speaking they may not affect rainfall, they do influence the amount of water that moves from clouds to the forest floor. As a result, removing cloud forests likely reduces the amount of water available in the dry season (Brown et al. 1996).

Global experiences: flow regulation and reduced erosion and sedimentation
In theory, forests may help reduce flooding by reducing the volume of water flowing overland during high intensity storms. However, this relationship probably only exists in smaller watersheds (< 50 000 hectares). In smaller watersheds, land use and forest type can affect some types of erosion. High infiltration rates associated with natural and mixed forests will reduce surface runoff and thus erosion. By binding soils, tree roots will reduce the susceptibility of soils to erosion, especially on steep slopes. Trees can also reduce the impact of rain on soils and thus the level of particle dislodgement. However, evidence suggests that forests are less important than other factors, such as ground cover, soil composition, climate, rain drop size, terrain, and slope steepness in determining sheet erosion rates.

Hydrological modeling and field results from the Santa Cruz valleys
Notwithstanding these global experiences, Auza (2005) modeled the effects of deforestation on sediment load and stream flow in the Quirusillas watershed, which flows north from Postrervalle. Vilcas and Mosqueras share the same headwaters but flow south, and like Quirusillas are especially threatened by extensive cattle grazing (in some areas leading to erosion rates > 50 tons/ha/year). With continued cattle grazing leading to a loss of forest cover at a rate of 1% per year for en years, Auza's model predicts that wet season flow in Quirusillas would increase by 25% and dry season flow decrease by more than 50%. Auza (2006) found similar results in the nearby Los Negros valley but the effects there were not as extreme as cattle grazing, and subsequent erosion and sedimentation, are not as prevalent in Los Negros as in Quirusillas. Nevertheless, even in Los Negros a 1% deforestation rate for the next ten years was predicted to result in a ~20% increase in wet season flows and 75% less dry season stream flow.

In conclusion, hydrological modeling and field data from the Cruceño valleys show that extensive cattle grazing and agricultural forest clearance exacerbates the naturally high rates of erosion and sedimentation in these tectonically active areas. Protection of vegetative cover is important to avoid increases in sediment load. Further, data from around the world suggests that protection of the Vilcas and Mosqueras cloud forests would play an important role in maintaining the dry season water flows that support agriculture in the lower Rio Grande. Loss of vegetative cover in these and other sub watersheds of the middle Rio Grande—especially if accompanied by activities that promote erosion such as livestock grazing—will likely reduce dry season flows and may increase the frequency and severity of wet season flooding events. Of particular importance is the Rio Mosqueras, which upon joining the Rio Grande provides almost half of the combined river's flow. The Mosqueras is still crystalline and sediment-free, but this will surely not be the case with extensive land use change in the valley.

Cultural Justification: the Caminos del Che

The Santa Cruz valleys have been populated since prehistoric times, as shown by the numerous cave paintings and pre-Inca ruins that scatter the area. Amongst the many cultural treasures, the most significant site within the proposed biosphere reserve is the pre-Hispanic ruin of El Fuerte, a ceremonial centre close to Samaipata. UNESCO declared El Fuerte a World Heritage Site in 1998. The archaeological site consists of two parts: the hill with its many carvings, believed to have been the ceremonial centre of the old town (14th–16th centuries), and an administrative and residential district. The huge sculptured rock, dominating the town below, is a unique testimony to pre-Hispanic traditions and beliefs, and has no parallel anywhere in the Americas.

Most importantly from a 20th century cultural perspective, the biosphere reserve will include most of the important Bolivian sites in the history of the revolutionary Ernesto (Che) Guevara (Delgadillo 2007). Che and his band of guerillas spent almost eleven months in the Santa Cruz valleys avoiding the Bolivian army while trying to foment support for a socialist revolution. La Higuera, where Che was finally killed is within the proposed Piraipane/Pesca core conservation area, while Bella Vista, where Che and his band prepared for their successful raid on Samaipata, is within the corridor that will link the Vilcas/Mosqueras core conservation area with the buffer zone of Amboró National park. The local economy will likely benefit greatly from increased exposure on the "Caminos del Che" (Che's trails) as tourist[7] attractions that complement the area's natural attractions.

Biosphere Reserve Financing Strategy

The Bolivian National, and Santa Cruz Departmental Protected Area budgets are already stretched. There is little new money for another protected area. From initiation we propose that the Valles Cruceños—Rio Grande—Caminos del Che Biosphere Reserve be designed for financial self-sustainability. This will require a fundamental change in mindset, culture and institutional framework from the way that protected areas have traditionally been managed in Bolivia. However, such financial independence and authority is required if the protected area is to succeed in the current political climate. Moreover, a decentralized model of protected area management will allow the Departmental Government of Santa Cruz to demonstrate its autonomy and innovative modern approach to natural resource management. Such financial models of financial self-sufficiency have been pioneered in Southern Africa for decades under the concept of community-based natural resource management (CBNRM). South African National Parks, for example, have two primary goals:

1) Job creation
2) Income generation

Within each protected area, these goals must be achieved without damaging the natural resource base for current and future generations. Nevertheless, economics and jobs are what drive the South Africa's world renowned and successful National Parks system[8]. The Departmental Government of Santa Cruz can aim for the same.

There are four potential sources of income for the proposed biosphere reserve. We propose that the area is designed to use the following for its management budget:

[7] In 2004 2471 tourists visited nearby Amboró national Park, but this was a decrease from the ~5000 who visited in 2002, and a fraction of the 47000 visitors to Eduardo Avaroa National Park in the same year. While tourist numbers in the Cruceño Valleys are currently low, there is great potential to increase: the city of Santa Cruz received 357000 tourists in 2004, of whom 108000 were foreign, a 4.6% increase on the previous year (Delgadillo 2007).

[8] "Parks in Transition" edited by Brian Child

Payments for Environmental Services: watershed protection
It is important to recognize that without detailed long term hydrological studies—which do not exist—the actual value of the Vilcas and Mosqueras forests for flood prevention is difficult to ascertain. However, given the high incomes of downstream rice and soy producers, and their reliance on flood minimization to maintain their incomes, it seems likely that downstream farmers may be willing to contribute to forest management if we could show which upstream forests are likely to be the most important for flood mitigation. Given that the opportunity of not converting forest to pasture in the remote upper Rio Grande basin is very low, and that local municipalities and the departmental government are actively trying to create a protected area, but do not have the funds to do so, the Rio Grande watershed presents a unique opportunity to persuade downstream, river-dependent farmers, to pay the costs of long term management of the protected area.

Payments for Environmental Services: biodiversity
Given the biodiversity importance of the area, there is potential to receive short-term funds for park management from international donors. For example Natura Bolivia is currently managing funds from the Blue Moon Fund and the United States Fish and Wildlife Service for creation of the biosphere reserve. Natura is also working with other investors such as Parkswatch, the Moore Foundation and the MacArthur Foundation to develop funding options. It is clear though, that few investors will want to pour money into a government bureaucracy. If we are to access international funds in the long term we must create a funding and disbursement mechanism that is effective, transparent and flexible.

Payments for Environmental Services: carbon
There is great potential in the long term for international funding for carbon sequestration to support reforestation in degraded and fragile areas. Again, such funding would be completely dependent on having effective, transparent and flexible institutions and funding mechanisms.

Payments from tourism
The city of Santa Cruz received 357,000 tourists in 2004, of which 108,000 were international visitors. The attractions of the proposed protected area are numerous, including pristine landscapes, and a rich biodiversity including a charismatic bird species, the red-fronted macaw, which exists only in the Cruceño Valleys. Cultural attractions include the El Fuerte UNESCO World Heritage Site and what may be the largest tourist attraction of them all—the sites of Che Guevara's last revolution. For long term sustainability we propose the development of a mechanism that facilitates payments from tourism to support protected area management.

Conclusion
Given the biological, hydrological values of the Santa Cruz valleys, the research team strongly recommends the creation of the long-proposed Rio Grande protected area. However, because of the current political sensitivity of the term "protected area" and the fact that the area is inhabited, we propose the creation of a *biosphere reserve* that will ensure conservation of key zones and promote sustainable development outside these core zones. Further, because the high cultural value, and enormous tourism and fund-raising potential of promoting the sites where Che Guevara fought his last battles, we propose naming the new area the **Valles Cruceños—Rio Grande—Caminos del Che Biosphere Reserve**. As shown in the enclosed maps, the research team proposes a total biosphere reserve of 734,000 ha, of which ~350,000 ha will comprise two core conservation zones (the Vilcas/Mosqueras and Piraipane/ Pescas watersheds). The other 384,000 ha will be reserved for sustainable development activities that promote economic development and job creation, with the condition that biological and hydrological integrity are maintained.