



Protected Area Profile – Peru Alto Mayo Protected Forest

Date of last field evaluation: July 2003

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Location: Department of San Martín, Rioja and Moyobamba provinces

Year created: 1987

Area: 182,000 hectares

Ecoregion: Peruvian Yungas

Habitats: Very Moist Pre-Montane Tropical Forest, Very Moist Montane Sub-Tropical Forest, Pluvial Montane Tropical Forest, Pluvial Montane Sub-Tropical Forest and two transitional zones Moist Pre-Montane Tropical Forest transitioning to Very Moist Pre-Montane Tropical Forest and Very Moist Montane Sub-Tropical Forest transitioning to Pluvial Montane Tropical Forest.



Summary

Description

The objectives of Alto Mayo Protected Forest are to protect the existing forest vegetation found in the upper Mayo River basin. Because of its characteristics and location, it serves fundamentally to conserve the soil and water from the destructive effects of erosion, torrents and floods. The protected area helps protect the water supply in the valley of the Mayo River. The area is a predominately mountainous landscape corresponding to the high forest zone, in the tropical yungas region.

Biodiversity

The area is characterized by beautiful landscapes and spectacular geologic formations with unique flora and fauna. The presence of cloud forests plays an important role in the hydrologic activity in the region. In the Venceremos mountainous forests, found in the interior of Alto Mayo Protected Forest, 159 species of trees and lianas have been identified. There also exist a great variety of orchids. Among the various types of fauna, threatened species such as the yellow-tailed woolly monkey (*Lagothrix flavicauda*), the oilbird (*Steatornis caripensis*), the spectacled bear (*Tremarctos ornatus*), and the Andean cock-of-the-rock (*Rupicola peruviana*) are present in the area.

Threats

The Alto Mayo Protected Forest is **critically threatened**. The principal threats include high levels of migration by Andean campesinos, territorial invasions, deforestation for agriculture or grazing, the illegal extraction and sale of orchids, butterflies, and other species, timber extraction, indiscriminant hunting of wild animals and unsustainable fishing practices. The impact of deforestation on the landscape of the Alto Mayo Protected Forest is significant and directly affects the habitat and the potential for tourism in the area.



Mayo River in the interior of the Alto Mayo Protected Forest, photo © Diego Shoobridge.

Description

Physical description

The Alto Mayo Protected Forest is located between the coordinates: $77^{\circ}45'53''$ - $77^{\circ}12'17''$ W longitude and $5^{\circ}23'04''$ - $6^{\circ}10'56''$ S latitude. To the north, it is bordered by the department of Loreto, to the west by the department of Amazonas, to the south by Tabalosos. The area is very prone to human disturbance and was consequently classified as a vulnerable and threatened zone by Dinerstein, et al in 1995.¹ Our evaluation shows that as of 2003, it is critically threatened.

Physical Geography

The distinguishing physical characteristic is the mountainous landscape, in this case, of the eastern Andes. There are also two sub-landscapes relating to the slope of the land, the piedmont that slopes between 20-30% and mountainous with slopes greater than 70%. The degree of slope is directly related to its susceptibility to erosion.²

Geology

The stratigraphic composition and the geochronology of the exposed rocks of this area are formed by a sequence of pure marine grey limestone from the Triassic-Jurassic eras with great structural deformations. Lithologically, the area is integrated with sedimentary materials of arenaceous quartz, grey lutites, clay marl and dark grey limestone. The composition of the soil is natural residue, shallow to moderately deep, of low fertility and susceptible to the risks of pluvial erosion.³

Hydrology

The principal river basin of Alto Mayo is the Mayo River. Eleven of the Mayo River's main tributaries originate within the Alto Mayo Protected Forest. Altogether, these tributaries contribute a volume of 171.38 m³/sec., approximately 80% of the river's volume at the mouth of the Tónchima River, the northernmost of the rivers whose basin is protected by the Alto Mayo Protected Forest. The cloud forests of the protected area contribute about 22% of the total water through condensation.⁴

The most important tributaries are the Serranoyacu, Amangay, Aguas Verdes, Aguas Claras, Mirador, Naranjos, Túmbaro, Naranjillo, Soritor, Yuracyacu, Negro and Tónchima Rivers.

Climate

There are noticeable climatic differences due to the various elevations present in the area. Data collected by a meteorology station in the zone showed the following tendencies: the maximum annual temperature is 72°F and the minimum is 54°F; the maximum rainfall is 165 in, the minimum is 71 in, with an average of 138 in. The relative humidity varies attitudinally, with the minimum being about 76%, with maximum levels of 100%, especially at high elevations in the cloud forests. The wind primarily originates from the east, and from the north during the first three and last three months of the year. Recorded wind speeds oscillate between 2 mph in February to nearly 5 mph in May, with an average 3.5 mph. These data are referential and correspond to the low areas near Rioja.⁵

The area experiences a dry season with low precipitation during the months of June and August and a moist or rainy season from September to May, with the maximum precipitation occurring in October and April. The area does not suffer from water shortages at any time during the year and shows clear increased temperatures during the summer months from June to August.



Southern part of Alto Mayo Protected Forest, photo © Diego Shoobridge

Biodiversity

The area is characterized by beautiful landscapes and spectacular geologic formations with unique flora and fauna. The forest zones in the protected area correspond to forest protection classes I and II (designated by forest legislation). According to this land classification, classes I and II are not suitable for intensive agriculture because of their significant slopes. They are managed to preserve the river basins, wildlife, scenic and scientific values, collective benefit, and social interest.

Flora

The type and structure of the forest is related to the climate and the edaphic conditions. The climate in any specific location is determined by the topography. The edaphic conditions are determined by the geology, drainage patterns, and the dynamics and historical development of the soil, all of which have influence over the characteristics of Alto Mayo Protected Forest. The presence of the cloud forests plays an important role in the hydrological activity of the region.

159 species of trees and lianas have been identified in the Venceremos mountainous forests, in the interior of the Alto Mayo Protected Forest, with high diversity among the Lauraceae and Melastomataceae families. Of 26 mountainous forest sites analyzed in Bolivia, Peru, Ecuador, and Columbia, Venceremos presents the greatest number of species.⁶

Some examples of species found in the area are: Spanish Cedar (*Cedrela odorata*), requia (*Guarea trichilioides*), rifari (*Miconia longifolia*), rupiña (*Miconia poeppigii*), manchinga (*Brosium uleanum*), ojé (*Ficus antihelmintica*), cetico (*Cecropia sp.*), chimicua (*Perebea chimicua*), uvilla (*Puorouma cecropiaefolia*), tornillo (*Cedrelinga catenaeformis*), cascarilla (*Cinchona pubescens*), sanango (*Faranea anisocalix*), palo seco (*Alseia peruviana*), huamansamana (*Dipterix alata*), amasisa (*Erythrina glauca*), quinilla (*Manilkara bidentata*),



marupa (*Simarouba amara*), tortilla caspi (*Allophylus divaricatus*), ingaina (*Mauria suaveolens*), yurac ciprana (*Guatteria hyposericeae*), espintana (*Duguetia spixiana*), chontaquiro (*Aspidosperma capitatum*), zapote (*Matisia cordata*), achiote caspi (*Bixa platycarpa*), copal (*Protium* sp.), yacushapana (*Terminalia oblonga*), ucshaquiro (*Sclerolobium chrysophyllum*), guayacán (*Tecoma grandiceps*), gutapercha (*Sapium aureum*), catahua (*Hura crepitans*), sangre de grado (*Croton erythrochilus*),

mashonaste (*Clarisia racemosa*), moena amarilla (*Aniba amazónica*), moena negra (*Ocotea* sp.), canela moena (*Aniba canelilla*), moena blanca (*Nectandra globosa*), quillosilla (*Vochysia weberbaueri*), pájaro bobo (*Tessaria intergrifolia*), cumala (*Virola* sp.), bellaco caspi (*Plumeria tarapotensis*), chuchuhuasa (*Heisteria pallida*), and tamshi (*Cardulovica* sp.). There are also palms such as *Ceroxylon* sp., *Geonoma* sp., *Mauritia* sp., *Iriartea ventricosa*, *Astrocaryum chambira*, *Euterpe precatória*, *Jessenia polycarpa*, *Mauritia peruviana* and ferns of the *Cyathea* sp., among others.⁷

Fauna

Among the various fauna in the area, there are species with great scientific value and those that require protection. The yellow-tailed woolly monkey (*Lagothrix flavicauda*) and the oilbird (*Steatornis caripensis*) are endangered species. The tufted capuchin (*Cebus apella*), white-fronted capuchin (*Cebus albifrons*), collared anteater (*Tamandua tetradactyla*), giant armadillo (*Priodontes giganteus*), spectacled bear (*Tremarctos ornatus*), jaguar (*Panthera onca*), king vulture (*Sarcoramphus papa*), and Andean cock-of-the-rock (*Rupicola peruviana*) are vulnerable species.

The work conducted by biologists Susan and Theodore Parker in the Afluente – Venceremos sector in the interior of the Alto Mayo Protected Forest has shown the existence of a great variety of birds, many of which are rare and were not previously recorded or discovered in Peru, like *Xenerpestes singularis*.⁸ In their 1980 study, in a 1.5 mi² area, they succeeded in finding 168 bird species. Also, in August 1976 in a study conducted by Gary Graves, John O'Neill and Theodore Parker, a new bird species, ochre-fronted antpitta (*Grallaricula ochraceifrons*) was discovered.⁹ It is also possible to find signs of the marvelous Spatuletail (*Loddigesia mirabilis*).

Other species found within the area are: swallow-tailed kite (*Elanoides forficatus*), razor-billed curassow (*Crax mitu*), Andean guan (*Penelope montagnii*), speckled chachalaca (*Ortalis guttata*), tropical American orioles (*Cacicus* sp.), blue-grey tanager (*Thraupis episcopus*), musician wren (*Cyphorhinus aradus*), Cuvier's toucan (*Ramphastos cuvieri*), ducks (*Anas* sp.), parrots (*Amazona* sp.), parakeets (*Brotogeris* sp.), woodpeckers (*Campephilus* sp.), red howler monkey (*Alouatta seniculus*), nine-banded armadillo (*Dasypus novemcinctus*), squirrels (*Sciurus* sp.), rats (*rattus* sp.), ocelot (*Felis pardalis*), white-lipped peccary (*Tayassu pecari*), red brocket (*Mazama americana*), brown brocket or grey brocket (*Mazama gouazoubira*), snakes *Spilotes*

pullatus, *Lachesis muta*, *Micrurus sp.*, *Bothrops sp.*, among others.¹⁰ (Click here to see a compilation of completed studies and extensive flora and fauna lists for Alto Mayo Protection Forest, by Claudia Véliz Rosa, Biologist, August 2003 (in Spanish only)).

Management

Supreme Resolution N° 0293-87-AG/DGFF, promulgated on July 23, 1987, created the Alto Mayo Protected Forest. The area consists of 182,000 hectares and is located in the departments of San Martín, in the Yorongos, Rioja, Elías Soplín Vargas, Nuevo Cajamarca districts and Pardo Miguel in the Rioja province, and in the Moyobamba district in Moyoamba province.

The Alto Mayo Protected Forest's objectives are to protect the existing forest vegetation in the upper Mayo River basin. Because of its characteristics and location, it serves fundamentally to conserve the soil and the water, as well as to protect the road infrastructure, populated areas, and agricultural land from the destructive effects of erosion, torrents, and floods. The protected area provides fresh water for human consumption, agriculture, and industry in the Mayo River valley. It protects and conserves endangered wild animal species, such as yellow-tailed woolly monkey (*Lagothrix flavicauda*), the spectacled bear (*Tremarctos ornatus*), Andean cock-of-the-rock (*Rupicola peruviana*), and oilbird (*Steatornis caripensis*), as well as numerous orchid species. The area is a valuable for many reasons, from its importance as a germplasm bank, to its tourism value, to its role as a recreation and educational area for the people of Alto Mayo.

The Management Resolution N° 305-2001-INRENA established a buffer zone for Alto Mayo Protected Forest. In general, buffer zones are the areas adjacent to the protected natural areas, which, because of their natural value and location, require a special treatment in order to guarantee the conservation of the area. Activities taking place in buffer zones should not comprise the goals of the protected natural area. The extension of the buffer zones is defined in an area's Master plan. In the case of the Alto Mayo Protected Forest, since the Master plan is not in effect, its buffer zone is provisional until the plan is approved.

Background

Initially, the Alto Mayo Protected Forest was created on October 9, 1963 by Supreme Resolution N° 442 with an area of 52,000 hectares, covering the Rioja and Moyobamba provinces. The discovery of the yellow-tailed woolly monkey in 1974 awoke institutions' and researchers' interest in the species and its habitat. In 1977, the Moyobamba District Forest drafted the document "The Delimitation of the Alto Mayo Protected Forest," which consisted of 71,827 hectares, including the protected areas located between the Tónchima and Naranjos Rivers, and the proposal for the protected area began to take shape.¹¹

Prior to the creation of the Alto Mayo Protected Forest, the Ministerial Resolution N° 01072-79-AA-DGFF of September 12, 1979 had declared the Rioja Forest over a 160,000 hectare area located in the Rioja province. This partially included an area in the Alto Mayo Protected Forest. On the basis of the studies made by Agrarian Region XIII – San Martín, in coordination with the Alto Mayo Special Project and the Peruvian Nature Conservation Association (APECO), the technical record for the creation of the protected natural area was developed. Subsequently, the Supreme Resolution N° 0293-87-AG/DGFF creating the Alto Mayo Protected Forest preempted the Ministerial Resolution N° 0293-87-AG/DGFF.

Article N° 22 of the Protected Areas Law 26834 and article N° 57 of the Regulation of the same law, Supreme Decree N° 038-2001-AG, establish that the protected forests are areas that are created with the intention of guaranteeing the protection of the highland or collector river basins, the river shores and other water resources, and, in general, to protect the fragile land from erosion. In these areas, the use of resources and development are permitted if it does not place the vegetative cover of the area at risk or adversely affect the fragile soil or the water resources.

Administration

The Administrative Division of the Natural Protected Areas of the National Institute of Natural Resources (INRENA), part of the Ministry of Agriculture, are responsible for all Peruvian natural protected areas. The Natural Protected Areas Law of June 30, 1997 and its regulations govern the administration.

A director, three park guards and one administrative secretary currently manage Alto Mayo Protected Forest. The area has an administrative building that acts as the central office. There is also a motorcycle and a light truck, which is currently inoperative. The protected area does not have a single control point.

Despite the fact that the area was created in 1987, it was not until February 2000 that INRENA began its actions and direct management of the area, with the support of the FANPE/GTZ project of the German International Cooperation. Initially the administrative seat was implemented within the city of Moyobamba, equipped with minimum qualified personnel, basic infrastructure, and equipment, which allowed the field operations and coordination and agreement with the main players in the area to begin.



Administrative office in Rioja, photo © Diego Shoobridge

All the institutions and sectors identified as stakeholders in the Alto Mayo area were notified with official documents about the rules and legal norms for the management of the natural protected area. This way, INRENA was established and recognized as the authority in charge of the management and administration of the natural resources of the Alto Mayo Protected Forest. This paved the way for the legal control of the area. The basic conditions for participation of the authorities and the local population in the planning and control were established. The local community recognized the borders of the area, although these borders that are still awaiting physical markers. At the request of the management of the area, the administrative seat was moved to the city of Rioja in April 2002.

The administration of the protected area has been carrying out, still in a restricted form, and there have been coordination meetings with institutions and local populations. They have established a schedule of meetings with the area's diverse communities. Although they have carried out

such meetings, the schedule as planned has not been completed. The area's administration produces an informative bulletin, called *SUGKA Cock of the Rock*, in which information related to the protection of Alto Mayo and conservation in general is published. It is produced irregularly, only when there is an available budget. The bulletin touches on topics like the buffer zone, vegetation, soil, forest issues, tourism, and includes a section on inter-institutional cooperation and the schedules for public meetings, among other activities.

Among its objectives for this year, the area's administration wishes to make an inventory of the natural features located in the protected forest. They also seek to promote tourism development that is rational and sustainable with respect to the natural environment.¹²

The Alto Mayo Protected Forest relies on a management committee. In October 2001, the management committee was established for the protected forest. Nevertheless, this has still not been recognized by INRENA and presents a series of problems that have not permitted a management norm to be established. The operative capacity of the management is still limited.¹³

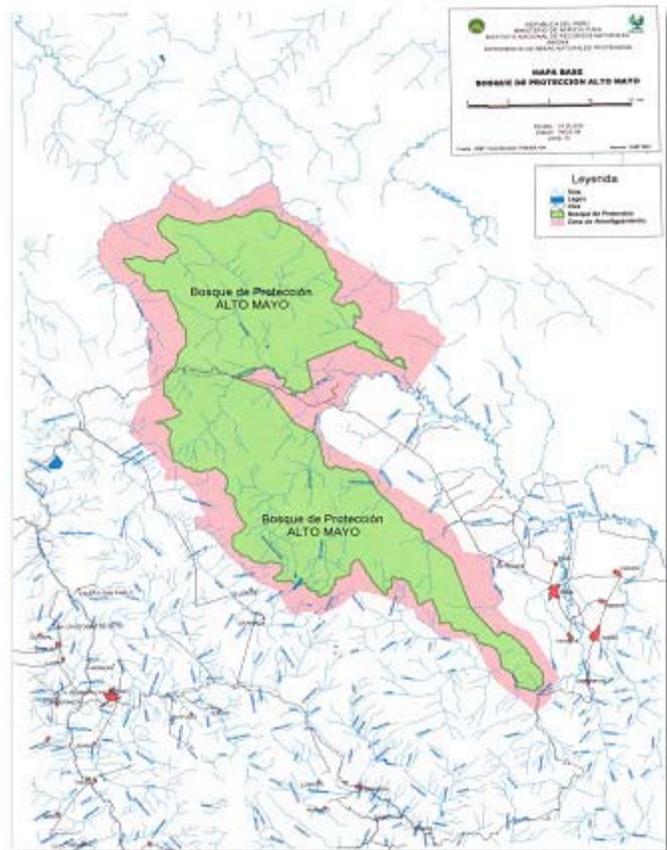
Budget

The budget for the protected area is very limited. They receive a sum of \$13,900 from the Protected Natural Areas Administration for operating expenses, used primarily for patrols and extensions. They also receive \$15,600 for salaries.

Boundaries

To the north, in the Amazonas, Loreto, and San Martín departments, it is located at 5°23'21" S latitude and 77°43'18" W longitude, following the border between San Martín and Loreto until 5°23'04" S latitude and W longitude.

To the east, it splits from this last point following the water division that marks the boundary between San Martín and Loreto until the rising land of the Huasta ravine. From here it continues parallel to the ravine until the border that marks the edge of the native community of Alto Mayo, continuing to the west until the rising land of the Valles ravine where it crosses the Mayo River to the height of the mouth of the Serranoyaco River. From this point, it continues parallel to the Serranoyacu until the boundaries of the town Aguas Verdes on the Olmos – Tarapoto highway. From here, it crosses the highway moving away to the Amangay ravine making an arc until the Mirador ravine and continues in an



Map INRENA

approximately parallel fashion to the mentioned highway in a winding fashion to a distance of 5 mi until it ends up at the town of Nuevo Tabalosos with the coordinates 6°10'56" south latitude and 77°12'17" west longitude, making the south end.

To the west, the boundary follows the border between San Martín and Amazonas along the water divide corresponding to the Chiriyacu River basin until Abra Pardo Miguel located 240 mi from the highway. Continuing along this border until the juncture of Amazonas, San Loreto, and San Martín at the coordinates 5°23'21" south latitude and 77°43'18" west longitude.¹⁴

The boundaries of the buffer zone for the Alto Mayo Protected Forest were established around the limits of the protected area in a roughly parallel fashion around its established perimeter. The demarcation of the buffer zone was formed using the national map scale of 1/100,000, prepared and published by the National Geographic Institute, complemented with satellite images and the official map of the Alto Mayo Protected Forest; all of this information in digital and geo-referenced format.

Alto Mayo Protected Forest Signs

In 1997, the Alto Mayo Special Project fabricated 40 signs to mark the physical limits of the Alto Mayo Protected Forest. The signs are indicative and informative but they do not actually correspond to the correct borders of the protected natural area. The location of each of the signs is detailed in the following table from south to north.¹⁵

N°	SECTOR	LOCATION		UTM COORD.	
		DISTRICT	PROVINCE	EAST	NORTH
01	BELEN II	YORONGOS	RIOJA	261125	9312557
02	BELEN I	YORONGOS	RIOJA	250815	9312270
03	YORONGOS III	YORONGOS	RIOJA	262175	9315553
04	YORONGOS I	YORONGOS	RIOJA	259907	9317112
05	YORONGOS II	YORONGOS	RIOJA	261063	9318105
06	YORONGOS IV	YORONGOS	RIOJA	258634	9318684
07	NUEVO SALABAMBA	RIOJA	RIOJA	257503	9321357
08	EL TRIUNFO	RIOJA	RIOJA	254878	9328316
09	CASCAYUNGA	RIOJA	RIOJA	252587	9326329
10	NUEVA SANTA ROSA	RIOJA	RIOJA	251744	9327565
11	PUERTO BAGAZAN	ELIAS SOPLIN	RIOJA	250155	9328028
12	NAC. DEL RIO NEGRO	ELIAS SOPLIN	RIOJA	248517	9326885
13	LA VICTORIA	ELIAS SOPLIN	RIOJA	248904	9330416
14	SANTA FE	ELIAS SOPLIN	RIOJA	247193	9333400
15	LA PRIMAVERA	Nva. CAJAMARCA	RIOJA	241111	9340352
16	LA FLORIDA I	Nva. CAJAMARCA	RIOJA	240369	9340750
17	LA FLORIDA II	Nva. CAJAMARCA	RIOJA	241006	9341706
18	LA FLORIDA III	Nva. CAJAMARCA	RIOJA	241162	9343016
19	CAMPO AMOR	Nva. CAJAMARCA	RIOJA	241800	9345149
20	PALESTINA	Nva. CAJAMARCA	RIOJA	239590	9344690
21	MIRAFLORES II	Nva. CAJAMARCA	RIOJA	237867	9345256
22	MIRAFLORES I	Nva. CAJAMARCA	RIOJA	237784	9346276
23	PERLA DE AGUAS	Nva. CAJAMARCA	RIOJA	239479	9348027
24	LIBER. DE PACUYACU	Nva. CAJAMARCA	RIOJA	238647	9350534
25	Nva. SANTA CRUZ	Nva. CAJAMARCA	RIOJA	231856	9350881
26	SAN CARLOS	AWAJUN	RIOJA	230596	9351072

N°	SECTOR	LOCATION		UTM COORD.	
		DISTRICT	PROVINCE	EAST	NORTH
27	RICARDO PALMA II	Nva. CAJAMARCA	RIOJA	232817	9352796
28	RICARDO PALMA I	Nva. CAJAMARCA	RIOJA	232298	9352718
29	SAN PABLO	AWAJUN	RIOJA	230033	9353093
30	TUPAC AMARU	Nva. CAJAMARCA	RIOJA	231432	9354974
31	VILLARICA	PARDO MIGUEL	RIOJA	225254	9360071
32	TRES DE MAYO	PARDO MIGUEL	RIOJA	224921	9383714
33	NARANJOS	PARDO MIGUEL	RIOJA	223214	9364255
34	SAN AGUSTIN	PARDO MIGUEL	RIOJA	220339	9360012
35	CORAZON DE JESUS	PARDO MIGUEL	RIOJA	219629	9361042
36	BUENA VISTA	PARDO MIGUEL	RIOJA	221568	9363365
37	SANTA CRUZ	PARDO MIGUEL	RIOJA	216224	9363770
38	AMANGAY	PARDO MIGUEL	RIOJA	210703	9369629
39	AGUAS VERDES	PARDO MIGUEL	RIOJA	205676	9370729
40	ALTO NIEVA	LIMITE DPTAL		194510	9372531



Information sign, photo © Diego Shooobridge

Human Influence

During 1973-74, due to the opening of the Rioja-Tío Nieva highway through what is now the protected forest, spontaneous and disordered human settlements were formed on both sides of the highway and on the shores of the Mayo River. Since 1974, the migration has been intense. Even today, migration continues, primarily poor campesinos from Cajamarca and Amazonas. People continue to move to the interior of the protected area, both into existing towns and create new towns.

In actuality, there are 24 small villages in the interior of the Alto Mayo Protected Forest and 33 in the buffer zone. The villages located in the interior of the protected area are: El Afluente, Jorge Chávez, Alto Jorge Chávez, Venceremos, Alto Nieva, Alto Valle, Juan Velazco, San Pablo, Santa Rosa del Alto Mayo, Perla del Alto Mayo, El Triunfo, La Libertad del Alto Mayo, Paraíso, Candamo, El Perol, Playa Azul, Nuevo Edén, Guayaquil, La Esperanza, Nuevo

Jordania, Sector Aguas Claras, Alta Floresta, Petroglifos, and Nuevo Candamo. It is estimated that between 3,000 and 3,500 people reside in the interior of the protected area. In the buffer zone, the following villiages are found: Aguas Verdes, Amangay, 2 de Mayo, Miguel Grau, San Isidro, Santa Cruz, Corazón de Jesús, Sánchez Carrión, Oriente Nuevo, César Vallejo, Sol Naciente, Tiwinza, Santa Rosa del Mirador, all in the district of Pardo Miguel. San Carlos in Awajún district. Santa Cruz, Sol de Oro, Miraflores, La Colca, Capulí, Paraíso, and Bellavista in the district of Nueva Cajamarca. Alto Mirador, Bolivar, Vista Hermosa, Santa Fe, La Victoria, Naciente de Río Negro in the district of Elías Soplín Vargas. Paraíso de las Minas, Zona Cuchachi in the district of Rioja. Buenos Aires, Selva Alegre, Galilea, and Salas in Yorongos district.

In the northeast of the protected area, there are Aguaruna native communities. Throughout the years and with the increasing foreign influence, the native populations have seen the modification of their surroundings and culture.

Presently, the Aguarunas are dedicated to commercial agriculture of rice and coffee. A great part of subsistence agriculture has been left behind, remaining only in small garden plots. Hunting, fishing, and harvesting, complement these activities.¹⁶



Human presence in the interior of the Alto Mayo Protected, photo © Diego Shoobridge

Access

The San Martín department is connected to the rest of the country by the Chiclayo-Bagua-Tarapoto highway, completely paved and in a good condition. The region is also accessible by the unpaved Tingo María-Tocache-Tarapoto highway. Another mode of access is the Tarapoto airport, from where vehicles are taken to the protected area. The city of Rioja also utilizes the airport, which is actually outside of the commercial route. Many dirt roads that exist off of the main route allow access to areas relatively close to the protected area.

The highway borders Alto Mayo Protected Forest for 81 mi from Abra Pardo Miguel until the Tónchima River. This highway directly crosses the protected area for 15.5 mi, passing through the towns of Alto Nieva, Venceremos, Jorge Cháves and Afluente of in the interior of the protected forest. On the west side of the protected area, surrounding the buffer zone in

Amazonas department, in the Bongará province, there is a unpaved access road to the town of Jumbilla.

From the main routes, there are a series of roads and foot trails to the protected forest that arrive at and connect the villages in the interior of the protected area.

Tourism

Tourism in the Alto Mayo region is still only beginning. Even though tourist services available have improved recently in Moyobamba and Rioja, it is important to emphasize the lack of possibilities that exist for those that rely on the development of tourism as a significant part of the regional economy.

The city of Tarapoto, located about 68 mi to the southeast, is much more complete with numerous tourism attractions, in addition to 10 years of experience promoting tourism. They do, however, face some basic problems like the lack of national prominence (that other Amazon destinations have) and the high costs of maintaining the infrastructure with an uneven influx of visitors.¹⁷

Alto Mayo Protected Forest offers beautiful landscapes typical of highland jungle, interesting flora and fauna, rivers for boating, cascades, waterfalls, beaches, lagoons, caves for oil bird watching, hot baths, among other tourist activities. In the region, in the environs around the protected forest, there is also tourism potential, for example, the caves of Perla de Cascalunga, Diamond, Aguas Verdes, Amazonas Sanctuary, Velas, Palestine, Campoamor, Santa Fe, the sources of the Negro, Tioyacu, Aguas Claras Rivers, the tides of the Avisado River, the cloud forests of Venceremos, Agua Blanca waterfall, among others.

During our trip to the field, it was possible to observe that small tourist groups arrive and cross the protected area stopping periodically to look at birds in the surrounding forest and orchids on the cliffs. The presence of these types of groups, however, is sporadic.

A local biologist specializing in orchids often takes groups of tourists around the highway that crosses the protected forest to observe orchids in their natural state. He comments that the destruction of the forest carried out by the local migrating campesinos kills the orchids and their habitat and spoils the landscape. The impact of deforestation on the landscape of the Alto Mayo Protected Forest is significant and directly affects the future promotion of tourism.

In the town of Naciente de Río Negro, in the southern part of the protected area, the Urcuchaqui and Bosque de Peña Blanca waterfalls are located, which are tourist destinations. An interviewee mentioned that between July and August, tourist groups arrive every 2 to 3 weeks, brought by tourist companies of the area who contract guides from the town. The community members want to construct a tourism center in the town. But, this tourist attraction has been negatively affected because of the degraded state of the forest. Presently, there are about 8 families settled in this zone that make it difficult to conduct tourism. The community wants to promote tourism, but cannot compensate these families in order for them to eradicate the area.

The *Tourism Use and Recreation Plan* is one of the most important planning instruments in protected natural areas. Its formulation is developed following the criteria from the master plan

and it attempts to cover in greater detail the criteria, priorities, and limits of use of the area by the public.¹⁸ There is neither a master plan nor a tourism and recreation plan for Alto Mayo. Nevertheless, an inventory of the interest points will allow identification of these things and knowledge about the actual state of conservation.

Conservation and Research

The following studies were conducted in or relate to Alto Mayo:

Cárdenas, L. Bosque de Protección Alto Mayo. Un paradisíaco refugio por consolidar. Publicación de la Asociación Ecologista y Cultural San Martín (mimeografiado). 1998.

Cárdenas, L. Alto Mayo, rutas de verdor y tradición. Guía cultural y turística. 2001.

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Módulo V: La Flora útil en las comunidades nativas del Alto Mayo.

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Threats

The threats to the Alto Mayo Protected Forest include:

- Migration, territory invasion, and traffic through the area
- Deforestation for agriculture and ranching
- Extraction and illegal sale of orchids, butterflies, and other species
- Timber extraction
- Indiscriminate wildlife poaching and unsustainable fishing

Migration, territory invasion, and traffic through the area

After the opening of the jungle highway (today, the Fernando Belaunde Terry highway) in 1974, the San Martín department in general and especially the Alto Mayo region underwent a severe environmental crisis due to the intense migration of Andean campesinos from Cajamarca and Amazonas that arrived constantly to settle in the area, including the interior of the Alto Mayo Protected Forest. This situation worsened due to the lack of political control and an insufficient and inefficient participation of the state institutions that are in charge of protecting the natural resources. The presence of a massive migratory population places the integrity and future of the natural protected area at great risk. The migrants are mostly rural farmers and on a smaller scale, traders, transportation providers and others looking for opportunities.



Highway that crosses through Alto Mayo Protected Forest, photo ©.Diego Shoobridge.

There are many factors that have encouraged the migratory process: 1) the governmental policies of productive occupation of the Amazon, 2) the spatial relationship between the areas and the highways, 3) the limited land and water resources in the areas from where the migratory populations come in the Andean region of the country, 4) the commercialization policy of rice and yellow maize on the part of state companies that created artificial and non-sustainable markets, 5) the past agricultural funding acquired through the governmental Agricultural Bank (now defunct), and 6) the lack of control over

and the relative ease of timber extraction. The Alto Mayo Special Project (PEAM) is a decentralized agency of the National Institute of Development (INADE), under the Ministry of the President centered in Moyobamba that institutes multisectorial rural development programs.

PEAM's agricultural promotion and production activities, road construction, irrigation, technical assistance, and farming credit have also stimulated the migratory flow to the region.

In the beginning of the process, the migrant population occupied the lowlands with higher agricultural productive capabilities. Later, after the productivity of the land decreased and the soil was saturated, they occupied marginal lands and employed slash and burn techniques on the forest to grow subsistence crops. The campesino migrants occupied the slopes and applied their own cultural patterns of land use. Because their methods were foreign, they were not appropriate for agriculture in this region or for the maintenance of the forest and its resources. The people searching for migratory lands occupy new zones of virgin forest. In this manner, the campesinos exert constant pressure on the land, which translates into disordered use and severe alterations of the environment in the region.

In the last 20 years, the pressure for new agricultural and pasturelands have resulted in an uncontrolled colonization of the primary forest in the protected area. Many establishments have extended on hills and at the heads of rivers and ravines. This expansion of the colonization toward the primary forest and lands of the native communities constitutes the principal threat to Alto Mayo Protected Forest.

The persistent migratory flow is placing pressure on the land and invading the Alto Mayo Protected Forest, often in collusion with land dealers. There are cases of settlements in the interior of the natural protected area that are simple, with only a few dispersed houses, generally inhabited by families, without characteristics of centralized towns. Nevertheless, these people manage the area like a centralized town before the authorities of the district, with the aim of selling and dealing the land. These settlements are so remote that the local authorities do not visit to do inspections and are often surprised and deceived by the applicants.

In other cases people arrive in a specific zone of the forest, cut the vegetation and open the land, place an inn or small house and later try to sell it, usually to new migrants. In Consuelo (also known as Ventana), in the southern interior of the protected area, this is occurring. These are generally people from other areas that have land and look for more to sell. Presently, the protected area's authorities are making it clear that the sales are crooked and prohibited, however, the land dealers have formed an association to appear legal to convince potential buyers.

With little conscience and little environmental sensibility among the migrant population and the local governmental authorities, effective coordination and the decision making process to support the protected area management are greatly limited. This problem particularly affects the public ministry, which grants land titles in unauthorized areas, and the judicial power, which does not authorize actions to remove the invaders and sanctions the land dealers and illegal harvesters.

The state breaches the legal norms concerning the natural protected areas and the environment because its sectors and social investment programs actually respond to the demands by informal and illegal settlements in the Alto Mayo Protected Forest. They create schools, grant land titles, recognize the settlers and local authorities, offer basic sanitation services, construct access roads, first aid posts, etc. All of these actions consolidate these settlers in the interior of the area and at the same time provides an incentive for other migrants to come to the protected area for these services. The vast majority of the settlers recognize that they are located in the interior of the

Alto Mayo Protected Forest, but because they have infrastructure, facilities, and work within the framework of their cultures, it is next to impossible to remove them, except through the use of compensations, which is very difficult considering the small budgets.

A series of conflicts have arisen in the area concerning land possession. In some cases, there are so many centralized, illegal settlements in the interior, like recognized towns and their respective local governmental authorities that benefit from the state's social investment and the attention of the government. There are also invaders dispersed throughout the area, some spontaneously grouped and others organized, but they are not recognized. There are towns that are right at the boundaries of the protected forest and that have been titled under the Special Land Title Program (PETT). These towns are found in areas that because of their topography and soil characteristics are not apt for settlements and are on lands catalogued as protected lands.¹⁹

The border between Amazonas and San Martín is ambiguous. In the southern portion of the area, a departmental landmark is located in the wrong place that further confuses the situation. The people think that the Amazonas department continues up to this sign, which includes the town of Ventana, however, this town is found in the interior of Alto Mayo Protected Forest in San Martín. Consequently, the Amazonas authorities have given permits or land titles allowing the people of Vista Alegre, an Andean town, as well as other people, into the protected area. There are also people from Rioja and Moyobamba that send workers to work on "their" lands in the interior of the area. The people of the town Naciente de Río Negro have also been involved in land dealings in the area. The people that are settled in this zone have purchased the land on which they work, but land sales are unlawful in the interior of the protected area. In the town of Villa Hermosa, in the high Nieva sector, in the Bongará province, Yambrasbamba district, there is also a departmental border dispute and there are land sales in the interior of the protected area.

At the beginning of the 1990's, when the natural protected area did not have personnel, the people of Rioja had interest in securing the Onercocha lagoon for tourism. They placed a security guard, to whom they gave food and paid every so often. When the people of Rioja quit going to the lagoon and abandoned the project, the guard brought in outside people who settled there forming the villages of Paraíso, La Perla, Santa Rosa, and Triunfo, all of which are within Alto Mayo Protected Forest.

In the west of the protected area, in the buffer zone in the Amazonas department, the threat of invaders also exists. The town of Chisquilla has a large amount of intact forest because there are still few people and access is difficult. They intend to construct a dirt road to the Tialango zone to access new land and to promote agriculture and ranching. They have already managed to obtain explosives to clear rock and open a road.

Deforestation for agriculture and ranching

Agriculture and cattle ranching are the principal activities of the migrant population that come to the region. They do not plan or employ technical methods. They sow and raise grass for grazing on the slopes of hills causing deforestation, serious erosion of the land and loss of topsoil.



Deforestation in the interior of the Alto Mayo Protected Forest, photos © Diego Shoobridge.

The forest resources are not used in a sustainable way. In the lowest parts of the protected area, the forest has been severely affected and its destruction continues. The forest activities in the mountainous lands cause irreversible changes in the capacity of the vegetation and the soil to retain water. They are causing severe soil management problems. The imminent disruption and destruction of the vegetation on the mountain slopes causes difficulties in the control of water flow and erosion of the soil. Consequently, the loss of forest impedes the future sustainable use of the productive areas in the lowlands in the river basin.

Deforestation contributes to the accelerated loss of the area's biodiversity through habitat destruction. The migrant population is characterized by acute ignorance and the lack of an environmental conscience. The negative impacts of deforestation affect the productive capacity of the land, the loss of which entails economic impoverishment and social malaise.

The local population believes that ranching and rice and coffee cultivation are the only development choices. Upon arrival, the migrants plant coffee, with the first harvest being in three years time due to the low productivity of the soil. The campesinos clear more forest in search of new, more productive land or turn to ranching. This activity requires constant expansion of the pastureland, which requires clearing more forest. Ranching is growing at an alarming rate among the settlers in the interior of the area as well as in the buffer zone. For example, in the town Naciente de Río Negro, there are 200 head of cattle and the number is increasing.

The migrant campesinos employ agriculture without any technical criteria and in an unregulated fashion. A hectare of coffee that should produce 40 to 50 quintals (4050 to 5070 lbs) on appropriate land with sound management produces 8 to 10 quintals (850 to 1015 lbs). An agriculturalist employing technically advanced management with 1 or 2 hectares of land devoted to coffee could subsist. According to a local authority, approximately three to five migrants families arrive daily in Naciente de Río Negro, clearing forest, even on stony land. They use the land for subsistence agriculture for two years, then leave secondary forest growing and move on, only to be back to the same land in 3 or 4 years.²⁰



Deforestation in the interior of the Alto Mayo Protected Forest, photo © Diego Shoobridge.

In the northern part of the protected area (in the Paríso, El Triunfo, Bello Horizonte, Candamo sectors among others) approximately 2000 hectares have been deforested, including secondary forest. In the south of the protected area, an estimated 350 hectares have been deforested, including secondary forest, for a total of between 2300 and 2500 hectares deforested in the interior of Alto Mayo Protected Forest.

In the buffer zone, intensive agriculture is practiced, principally for the cultivation of irrigated rice that occupies the flat areas. This rice cultivation generates acute water and soil contamination from the intense application of fertilizer and chemical products. The rest of the agricultural land is planted with coffee, which approaches the higher land of the interior of the protected area. The inadequate promotion of coffee cultivation pushes the farmers to the higher and most fragile parts of the protected area. Unlike the rice growers, the coffee farmers interviewed in the interior of the protected area mentioned that there is demand for coffee grown without chemicals, that is, organic coffee for export. If this were to become common, the protected area would avoid unnecessary environmental contamination.

The irreversible negative effects on the region's hydrology and nutrients are anticipated over extensive area of the Mayo River basin in the coming years if the land use patterns and the level of deforestation continues on the primary forest of the protected area. Deforestation causes the deterioration of the highlands in the river basin that provide water to the lower regions. Deforestation has increased the risk of natural disasters in the area. Avalanches or landslides, flooding of the rivers, erosion and soil destabilization in sloped areas expose people and infrastructure to gradual collapse.

The flooding of the Mayo, Yuracyacu, Indoche, Gera, and Tónchima rivers, in the rainy seasons has caused losses in irrigation systems, houses, cultured land, and infrastructure. The overflowing of the Indoche River in 1989 affected 218 families, flooding 1065 hectares of farmland, with losses of 3000 metric tons of farm products and 2,100 animals.²¹

In the western buffer zone, in Amazonas, cattle ranching dominates the area. This forest zone has been severely impacted, to the point that it is difficult to obtain firewood near the towns. In this zone, there is a threat of an advancing cattle ranching frontier into the protected area.

Deforestation is evident from the mouths of the rivers to the protected forest. The mouth of La Chorrera gorge is being destroyed in an alarming fashion. The same is occurring in the Trialango gorge, which is the water source for the Jumbilla small hydroelectric dam. The local farmers do not pay mind to the recommendations from the authorities and continue the deforestation.

Extraction and illegal sale of orchids, butterflies, and other species

Illegal orchid sales occur most visibly in small villages along the highway crossing the protected area. Some settlers offer transportation to where orchids are extracted from the interior of the area. They have constructed an infrastructure including shelves to place the species on for those passing by to see.

Although the director of the protected area has already notified the owners previously of their illegal activity, the sales continue. During a visit to the field conducted by ParksWatch-Peru, the head of the protected area intervened to prevent these sales, with the support of the Forest and Fauna Technical Control Administration seated in Moyobamba and with the support of members of the National Police from Narjanos. They were ordered to dismantle the infrastructure for good and return all the orchids to the forest. They were told that any future operations will be met with seizure of the plants and a fine.

There are numerous nurseries dedicated to growing, reproducing, and selling orchids and other plants in Moyobamba. There are at least three important nurseries, yet according to the owner, only one (Agroriente Viveros) has the appropriate operating license.²²

According to an informal conversation, nursery workers go to the street sellers searching for rare or new species to reproduce for science. The nurseries can supply the market with legally grown orchids, however, the search for new species perpetuates this illegal harvest of wild orchids. There also exists a network of informal extractors that continually offer the nurseries rare species.



Illegal orchid sales along the highway, photo © Diego Shoobridge.

Orchid sales are permitted only for cultivated plants. Article No. 279 of the Forest Law Rules establishes that the commercialization of ornamental species, such as orchids, are to be done in accordance with the specific rules put forth by INRENA (currently being expanded).²³ The commercialization of these ornamental species classified under some of the threatened species categories defined in article 272 of the Forest Law Rules, only applies to those originating from centers of production (in vitro cultivation laboratories and/or nurseries) properly registered with INRENA and employing an approved annual propagation plan.²⁴

The international export of orchids and other ornamental species is conducted according to CITES guidelines, for which INRENA authorizes the corresponding exportation, establishing safeguards relative to the property of the country's genetic resources. Nevertheless, authorized cultivators affirm that a large number of orchids continue to leave in country, due to the ignorance and corruption of the civil employees charged with control. There have been cases in which foreign scientist obtained new species for science from Alto Mayo Protected Forest through illegal sales. They are then taken from the country and registered with a scientific name referring to the name of the scientist and not to the location of the origin of the species.²⁵

The extraction and sale of these orchids, including CITES protected species, puts the regional biodiversity at risk. It has also greatly impoverished the Alto Mayo Protected Forest ecosystem near the highway. Some campesinos claim that they have to walk for up to four days into the forest in order to find certain orchid species with commercial value.²⁶

Collection and commercialization of butterflies has also been widely conducted with equipment and sophisticated technology. During our field visit, there were three traders from another region preparing paperwork for the transport of butterflies at an inhabitant's house in the interior of the protected area. When we arrived and the business was halted and they all denied these intentions.

Foreign visitors could easily converse with a campesino along the side of the highway and learn that he had collected around 1000 butterflies per month from the Alto Mayo Protected Forest for a retailer. That retailer pays, depending on the species, up to \$6 per specimen and then exports them to the United States and Japan.

An email sent to ParksWatch Peru by Karol Villena, a biologist for AgrOriente Nursery, regarding the orchid extraction problem (13/08/03).

Hello Diego

I am delighted to have the ability to help you, on the contrary, I am thankful that you give me the opportunity to do something for this beautiful forest. I think that the root of all these problems is the settlers living in the forest. I think the authorities should be very firm in order to end their occupation completely or to relocate them to another place. These people are the principal destroyers of this forest. They cut the trees, build small farms, harvest orchids, butterflies, ferns, and birds.

In my opinion, it is not worthwhile to educate them, or to show them how to rationally exploit the resources. I think it would be a waste of money because their hunger is not rational; they only want to fulfill their needs. An orchid sold for a sole (about 28 cents) for the international market can have an actual cost of \$10-500. The forest's orchids have not been thoroughly studied; two years have passed since a scientist discovered 5 new orchid species by simply walking along the highway. Last year the news of the discovery of the *Phragmipedium peruvianum* traveled around the world and has been considered the greatest orchid discovery in the world, as its beauty has great genetic potential in hybridizations. Lamentably, it was discovered by campesinos that did not know its value and were only extracting it for insignificant amounts of money, while each plant was being sold for between \$500 and \$10,000 on the black market!!

I think that we still have time to save this forest, and that immediate measures should be taken. Warnings or signs should be placed warning the sale of orchids within the forest is prohibited and to completely remove those living here, or at least immediately remove the stands selling the orchids. It is incredible that a year and a half has passed since the discovery of this new species and even after the worldwide contraband scandal, absolutely nothing has been done. Things continue in the same way and more shameless because in the afternoon on the day you all were here, I went to visit a artesian store that the municipality has opened for the local artisans, even there I found a pair of this species' plants, one of which was in bloom, apparently not harvested even a month ago, and it belonged to the current lieutenant mayor, no less.

I informed the professional that works for INRENA here in Moyobamba. He took note but did not go to see for himself until two days later and only because I followed up. According to him, the plant was no longer there and he told me I had been lying and that he did not want press problems with this plant. This attitude alone is infuriating and on top of that, they call you a liar!!!!!!

Regards
Karol

Timber extraction

Due to highway access and human presence in the zone for several years, the forest resources in the region have been greatly affected. All the valuable wood, like the Spanish cedar (*Cedrela odorata*), has already been extracted in places of heavy access and in the areas around the settlements. Today this wood is only found in very isolated places in the interior of the protected area.

Although the timber activity is limited due to the area's geography, selective timber extraction continues in the zone, above all Tornillo (*Cedrelinga catenaeformis*) and *Virola* sp., which constitute the majority of the illegal extraction. The harvesters do not have any type of harvest permission, nor do they have concessions or follow any sort of management plan. Extensive use of power saws to fell trees and prepare the boards in situ to facilitate transportation has contributed to the irrational use of the forest resources in the region. There are traders and carpenters that contract out to small extractors that do the hard work in the field and then bring them the wood.²⁷ If there is wood of greater value, it is sent by truck to the coast in the city of Chiclayo, lower quality wood is also included that is mainly used in construction. For transportation, the traders obtain false or forged documentation in order to pass the checkpoints on the highway. They place the boards under cargo such as coffee and it is difficult to detect. The local carpenters are also important part of the demand for wood.



INRENA forest control point in Aguas Claras, photo © Diego Shoobridge.

In Aguas Claras, the Technical Forest and Fauna Control Administration of INRENA has a control point. The infrastructure is minimal and consists of a small covered cart located next to the highway patrol's checkpoint. Although one may think the location is strategic being so close to the national police, the forest control personnel affirms that the police do not offer any support. On the other hand, the police do not receive any funding from the ecological police for such duties.

Streams are used to transport the wood out of the protected forest. Wood from the interior of Alto Mayo Protected Forest is removed; dealers and extractors contract with local settlers in the interior dedicated to timber extraction. They remove the wood surreptitiously.



Illegally harvested wood seized by the area's administration and timber extraction in Alto Mayo, photos © Diego Shoobridge.

Thanks to our presence in the zone and our logistical support, the director of the area was able to pursue the wood extracted from the interior of the protected area. This wood was found at about six in the afternoon on the side of the highway, waiting to be loaded on a truck. The director called Aguas Claras forest patrol and the police to carry out the raid, following standard protocol. Both groups arrived where the wood was, the corresponding documents were drafted and the wood was detained. On the following day, the director returned to the area and the owner, despite the raid, had already removed the wood. This created confusion, distrust, and frustration. The forest control administration demonstrated its inefficiency and suspicious behavior. If this is how things work in the presence of the protected area's administration members, how does it function in raids that are carried out without their presence?

Indiscriminate wildlife poaching and unsustainable fishing

Due to the intense migration in the region and the growing number of human settlements in the interior of the Alto Mayo Protected Forest, there has been a strong negative impact on the fauna. The migrants indiscriminately hunt animals with guns. Human presence and associated activities not only frighten the fauna but also destroy habitat. Nowadays, wildlife cannot be found around the settlements or the highway. It is necessary to walk between 4 and 6 hours, and in some cases 8 hours, in order to find major fauna.

When it comes to fishing, the migrant population does not dedicate much time to it. They use nets and hooks to catch fish daily. On the other hand, the natives that live around the protected area use barbasco, which is a vegetable that is crushed and put in the water and forces the fish to look for oxygen near the surface. The moment they surface, they are captured. When this is used frequently, the barbasco affects the overall availability of fish. There are also people that fish with dynamite, a very destructive method that kills all types and sizes of fish. Use of this

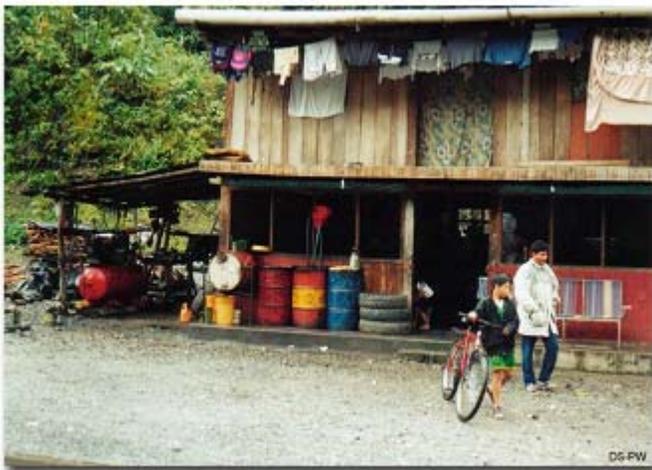
method has not been recorded in the protected area, but because people use it to fish other places in the region, it is a threat that could easily enter the protected area.

Management difficulties in the area

Small budgets make managing the area difficult and limit the planning and implementation of long term activities. There is a great lack of control and vigilance for the Alto Mayo Protected Forest. There are not control points or cooperative offices. The administration does not possess sufficient personnel, adequate equipment for fieldwork, logistic capacity, means of transportation, or fuel. The area still lacks definitive borders and the associated signage. This makes planning control and vigilance actions and monitoring very difficult. The multi-sectorial coordination opportunities, which include committee management, promote many meetings about common interests, but concrete agreements are not made or make effective decisions that affect the development of Alto Mayo Protected Forest.

Other threats

The presence of small shops selling fuel in the interior of the protected area near the highway is a threat of contamination for the area, of both the air and the soil.



Local fuel station in the protected area,

Drainage contamination from the station

Photos © Diego Shoobridge

The presence of an industrial cement production plant and a quarry for the main highway material in New Jerusalem exercises influence over the area. Although this plant and quarry are found outside the buffer zone, the impact they generate through the production of smoke and dust from the operations, still affects the area, both the buffer zone and the interior of the protected forest, because of the winds. The subtle effects can be observed on the slopes of the hills where the accumulation of smoke and dust clouds and will have long term effects on the zone's flora and fauna.



Cement factory on the highway, with constant emissions into the atmosphere and a quarry within the protected area, photos © Diego Shoobridge.

Another problem is related to the oil birds. On occasions, hunters burn the openings of the oil bird caves in order to kill and capture them. According to reports, in the reproductive oil bird colony found in El Naranjillo cave in El Naranjillo, people have burning tires at the entrance and subsequently destroying all the biodiversity held within. In a letter sent to the president of the San Martín region by S. Kasel, director of GTZ FANPE, this practice is considered to be an unjustified crime against the region's sustainable development, done not out of necessity nor poverty.²⁸

Future threats

- Increased migration and deforestation.
- Increased access to the interior of the protected area.
- Potential increase of demand and extraction of orchids.

Increased migration and deforestation

If the present migration and deforestation rates remain constant in the near future, there will be significant and irreversible impacts on Alto Mayo Protected Forest. To date, no preventive measures have been taken for this situation. It is foreseeable that the migration flow will continue toward the interior of the protected area and the consequent destruction and deforestation will continue.



Landslides caused by deforestation, photos © Diego Shoobridge.

Increased access to the interior of the protected area

The construction of new access roads, dirt roads, pedestrian paths, and the consolidation of existing roads, constitutes an incentive for migrants and resource harvesters to enter the protected area. All the recently established towns, both in the interior of the protected forest and around it, want to be interconnected by roads. The settlers in these towns are the same that promote road construction, both new access roads as well as those between towns. In some cases, they construct the roads on their own initiative with local resources and in other cases with the support of the regional authorities with social program financing. An example of such support is the central government's program "A Trabajar Rural" that pays the local work force for road construction and improvements.

The existence of a network of access roads places the integrity of the protected area's resources at risk and impacts the quality of habitat, allows people to circulate freely, reduces fauna, compacts the soil, alters the drainage patterns, and allows access for cattle ranching and agriculture.



A trail in the southern part of the interior. The transport of cargo and supplies from the highway to the interior.
Photos © Diego Shoobridge

Potential increase of demand and extraction of orchids

Presently, substantial demand exists for commercial orchids. The settlers living near the highway have created an infrastructure for showing and selling orchids, indicating the business has success. According to interviews, all types of people come to buy orchids, from occasional travelers that stop their cars in the side of the road to bus passengers traveling between provinces to specialized researchers to informal suppliers from nurseries and storekeepers from the cities.

Orchid harvesting has already created problems in the most accessible areas and near the highway. In these places, orchids are simply not found because they have all been harvested. If the demand for orchids continues, there will be an incentive for the local settlers to travel further into the protected forest in search of orchids.

Recommended Solutions

Migration, land invasion and land trafficking

The director of the protected area should intensify coordination between governmental agencies and regional authorities including district mayors, the prosecutor's office, the Ministry of Education, and Ministry of Health, so that these groups do not give authorization, land titles, recognize or offer services to new settlements in the interior of Alto Mayo Protected Forest. The director should gradually restrict the direct support that the illegal populations in the interior of the protected area actually receive (milk, medicine, and school) to create an incentive for them to move out of the area.

A migration prevention and control program should be created, at least within the protected area. The authorities should restrict the arrival of new migrants in their respective locations. Migrant colonists, whether strangers or relatives of settlers, that arrive in search of land should be directly rejected. The director of the protected area should coordinate with the corresponding localities and identify mechanisms and allies to implement this program. The director should seek the

support of the regional administration and the public ministry so that they will adopt this initiative and promote it at a regional level.

It is recommended that a detailed census of the protected area be conducted for the number of people living in the interior and the number of hectares deforested. These data will serve as a baseline data for the control and monitoring of actions intended to slow migration and ameliorate the human impact on the forest.

Local governmental institutions and authorities should put territorial ordering and zoning actions into practice in the area surrounding the Alto Mayo Protected Forest to ensure sustainable development on lands outside of the protected area and therefore lessening the direct pressures on the forest itself. If agriculture, cattle ranching, natural resource extraction, and human settlements are ordered and established around the protected area, there will be more possibilities to exercise control so that the protected area does not suffer the impacts of the disordered non-sustainable activities. The Alto Mayo Special Project (PEAM) would take a fundamental role with respect to this, as a regional development institution, to organize activities and to demand sustainable levels to implement its programs. All of this would greatly aid in the protection of the protected area.

There should be control over new farming settlements in the region as well as those farmers already located there. Non traditional activities such as bee keeping, ornamental plant management, tourism, agroforestry system implementation should be promoted. In the buffer zone, land should be used in accordance with its capacity for greater use, that is to say, if there land is suitable for agriculture, protection, or forest management, it should be dedicated to its corresponding use.

A detailed diagnosis of Alto Mayo Protected Forest is urgently needed. The census would help identify and quantify the settlements within the interior, and document their legal status and land title possession, the activities they engage in, how they use the natural resources and the land, the existence of access roads, and the location and magnitude of deforestation.

It is necessary to identify the risks and threats affecting the Amazonas and Loreto departments. It is also important to identify the relevant authorities in both departments and to establish communication nexuses and avenues for information exchange.

Design and urgent implementation of environmental education campaigns are essential for the local population, as much for the rural settlers as in the urban areas of Rioja and Moyobamba, also between the diverse actors in the protected area, such as local institutions, regional governments, authorities, public officials, etc. The program must promote the general knowledge of the protected area, the benefits for the region and the nation, its potential and opportunities, the problems to which the area is subjected, and alternatives to development. The environmental education program should aim at the interchange of information between the diverse stakeholders and to assure local commitments for conservation and sustainable development of Alto Mayo Protected Forest.

Deforestation for agriculture and cattle ranching

The director for the area must intensify the frequency of meetings with the local people in order to offer information and explain details about the actions adopted in the protected area for promoting its conservation. The director should be clear and consistent about the prohibition of timber harvesting, opening new areas in virgin forest, and the extraction of orchids. For an effective implementation of these restrictions, INRENA will have to elaborate and approve norms concerning fines and sanctions for those committing infractions, at least under the directorial resolution, in order to achieve a level of legitimacy in its application. The area's administration will need to seek the help of the public prosecutor for the enforcement of the norms and rules.

It is important to note that, according to local observers, when the price of coffee is low, the deforestation rate is also low. The companies buying the coffee operating in the region are an important gear in the deforestation process of the forest in the region. The use and employment of economic mechanisms can help to slow deforestation and to control invasions in the protected area. An incentive should be created for the businesses to pay a lower price for coffee grown in the interior of the protected area. The mechanism should be implemented gradually to the point that they do not accept coffee grown in the interior of the area. This will contribute to lessening the demand for land and lowering deforestation in the protected area.

Greater coordination is necessary between the director of the protected area and the authorities from the department of Amazonas, both in the capital Chachapoyas as well as in the districts bordering the protected area.

The team working in the protected area will need to implement an intense awareness campaign and environmental education, most importantly among the settled population in and around the area. Substantial funding will be needed for printed materials. The frequency of bulletins needs to be intensified along with the use of lower-cost fliers with greater capacity for distribution. Sporadic radio communication on local stations would also be beneficial. The message must address the problems in and the benefits of the protected area, the programs that the administration carries out, and to clarify the limitations on the misuse of the natural resources.

A map of ecological sensitivity should be developed and regularly updated to evaluate the state of the forest to support the future decision making process and for the use and planning of the territory. Currently, the La Molina National Agrarian University Data Center for Conservation is developing a methodology for the electric monitoring of deforestation in several protected areas in the country, one of which is Alto Mayo Protected Forest.²⁹

Harvesting and illegal sale of orchids, butterflies, and other species

The extraction and illegal sale of orchids and butterflies should be fought in a joint and coordinated way between the director of the natural protected area, the National Police, and the Technical Forest and Fauna Control Administration of INRENA. They need to implement constant operations, especially near the highway, in order to seize all the species on display and offered for sale, to dismantle the infrastructure and fine the violators. Notices should be posted restating the prohibition of buying and selling orchids, butterflies, and other species, and list the activities that do not conform to these norms.

The main buyers of orchids and butterflies should be identified with the help of local peoples, and given notice to cease their illegal activities. These buyers and sellers should be fined and used as an example in order to dissuade future trading. In the case of repeat offenders, they should be jailed for their crimes against the environment.



Natural Protected Areas Intendancy intervention at an illegal orchid shop in the interior of Alto Mayo Protected Forest. The operation was carried out with help from the Technical Forest and Fauna Control Administration and the National Police (17/7/03), photo © Diego Shoobridge

Timber harvesting

In the long run, the effective protection of Alto Mayo Protected Forest's resources depends on the control exerted by the Technical Forest and Fauna Control Administration over the forest resource management in influential areas of the protected forest as well as the prompt implementation of a system of vigilance and control over the area by the Natural Protected Areas Intendence. Timber harvesting in the interior of Alto Mayo Protected Forest must be stopped immediately. It is necessary to identify the local harvesters and their respective suppliers to end the illegal harvesting.

The responsible authorities should apply the forest and natural protected areas laws strictly. The loggers should only be allowed to operate outside of the protected area. Loggers should also be required to follow management plans that stress the norms for timber extraction as well as other forest products.

The protected area's administration, in coordination with INRENA's Technical Forest and Fauna Control Administration, should conduct inspections and make visits into the field to the known areas of illegal activity, halt the activity, and fine those involved. The protected area's personnel

should maintain constant coordination with the forest control and demand information about their actions concerning the protected area's buffer zone.

To ensure effective management of the protected area and to eliminate corruption, the public officials that do not fulfill their obligations and responsibilities should be removed from their positions using administrative procedures.

Inside contacts should be discreetly established in order to keep INRENA's personnel informed about the extraction activities in the interior of the protected area. INRENA's personnel should be involved in these actions. A culture of respect for the required norms and a denunciation of the violators needs to be gradually promoted among the population, in a way that eliminates the clandestine behavior and provides an incentive for the people to be involved and participate in the protection of the forest.

In the buffer zone it is necessary to reforest using species of commercial value, and the forest should be managed with suitable planning and technology in order to keep more people from placing pressure on the protected area. It is important to stress to the local people as well as those harvesting forest products that the forest management plan requires permits for forest use.



Indiscriminate hunting and unsustainable fishing

It is important to complete studies on the actual situation of the flora and fauna in the protected area and its buffer zone. Studies on the distribution of the yellow-tailed woolly monkey (*lagothrix flavicauda*), spectacled bear (*Tremarctus ornatos*), the Andean cock-of-the-rock (*Rupicola peruviana*), among other species of scientific interest are needed.

Hunting in the interior of the protected forest should be completely restricted and prevented as much as possible. In the buffer zone an adequate hunting plan is needed. Incentives should be developed for the communities already located in the protected area to establish monitoring and control mechanisms for hunting activity. For such a task, they need consultation and aid from professionals and institutions. The hunting management plan should include species bans, rules against killing animals with young, a plan for rotating hunting territories, firearm restrictions, native species breeding programs, and limits on commercial hunting.

Fishing, especially commercial, should be regulated with restrictions on the catch sizes. Local users, with the support of professionals and institutions, should organize their own fishing control mechanisms, designate fishing zones and seasons, and prevent the entrance of non-local fishermen in the protected area. The use of chemical poisons and dynamite for fishing should be stopped and violators fined for a serious crime against the environment and public security. Those providing the materials should also be fined in accordance with the law. Public

collaboration and the support of the National Police are integral to combating these types of crimes.

Management of the protected area

Alto Mayo urgently needs implementation. First and foremost, Alto Mayo's Master Plan has to be drafted, adopted and implemented. Secondly, detailed plans are needed to regulate resource use, tourism, infrastructure, and vigilance and control. Physical demarcation of the protected area through landmarks that clearly define the limits of Alto Mayo Protected Forest is also a pressing concern. It is necessary to implement actions of vigilance and control through patrols. A presence in the field as well as in the communities and the critical zones, and the formation of teams of voluntary park guards in diverse towns are also needed. The construction of an infrastructure for these actions is essential, such as control points and guard posts.

Coordination between the protected area's administration, the diverse institutions, and the localities involved with the protected forest should be increased and improved. Along the same lines, it is important to encourage the committee responsible with managing the area to meet more frequently and to achieve concrete results from these meetings.

The voluntary park guard program should be refined through constant qualification testing and workshops for the personnel, as well as through continuous coordination between the director of the protected area and the corresponding communities, through field supervision, coordination between offices, and better communication and shared information. It is important to keep a detailed register of the diverse events in the distinct sectors with voluntary park guards in order to document and standardize the experience and to identify the strengths and weaknesses of the program and possibilities for improvement.



Initial approach and presentation to the authorities of Jumbilla (16/7/03).

New municipal protected areas around Alto Mayo Protected Forest need to be established. The municipality of Corosh, in the Bongara province in the west zone of the protected area in Amazonas, is trying to establish a municipal intangible zone at the head of the Goquete river in order to protect the water flow for a small hydroelectric dam that provides energy to the town of Beirut and the area around it. Greater coordination and free information exchange will have to be offered to the municipality by the protected area's administration to ensure proper design and management of the protected area in question.

Conclusions

Alto Mayo Protected Forest is characterized by beautiful landscapes and spectacular geological formations with a distinct flora and fauna. The area's objectives are to protect the existing forest in the upper Mayo river basin. Because of the magnitude of the difficulties facing it, the natural protected area is **critically threatened**.

Since the construction of the marginal highway in the jungle, the Alto Mayo region faces a severe environmental crisis, due to the intense migration of Andean campesinos that constantly arrive and settle in the interior of the Alto Mayo Protected Forest. The massive migrant population places the integrity and future of the natural protected area at great risk. The migrant campesinos exert constant pressure on the land, generating severe environmental alterations. The cultivation and sowing of pastures is carried out by the campesinos, which generates extensive erosion of the land and significant loss of topsoil. They believe that cattle ranching and the monoculture of rice or coffee are the only forms of development.

Deforestation accelerates the loss of the area's biological diversity through habitat destruction. If present land use patterns and levels of primary forest deforestation are not changed, in the coming years serious and irreversible negative effects are anticipated to affect the hydrologic dynamics and nutrient composition of the Mayo River.

Orchid extraction and sale place regional biodiversity at risk and have already impoverished Alto Mayo's forest ecosystem, especially near the highway. The illegal collection and commercialization of butterflies with sophisticated technical equipment has also become a serious problem.

The area's allotted budget is very small and makes managing the forest difficult and especially hinders planning and implementation of long-term activities. The protected area faces a difficult future because the migrant population has very low environmental awareness and sensibility and the local governmental authorities hinder its effective management.

Direct support received by the illegally settled populations in the interior of the protected area should be gradually reduced to encourage them to move out of the area. The use of economic mechanisms could help to discourage deforestation and to control future invasions in the protected area.

A program of migration prevention and control should be developed. The town and community authorities should restrict the arrival of new migrants to their respective localities. The local governments and authorities need to institute actions aimed at territorial land use planning and zoning in the region surrounding Alto Mayo Protected Forest in order to assure sustainable development of the lands outside of the protected area and to diminish the direct pressures on the forest.

The development of a detailed diagnosis of the situation of Alto Mayo Protected Forest is urgently needed. Environmental education campaigns for local people are integral to forest protection. The program should promote general knowledge of the protected area, the benefits it offers, the problems that the forest faces, as well as alternatives for development. The environmental education program should aim at the exchange of information between the diverse

stakeholders and to assure local commitments for conservation and development of Alto Mayo Protected Forest.

Operations should be carried out constantly, especially near the highway, in order to seize orchids, to dismantle the entire infrastructure associated with it, and to fine the violators. Timber extraction from the interior of Alto Mayo Protected Forest should be halted immediately. The local extractors and their respective suppliers that allow them to harvest the timber need to be identified. The responsible authorities must enforce the laws. Harvesting should be limited to areas outside of the protected area. The formation of management tools, specifically the Master Plan, is an absolute necessity.



Alto Mayo Protected Forest, photo © Diego Shoobridge

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All of the photos in this profile taken by Diego Shoobridge, ParksWatch-Peru, 2003. Alto Mayo Protected Forest edited and translated by ParksWatch-USA.

NOTES

¹ Dinerstein E. Una Evaluación del Estado de Conservación de las Ecorregiones Terrestres de América Latina y el Caribe. WWF – Banco Mundial. Washington DC. 1995.

² Laínez, A., Moncada, M., Gómez, T. Informe Técnico Justificatorio para el Establecimiento del Bosque de Protección Alto Mayo, Rioja – San Martín. Noviembre 1986. Pag. 12.

³ Ibid. Pag. 12.

⁴ Ibid. Pag. 5.

⁵ Ibid. Pag. 18.

⁶ Gentry A. Diversity Floristic Composition of Andean Forest of Peru and Adjacent countries: Implications for their Conservation. 1992.

⁷ Laínez, A., Moncada, M., Gómez, T. Op. cit. Pags. 27 – 29.

⁸ Parker, Theodore A., and Susan Parker. 1980. Rediscovery of *Xenerpestes singularis* (Furnariidae). Auk, 97: 203-205.

⁹ Graves, Gary R., John P. O'Neill, and Theodore A. Parker, III. 1983. *Grallaricula ochraceifrons*, a new species of antpitta from northern Peru. Wilson Bull., 95: 1-6.

¹⁰ Laínez, A., Moncada, M., Gómez, T. Op. Cit. Pags. 29 – 33.

¹¹ Laínez, A., Moncada, M., Gómez, T. Op. Cit. Pags. 2 – 3.

¹² SUGKA Boletín Informativo del ANP: Bosque de Protección Alto Mayo. No. 1 Abr-May 2003. Año 2. Pag. 7.

¹³ Management committees are made up of private and public people and institutions that come together voluntarily to carry out activities that benefit the protected area under the direction of a work plan approved by INRENA and in accordance with articles 15 and 16 of Law Number 26834, the Natural Areas Protected Law, and its related regulations. These committees are not legally recognized as an independent cooperation and they are formed for an indefinite time period. The management committees propose policies and plans in accordance with the Natural Areas Protected Law to ensure proper functioning of the area. They supervise and regulate contracts and facilitate intersectorial coordination.

¹⁴ Laínez, A., Moncada, M., Gómez, T. Op. Cit. Pags. 10 – 11.

¹⁵ Base de datos FANPE.

¹⁶ El Desarrollo de la Amazonía Peruana (con énfasis en la región Alto Mayo). Tomo I Resúmenes Ejecutivos y Connotaciones Generales. Compendio literario Christine Brendel. Junio 1996. Pag. 47. Biblioteca FANPE.

¹⁷ Wust, W. El Bosque de Protección Alto Mayo, potencial para el desarrollo turístico. Informe final presentado al proyecto Fortalecimiento del Sistema Nacional de Áreas Naturales Protegidas – FANPE. Marzo, 2003.

¹⁸ SUGKA Boletín Informativo del ANP: Bosque de Protección Alto Mayo. No. 1 Abr-May 2003. Año 2. Pag. 10.

¹⁹ Plan Operativo Anual del Bosque de Protección Alto Mayo 2001. Pag. 8.

²⁰ The current use of secondary forests is very intense and not at all sustainable, the short fallow periods do not allow the soil to recuperate. Native communities in other regions allow land to go fallow for 10 to 12 years, which actually promotes secondary forest growth. Alto Mayo sees high turn over rate for the lack of land and the intense colonization. They impede regeneration and maintain high deforestation rates.

²¹ Bibliografía FANPE. Julio 1998.

²² Agroriente Viveros. Jr. Reyes Guerra 900 Moyobamba. Contacto Blga. Karol Villena agroriente@terra.com.pe

²³ Article No. 279 of the Forestry Law Regulations is currently under elaboration and should include extraction guidelines regarding harvest, reproduction, and management of permitted species. It should include regulations to avoid biological pirating. This rule is being drafted with the National Service of Agrarian and Vegetative Health SENASA.

²⁴ Ley Forestal y de Fauna Silvestre Ley No. 27308 y su Reglamento Decreto Supremo No. 014-2001-AG.

²⁵ Personal communication with a local biologist.

²⁶ Siegfried Kastl ATP GTZ FANPE. 28 de Marzo del 2003. Carta dirigida al Sr. Max Ramírez García Presidente Regional, Región San Martín.

²⁷ The enabling system, pervasive in the Peruvian Amazon, consists of the logging company or creditors providing credit for consumables, fuel, and tools to facilitate and obligate locals to harvest wood to pay back their loans. Once the locals provide the wood, the creditor discounts the debt according to whatever price he decides to give the logger. Locals are often tricked, exploited, and only earn minimum benefits.

²⁸ Siegfried Kastl ATP GTZ FANPE. 28 de Marzo del 2003. Carta dirigida al Sr. Max Ramírez García Presidente Regional, Región San Martín.

²⁹ Centro de Datos para la Conservación (CDC). Contact: Pedro Vasquez Ruesta. cdc@lamolina.edu.pe