PARKSWATCH

Strengthening Parks to Safeguard Biodiversity

SOCIO-ENVIRONMENTAL EVALUATION OF THE YAVARÍ – YAVARÍ-MIRÍN AND TAMSHIYACU-TAHUAYO ZONES

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Yavarí River

INTRODUCTION

The forests of Yavarí and Yavarí-Mirín River Basins are priority conservation areas. Although officially recognized and established by Peru's Natural Protected Areas' Master Plan, they are not included in Peru's National System of Natural Protected Areas (SINANPE). Declaring these forests as a Reserved Zone (*Zona Reservada*) would provide temporary protection for the forests and basins of these important rivers, as well as the rich biodiversity of plants and animals within, until further studies are completed to provide information necessary to declare a permanent protected area category.[1]

Specifically, the area from Yavarí-Mirín River extending to Yavarí River is functioning as a source, supplying animals to areas where hunting exists. In this way, the area is helping to maintain the regional economy of communities settled between the Orosa, Manití, Tamshiyacu, Tahuayo, Yarapa, Gálves, and Yaquerana Rivers: 25% of the bush meat consumed in Loreto is from the Yavarí-Mirín and Yavarí Rivers.

There are many reasons why this region urgently needs national-level protection, including the growing number of forestry concessions in Loreto, expansion of other extractive activities, and migration into the area. The Yavarí-Mirín River Basin is one of Peru's priority conservation areas. By protecting the area, Peru could advance towards reaching its national conservation goals, establish efficient regional planning and appropriate land use, and in the future select the best opportunities for development in the area. [2]

Long-term animal studies have inventoried large populations of species endangered in other parts of the Amazon: giant otter, dolphin, manatee, and the rare red uakari (*Cacajao calvus*), which is not protected by any area in Peru's National Protected Areas System (SINANPE).[3] Lack of properly managed natural resources will not only result in

biodiversity loss, but also impoverishment of local human populations.[4] In order to protect threatened habitats, the local community must provide continued support. If the local people do not benefit from the habitat and wildlife found within, they will have no incentive to protect them.[5]

Natural resource management could provide the bridge between biodiversity conservation and local community survival. This community-based conservation can only function if the resources are not overexploited and if the economic, social, and political aspirations of the community are taken into consideration in the management programs.[6]

The Amazonian forests of the Yavarí Valley and their fragile, highly diverse ecosystems and rural, poor families exemplify the need for future sustainable economic and ecological development. In Yavarí lies the perfect opportunity to link use and integrated management of the nearby forest concessions with community management programs in the Tamshiyacu-Tahuayo Communal Reserve to guarantee protection of the region's biological richness.[7]

This evaluation was conducted because in the near future environmental management actions will be taken in the area and its official protection will be promoted. There are two main foci of this study: 1) a socio-environmental characterization of the communities surrounding the proposed protected area; and 2) an identification of threats to the proposed protected area. We synthesized qualitative information regarding the area's dynamics and completed a quantitative database of economic activities in the proposed protected area's zone of influence. This evaluation provides baseline data necessary to monitor future natural resource usage and determine the area's state of conservation.

This report was completed entirely under ParksWatch's initiative in an attempt to support the region's sustainable development process. The report is not an evaluation of the activities of institutions or organizations working in the area, but rather a synthesis of the area's general state of conservation. ParksWatch is responsible for its contents and distribution.

This evaluation has been made possible thanks to the support from Wildlife Conservation Society (WCS) and the Durrell Institute of Conservation and Ecology (DICE), two institutions that promote conservation in the area by researching keystone species and their ranges, and by identifying and protecting source areas that help guarantee sustainability in hunting areas and areas with fauna deficiencies. WCS and DICE work towards long-term conservation in Loreto. This evaluation would not have been possible without their support and contributions.

About ParksWatch

ParksWatch collaborates with individuals and local organizations to conduct protected area evaluations in Latin America to determine their state of conservation. The results of each evaluation are compiled into multidisciplinary reports called "Protected Area Profiles" that provide the protected area's state of conservation based on an analysis of

threats, socioeconomic context, management needs, and related issues. Each evaluation prescribes actions needed to reduce or eliminate the most serious threats. The profiles are found on ParksWatch's website (www.parkswatch.org) and copies are provided directly to governmental agencies, conservation organizations, local authorities and community stakeholders involved in the protected area's management. ParksWatch's headquarters are located at Duke University's Center for Tropical Conservation. ParksWatch operates in Mexico, Guatemala, Venezuela, Peru, Brazil, and Bolivia.

By conducting integrated field evaluations, ParksWatch directly supports efforts of diverse institutions to conserve natural protected areas and the environment in general. ParksWatch evaluations are focused on identifying conservation threats, contributing complementary information to help other institutions carry out their work. The results of this particular evaluation will help to better understand the socio-environmental dynamics in the region in order to implement improved conservation initiatives and develop better conservation strategies. In addition, this evaluation provides baseline threat data that can be compared with future threat levels in order to determine conservation advancements in the region.

Objectives of the Evaluation

The principal objectives of this evaluation are:

- Identify and evaluate threats to conservation in the area of the Yavarí – Yavarí-Mirín and Tamshiyacu -Tahuayo river basins, providing complementary information to support conservation initiatives carried out in the region.

- Describe the principal productive activities carried out in the area, identifying the problems and determining their relationship to the environment.

In addition, in order to better understand the socio-environmental situation--in which the local people have a significant role in managing and conserving the natural resources--this study characterizes the surrounding communities, describing natural resource use tendency, social conditions, and organizational level of each community.

Methodology

The evaluation of the socio-environmental dynamics was conducted in the zone of the Yavarí and Yavarí – Mirín Rivers, located in Mariscal Ramón Castilla province, Yavarí district, and in the zone of the Tamshiyacu and Tahuayo rivers in the Maynas province of Fernando Lores district.

Information was gathered using primary bibliographic resources, interviews, surveys, and field observations. We chose a methodology that allowed us to include both quantitative data (through a natural resource use survey) and qualitative data (interviews and observations). That is, we wanted to verify consumption tendencies and behaviors as well as investigate perceptions and values from the individual perspective.

The objective of this study was to analyze the productive activities and their relationship with the environment as well as the communities' socio-economic situation and level of organization. The evaluation provides information regarding the characteristics and problems surrounding a specific phenomenon or aspect, in a specific place and time, and therefore tries to identify typical traits and tendencies.

Regarding the locals' productive activities, this research focused on natural resource use and subsistence activities: hunting (location, species, frequency, methods), fishing (location, species, frequency, methods), gathering (distances, frequency, products), logging (species, distances, uses), agriculture (location, crops, land use), trade and commerce (main products, production destination, buyers, money management, consumption habits), among others.

By using the survey tool, we can establish baseline quantitative data regarding the communities' natural resource use. These quantitative data facilitate effective monitoring because they can be compared to data collected in future evaluations. Data collected will help the local people recognize changes in their natural resource use in the future.

We completed 166 surveys, a statistically significant sample size based on the estimated population size and number of families. Surveys were given to the heads of family in each community. When the father was not present, the mother was surveyed. In total, 12 communities were surveyed (6 in Yavarí – Yavarí-Mirín and 6 in Tamshiyacu -Tahuayo). We used a random, two-stage cluster sampling statistical method to determine the sample size and conduct the survey because we first had to consider which communities would be included in the sample and then, which families would be surveyed. To do so, we used the program "COSA" that allowed us to randomly determine the sample size knowing the population of each community. We used the Statistical Package for Social Sciences SPSS 12.0 for data analysis since it is a user-friendly statistical program that allowed us to determine the statistics precisely in terms of the variables we needed to meet the study's objectives.

We conducted semi-structured interviews with local authorities and key members of the communities in order to complement the data collected in the surveys with qualitative information. In this way, we were able to get the perspectives of local authorities, public officials, community representatives, and grassroots leaders regarding natural resource use in the area and their opinions regarding the creation of a natural protected area.

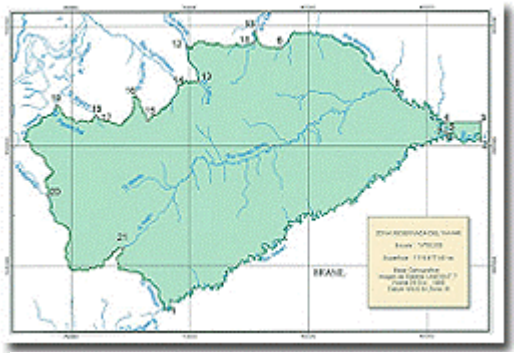
The field team included four professionals, one driver, and one assistant driver. We traveled entirely by boat entire trip and the communities we visited were those directly neighboring the proposed protected area.

CHARACTERISTICS OF STUDY AREA

Description

This general description of the study area is based on information from the Expediente Técnico para la creación de la Zona Reservada del Yavarí (Technical File for the creation of the Yavarí Reserved Zone), which is based almost entirely on the Field Museum's Rapid Biological Inventory 11.[8] This brief summary is included as background information for interested readers.

The forests of Yavarí, which make up the proposed protected area, are located in the northeastern Peruvian Amazon in the department of Loreto. The original proposal for the protected area recommended including 1,105,517.50 hectares of lowland Amazonian forest and forested hills in the provinces of Mariscal Ramón Castilla, Yavarí district; p Maynas, Fernando Lores district; Indiana and Las Amazonas; and Requena, district of Sapuena. However, because of logging concessions in the area, the territory was reduced and the current proposal for the protected area covers 819,908.27 hectares.



Original proposed protected area

Proposed area after it was reduced, due to logging concessions

Habitats

The proposed protected area includes high forests of terra firma that are hyperdiverse in flora and fauna and covers large extensions of flatlands in the northern sector and hilly terrain in the south. There is a rich mosaic of flooded forests, dozens of oxbow lakes, beaches and other aquatic habitats along the Yavarí, Yavarí-Mirín, Esperanza, Tahuayo, and Tamshiyacu rivers. There are also expansions of swamp forests, dominated by aguaje palm *(Mauritia flexuosa)* and other palms.

Hydrology

The area's major rivers include the Yavarí and the Yavarí-Mirín, which make up most of the border for the proposed reserved zone. The rivers wind, forming a series of oxbow lakes that maintain their connectivity with the principal river. Both rivers are fed by tributary creeks and rivers of varying chemical compositions and include everything from clear water rivers to black water rivers, depending on the particular organic load and soil characteristics of the area in which that river passes. Yavarí is a clear water tributary of the Amazon River and reaches 160 m across in the southeastern limit of the proposed zone.

The hydrologic system of the Tamshiyacu and Tahuayo river basins is in the western sector of the proposed protected area (both tributaries of the Amazon) and includes tributary creeks, oxbow lakes, and flood zones especially, in the upper Tahuayo.

Climate

Average temperature is 26°C and annual precipitation varies between 2,800 and 3,200 mm. There are two well-defined seasons--the rainy and dry seasons--which in turn determine the water levels of the rivers. The high water levels occur during November to May and low water levels are from June to October.

Geology

The most representative geological formations within the proposed reserved zone are the *Nauta* and *Pebas*. In the riverbeds and along the river edges are quarternary alluvial deposits.

Soils

The soils of the terra firma forests are oxisol and ultisol, of low-nutrient content and unfit for agriculture. The seasonally flooded (*várzea*) soils found in the flatlands of the inceptisol type have alluvial fertility.

Landscape units

The Yavarí Valley is a vast extension of forested areas located between the Amazonian, Ucayali, and Yavarí River Basins. The landscapes within the valley are aquatic, floodplain, and forested hills.

The aquatic landscape includes all the bodies of water such as the rivers, creeks, oxbow lakes, and aguajales, among others. The floodplain includes terraces and hydromorphic areas along the riverbanks. The terraces have been formed by repeated sedimentation and they have different positions depending on the level of the main river, although most are low terraces and a few are medium-sized. The forested hills landscape covers a large part of the proposed area and reaches altitudes of 25 to 30 m depending on the water level in the river. In both landscape types, there are hydromorphic areas such as swamps and aguajales.

Life Zones

According to Holdridge classification, Yavarí includes four life zones, from humid to pluvial. These are humid tropical forest, very humid tropical forest, very humid transitional tropical forest, and very humid premontane tropical forest at the headwaters of Yavarí-Mirín River Basin.

Biodiversity

The area's conservation value includes all natural levels: ecosystems, biological diversity, and natural characteristics. The quality of the ecosystems is related to the rainforest's integrity and extension. These forests are home to large predators and intact ecological process that support one of the most biological diverse areas of the world. Yavarí still harbors large populations of flora and fauna species that are threatened or endangered according to CITES.

Fauna

Yavarí is home to an extremely diverse wildlife community in which healthy populations of globally threatened species thrive, including the jaguar (*Felis onca*), common woolly monkey (*Lagothrix lagothricha*), southern tamandua (*Tamandua tetradactyla*), short-eared dog (*Atelocynus microtis*), South American tapir (*Tapirus terrestris*), and white-lipped peccary (*Tayassu pecari*). There are 15 primate species, the largest number of primates in the Amazon, including large populations of red uakari (*Cacajao calvus*). This species does not inhabit any of the existing natural protected areas in Peru, and in Yavarí there are at least 11 troops identified in the area—one troop has more than 200 individuals. The area's avifauna is intact and extremely diverse, with large numbers of parrots and scarlet macaws. The fauna found in the rivers and flooded forests is extremely rich and includes every class of fish and large populations of giant otters (*Pteroneura brasifiensis*), Amazonian manatees (*Trichecus inunguis*), white caimans (*Caiman crocodylus*), and black caimans (*Melanosuchus niger*).

Yavarí Valley produces most of the wildlife in Loreto. Large quantities of bush meat are hunted from the Orosa, Maniti, Tamshiyacu, Tahuayo, Yarapa, Gálvez, and Yaquerana rivers. At least 25% of the bush meat hunted in the entire department of Loreto comes from Yavarí Valley. Many communities rely on this bush meat, including Islandia, Angamos, Caballococha, Tamshiyacu, Pevas, San Pablo, Nauta, Santa Rosa, and Requena. In addition, some of the Yavarí bush meat is sold in Iquitos.

The Yavarí-Mirín Basin is the principal source area for wildlife to hunt in the Yavarí Valley. Sustainable wildlife hunting in the Orosa, Maniti, Tamshiyacu, Tahuayo, Yarapa, Gálvez, and Yaquerana rivers depends on maintaining the Yavarí-Mirín Basin as a source.

Flora

The most diverse communities of trees on earth are found in Yavarí Valley. There are between 2,000 and 3,500 species present in the different intact forest types not found in other areas of Loreto. There are large populations of precious woods that are seriously threatened in the rest of the Peruvian Amazon, including tornillo (*Cedrelinga catenaeformis*), Spanish cedar (*Cedrela odorata*), and floss silk tree (*Chorisia insignis*). The diversity gradient and floristic composition ranges from the forested hills in the south to the flatlands in the north of the proposed protected area.

There are three main forest types in the proposed reserved zone:

Tall forest (also called *terra firma* forest*)*, which is slightly hilly. Vegetation in the understory varies between 50 cm to 5 m in height. Emergent trees can reach 30 m in height. Fruit distribution in this habitat is disperse.

The floodplain forests (várzea), where the understory has vegetation growing between 1 and 5 m, and the average canopy height is 20 m. This forest is flooded for 4-7 months per year with white--water, water rich in clay sediments with a large amount of organic particles. The floral species are adapted to survive these long, annual flooded periods. There is less biodiversity in this forest than in the *terra firma* forest.

Aguajal forests with poor draining soil that permanently stores water from the seasonal floods. The understory vegetation varies from sparse to dense and reaches between 1 to 5 m, and its average canopy height is 13 m. Its characteristic vegetation includes the palms *Mauritia flexuosa* and *Euterpe edulis*. There is less plant diversity in this forest than in the *terra firma* forest. There are approximately 20 palm species in this habitat, many of which are extremely important for subsistence.

Human Influence

Population

The estimated population living around the proposed protected area is approximately 2,000 inhabitants. We collected general information on the surrounding communities during our field evaluation. The following table provides a population summary of the selected communities. See Annex I for more information on these communities.

Table 1.* *General data of the communities surrounding the proposed protected area*

Community Name	# of Families	# of Inhabitants	Health Center?	School?
Cuenca del Yavarí	**136**	**665**		
Nueva Carolina	4	10	No	None
Nueva Esperanza	33	162	Yes	Primary
San Francisco de Mercedes	4	22	No	None
Angamos	72	340	Yes	Secondary
Paujil	14	75	First Aid Only	Primary
San José de Añushi	9	56	First Aid Only	Secondary
Tamshiyacu -Tahuayo	**226**	**1261**		
Libertad	14	80	None	Primary
Esperanza	89	470	Yes	Secondary
Buena Vista	30	270	Yes	Primary
El Chino	39	186	First Aid Only	Primary
San Pedro	19	105	First Aid Only	Primary
Diamante / Siete de Julio	35	150	None	Primary
TOTAL	**362**	**1926**		

** All the data tables in this report were created from information collected by ParksWatch during the field evaluation conducted between March and April 2004.*

Other communities close to the proposed protected area include Fray Pedro (40 people), Las Malvinas (50 people), and Jorge Chávez (65 people). There are approximately 8,000 inhabitants in the entire district of Yavarí, including the district capital Islandia and the settlements along the Amazon River. There are 1,500 inhabitants in the lower Yavarí sector, which is in the northern part of the proposed area. The Technical Report of the Special Land Titling Project (PETT) of January, 2004 identifies the following communities in the lower Yavarí: Santa Rita, Nueva Zelandia, Simón Rivera, Remanso, Pobre Alegre, Buen Suceso, Santa Teresa I, Santa Teresa II, la Comunidad Campesina Nueva Jerusalén, la Comunidad Campesina de Santa Rosa, Nuevo Paraíso, Predio Yurará, Fundo Carrosales, Comunidad de San Pedro, Comunidad Nativa Limonero (Ticuna ethnicity), Comunidad de Antiquera, Predio Esperanza, Nuevo San Juan, Monte de los Olivos, Nueva Yarina, Predio Buen Intento, Carolina, San José de Parinari, and Nueva Esperanza. At least half of these communities are populated entirely by members of the Israelite Mission of the New Universal Pact (*Misión Israelita del Nuevo Pacto Universa)l* religious sect.

There are a total of 3,935 inhabitants in the district of Yaquerana, which includes part of the southern sector of the proposed protected area. Eighty-five percent are of the Matsé ethnicity (3,300 people) located in 12 annexes distributed throughout their communal territory of 452,735 hectares located near the southern part of the proposed protected area. The Matsé Community was officially recognized in 1962. The Native Communities Law, number 22175, has granted the Matsé people "Organization Status." In addition, each annex has an administration board and its own internal regulations, approved in 2001. The Matsé Community's General Governing Board, recently appointed, has six members: a president (Manuel Vela Collantes), a vice-president (Angel Vaqui Dunu Maya), a secretary (Elías Vela Collantes), a treasurer (Elías Reyna Ahuanari), and two board members (Pedro Dashe Pemi and Segundo Reyna Pérez).

According to one source, there are 32 communities in the Tahuayo, Tamshiyacu, Yarapa, and upper Yavarí-Mirín River Basins with approximately 6,000 inhabitants.[9] Another source claims that there are 35 communities and more than 4,000 people living along the Tahuayo, Tamshiyacu and Yavarí-Mirín Rivers. There are six additional communities upriver of the Serafín Filomeno community along the Tamshiyacu Stream. There are approximately 600 inhabitants in these six communities, only a fraction of which enters the proposed reserved zone to extract resources. The communities of Miraflores (250 people), Libertad (100 people), San Miguel (90 people), and Rosario (88 people) exert more extractive pressure on the reserve.[10]

The only communities that would be included within the proposed protected area's borders in the Yavarí-Mirín zone are Nueva Esperanza and Nueva Carolina, both of which have less than 200 inhabitants each. If they are included they should receive special zoning consideration. Three or four decades ago, there was a community settled in the interior of the proposed protected area along the Yavarí and Yavarí-Mirín.

Nueva Esperanza community along the Yavarí-Mirín River

In general, communities disappear as soon as the local logging boom fades. Recently abandoned communities victim to this phenomenon were Buen Jardín and San Felipe, whose members ended up moving to Nueva Esperanza and the lower Yavarí.

People in the zone tell us that during the 1950s there were houses at every turn in Yavarí-Mirín. In an interview with Dr. Bodmer, he recalls, "When we entered the zone 14 years ago, there were four communities in Yavarí-Mirín and four timber companies. Today, there are only one and a half communities in Yavarí and no timber companies, which will change with the logging concessions, but we noted that before there was more human presence than today. Animal populations have recuperated notably in the last ten years. This river will continue to have its ups and downs, now is the opportune moment to try to conserve the area since human population is at an historically low level."[11]

Services

Access to education in the zone is difficult and the existing education is substandard: basic materials are often lacking, teachers lack pedagogic training, and the infrastructure is inadequate. Insufficient state funding is one of the main reasons for this substandard education, but difficult access also contributes to the level of education because it is hard for teachers, students, and supervisors to even reach the education centers.

In addition to substandard education, health services are of poor quality. In Angamos there is one health center in good condition, but it lacks equipment. The health center was built in 1996 and services approximately 500 patients per year from the community of Angamos and nearby native communities. This is the only health center for the entire district. The native communities are entirely forgotten when it comes to health services.

There are no medical outposts despite the high occurrence of malaria and hepatitis. Most of the sick are left untreated and their cases become emergencies, life or death situations that require evacuations. Then, because available transportation is lacking, the evacuations are always delayed and have to be coordinated with the municipality and the regional governmental headquarters in Angamos, further aggravating the already precarious situation.

Although Angamos is a district capital and is organized as an official town, with regional and national representation, it has fewer services than the neighboring Brazilian towns on the other side of the river. The director of the Yaquerana Subregion describes the situation, "While in Angamos there is electricity for only a few hours a day, there is a fuel scarcity, and an unpaved airstrip, the neighboring communities in Brazil have electricity 24 hours per day with two generators that work 12 hours each, and they have petroleum storage facilities able to hold 15,000 gallons. They also have potable water 24 hours per day, local, national, and international phone service, open television with more than 80 channels, an excellent landing strip, and a hospital with a surgical wing. The government sends an airplane twice a month with food rations."[12]

Nueva Esperanza has a well-equipped medical post. When we visited, there was a health officer on staff and a supply of basic medications. The Nueva Esperanza health center serves the communities of Macao (5 families), Foly (5 families), Yarina (11 families), Parinari (5 families) (all of these are of the Israelite Mission religious sect) and Carolina (4 families). All of these communities are far from Nueva Esperanza, which rules out the possibility of immediate attention in the case of an emergency. The healthcare center mainly just provides malaria medicine and vaccines. In the Tamshiyacu-Tahuayo sector, the community health centers lack supplies and health officers. Nonetheless, for the people living in this sector, it is logistically easy to reach the larger health centers in Tamshiyacu or Iquitos, so these substandard community health posts are not as problematic as they are in the Yavarí sector.

Major health risks for these communities include lack of healthcare access, little coverage and low quality healthcare, lack of potable water, inadequate sanitary services, lack of waste management, insects as disease vectors, and inadequate housing, among others.

Nutritional information

Children's health is an indicator of community development. Here we present data regarding children's health in the visited communities. We determined the level of malnutrition using a weight/age ratio in children younger than 6 years old.[13] We measured, weighed, and evaluated 120 children (52 boys and 68 girls) in the communities.

Table 2. *Type of malnutrition (expressed in percentages)*

Community	Type of malnutrition based on weight/age			
	Normal	Slight malnutrition	Moderate malnutrition	Severe malnutrition
Cuenca del Yavarí	**86.4**	**11.4**	*	**2.2**
Nueva Carolina	100.0	*	*	*
Nueva Esperanza	77.8	22.2	*	*
San Francisco de Mercedes	*	**	*	*
Angamos	75.0	25.0	*	*
Paujil	88.9	*	*	11.1
San José de Añushi	100.0	*	*	*
Tamshiyacu -Tahuayo	**84.2**	**13.2**	**2.6**	*
Libertad	*	**	*	*
Esperanza	76.2	14.3	9.5	*
Buena Vista	88.9	11.1	*	*
El Chino	85.7	14.3	*	*
San Pedro	100.0	*	*	*
Diamante / Siete de Julio	83.3	16.7	*	*

* The sample provided an alternate response not included in the survey.
** Not evaluated.

There are more cases of slight malnutrition in Tamshiyacu-Tahuayo than in Yavarí. Angamos and Nueva Esperanza are the only communities with slight malnutrition in Yavarí, while in Tamshiyacu-Tahuayo the communities of Esperanza, Buena Vista, El Chino and Diamante/Siete de Julio all have incidences of slightly malnourished children. It is interesting to note that Nueva Esperanza in Yavarí-Mirín has a significant percentage of malnourished children (22.2%) even though wildlife hunting and commercialization of bush meat are two of the community's major productive activities. Paujil is the only community with cases of severe malnutrition and in Esperanza there were two cases of moderate malnutrition.

Table 3. *Percentages of malnutrition in each sector*

SECTOR	Children < 6 years old	
	Normal	Malnourished
Yavarí	86.4	13.6
Tamshiyacu-Tahuayo	84.2	15.8
% Total	**85.3**	**14.7**

Overall, there is more malnourishment in Tamshiyacu-Tahuayo than in Yavarí, although the difference is not very large (15.8% vs. 13.6%). Average malnourishment for the entire sample is 14.7%, which is much larger than the regional average of 5.6%.

Organization

The communities surrounding the proposed protected area have diverse levels of organization, some better organized than others depending on the community, social cohesion, and citizen participation. There is community organization that includes heads of family and a governing board with a president, vice president, secretary, treasurer, and membership (which differs depending on the community). The community assembly is a coordinating body with the power to make community decisions. The *faenas* are community work groups that work together to perform joint actions.

The communities also have a lieutenant governor, who is a state representative responsible for maintaining order, security, and general town functioning. The municipal agent is responsible for community development in terms of infrastructure and maintenance. The communities have mothers' groups that promote women's issues and conduct activities in favor of the family. There are also *vaso de leche* (cup of milk) groups that receive foodstuffs every so often (for example, in Yavarí they receive them every 3 to 6 months because of their remoteness) to provide additional nutrition for children. In many communities, the mothers' groups administer the *vaso de leche* program. There are also Parent's Associations (APAFAs) who work with the teachers to coordinate maintenance in the schools and attend other school-related issues.

There is also religious organization in some communities in which members meet and participate in religious services on a regular basis. Additionally, there is some level of organization when it comes to sports; most communities have soccer teams that coordinate with other teams to have officiated competitions and championships. Most soccer teams have a board that includes a president, treasurer, secretary, and members. When the team does not have a board, the captain is responsible for coordinating and handling related procedures. See Annex I for more detailed information on the level of organization per community.

Despite the fact that the communities have consolidated organizational systems, most of their organizations are poorly developed and lack advancement capacity, which inhibits them from actively participating in civil society and in actions needed to promote integrated development to better their quality of life.

Natural Resource Use

The human being is the key to conservation and sustainable natural resource management. The socio-environmental characteristics of the local populations show the relation between people and their natural resources. In this section we present the quantitative results of the survey, thereby understanding how the local people conduct their productive activities. These results serve as baseline data and serve as a starting point to understand local natural resource consumption tendencies, and how those tendencies contribute to sustainable development in the zone.

Here we describe the communities' involvement in selected activities: hunting, fishing, gathering, logging, agriculture, and commercialization; and then we highlight percentages of the most important activities in the communities. The interviews, conversations, and field

observations helped us to learn how the local people carry out their activities and their relationships with the environment. The survey was the main tool used to gather information on specific activities. This allowed us to obtain first-hand information from the people who use the natural resources directly and who are the targets of future environmental education, sustainable development, and biodiversity conservation campaigns.

The following productive activities are an inherent part of the people's economy and daily lives. How they carry out these activities has implications regarding the amount of resource harvested as well as the conservation of the targeted natural resource. This baseline data helps not only to understand current natural resource use, but also serves as a reference point to compare future data and see natural resource use trends in the area. Conducting the survey again in three years will help indicate whether the natural resource use remains the same, increases, or decreases.

Survey results are presented in percentages. We chose to present the data in percentages because it is an easy and direct way to demonstrate use tendencies. The percentages of the initial yes/no questions are based on the total sample size (N=166), while the percentages regarding detailed information of each activity are based on a varying total depending on whether or not the person surveyed responded "yes" or "no" to the initial question. Those who responded "no," they did not engage in said activity, were excluded from the detailed percentages. There were 75 people who said "yes," they hunted; 135 said they fished; 63 who said "yes" when asked if they gathered non-timber forest products; 16 who logged timber; 150 who engaged in agriculture; and 121 people who engaged in commerce. Annex II provides additional analyses of these quantitative data.

Percentages are presented for each community, which indicates individual tendencies, as well as for each sector (Yavarí and Tamshiyacu-Tahuayo) within the study area, which shows any regional differences. In the case of multiple responses, the data were not presented per sector since that required more complex data analysis that we did not employ for these results.

Characteristics of those surveyed

The sample size was determined based on the number of families inhabiting each community. The number of people present at the time of the survey influenced the sample size. We attempted to survey the head of the family (which is traditionally the father). In many cases, the father was not present because he was on a hunting or timbering trip, so we surveyed the mother. The following tables (4-7) provide general background information on the people surveyed.

Table 4. *Number of people surveyed in each sector and community (N=166)*

Community	Number of people surveyed
Yavarí Basin	**56**
Nueva Carolina	3
Nueva Esperanza	17
San Francisco de Mercedes	5
Angamos	20
Paujil	4
San José de Añushi	7
Tamshiyacu -Tahuayo	**110**
Libertad	10
Esperanza	34
Buena Vista	25
El Chino	16
San Pedro	14
Diamante / Siete de Julio	11
TOTAL	**166**

Table 5. *Gender of those surveyed*

GENDER	Frequency	Percentage (%)
Male	130	78.3
Female	36	21.7
Total	**166**	**100**

Table 6. *Age of those surveyed*

AGE GROUPS	Frequency	Percentage (%)
18 – 24 years	22	13.3
25 – 34 years	50	30.0
35 – 44 years	46	27.7
45 – 54 years	27	16.3
55 and above	21	12.7
Total	**166**	**100**

Table 7. *Levels of education*

EDUCATION LEVEL	Frequency	Percentage (%)
No answer	1	0.6
Illiterate	15	9.0
Primary	106	63.9
Secondary	40	24.1
Post-secondary	4	2.4
Total	**166**	**100**

Hunting

Hunting (locally called "mitayo") is an important part of the ribereño people's[*] diet. There is a steady demand for wildlife meat in the communities. The following table shows the hunting tendencies in the interviewed communities.

Table 8. *Responses to the question, "Do you hunt?"*

Community	Do you hunt?	
	Yes	No
Yavarí Basin	**71.4**	**28.6**
Nueva Carolina	100.0	*
Nueva Esperanza	76.5	23.5
San Francisco de Mercedes	100.0	*
Angamos	45.0	55.0
Paujil	100.0	*
San José de Añushi	85.7	14.3
Tamshiyacu -Tahuayo	**31.8**	**68.2**
Libertad	70.0	30.0
Esperanza	23.5	76.5
Buena Vista	24.0	76.0
El Chino	6.3	93.8
San Pedro	50.0	50.0
Diamante / Siete de Julio	54.5	45.5

* The person interviewed did not select provided alternatives
Percentages based on total the sample size (N=166)

More people in Yavarí hunt than in Tamshiyacu -Tahuayo; the most hunters in this sector live in Nueva Carolina, San Francisco de Mercedes, and Paujil. In Tamshiyacu -Tahuayo (RCTT), more people from Libertad, San Pedro, and Diamante/Siete hunt.

[*] Ribereño people are the rural people of the zone.

There are many types of hunting. Some hunters go into the rainforest for a few hours, taking advantage of nighttime or sunrise to search and capture prey. Hunters usually hunt alone, or with one other family member. These types of hunters usually hunt one to three times per week. Other hunters go on extended hunting trips where they stay in the forest for days or even weeks, especially if hunting is poor near the community. For this type of hunting, it is more common for groups of people to travel together. They bring salt and smoke the meat to preserve it, since they have no refrigeration and are gone for several days. For these longer trips, many of the hunters receive financing from meat merchants that allows them to stay in the rainforest for long periods of time. To pay back the loan, the hunters then sell the meat to these merchants. There is always demand for bush meat. There are financers and middlemen facilitating this business and the animal skins trading business who involve local people as their suppliers. Table 9 shows hunting frequency, duration of hunting trips, and the preferred hunting seasons.

Table 9. *Detailed hunting information from those people who responded "yes" when asked if they hunt (N=75)*

Community	Hunting frequency				Amount of time spent hunting						Best hunting season	
	Once per week	Twice per week	3 times per week	4 times or more per week	Less than 1 hour	1 to 3 hours	3 to 5 hours	5 to 8 hours	8 to 12 hours	More than 12 hours	Rainy	Dry
Cuenca del Yavarí												
Nueva Carolina	33.3	33.3	33.3	*	*	*	33.3	*	33.3	33.3	*	100.0
Nueva Esperanza	23.1	46.2	7.7	23.1	*	23.1	7.7	23.1	15.4	30.8	30.8	69.2
San Francisco de Mercedes	*	20.0	40.0	40.0	*	20.0	*	20.0	*	60.0	*	100.0
Angamos	55.6	*	33.3	11.1	*	11.1	33.3	11.1	*	44.4	22.2	77.8
Paujil	50.0	25.0	*	25.0	*	*	25.0	*	75.0	*	25.0	75.0
San José de Añushi	83.3	*	16.7	*	*	33.3	*	*	50.0	16.7	50.0	50.0
Tamshiyacu -Tahuayo												
Libertad	*	28.6	*	71.4	*	*	14.3	*	*	85.7	28.6	71.4
Esperanza	75.0	25.0	*	*	*	*	*	*	*	100.0	25.0	75.0
Buena Vista	33.3	50.0	16.7	*	*	*	*	16.7	33.3	50.0	16.7	83.3
El Chino	100.0	*	*	*	*	*	*	*	*	100.0	*	100.0
San Pedro	85.7	*	14.3	*	14.3	*	14.3	*	28.6	42.9	14.3	85.7
Diamante / Siete de Julio	33.3	50.0	*	16.7	16.7	*	*	*	*	83.3	33.3	66.7

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=75)
This table does not include "no" or "unknown" responses

In Yavarí, the community with the least amount of hunting is San José de Añushi followed by Nueva Esperanza, where most people hunt twice a week. San Francisco de Mercedes has the most frequent hunting. In RCTT, hunting is least frequent in the community of El Chino

followed by Buena Vista and Diamante/Siete de Julio where people hunt on average twice per week. Hunting is most frequent in the community of Libertad. As these results show, Libertad and San Francisco de Mercedes are hunting centers; both communities are connected by a trail.

The amount of time dedicated to hunting is the hunting effort. The communities in which most of their hunters dedicate only one hour to hunting are San Pedro and Diamante/Siete de Julio, both in RCTT. This implies that they hunt for subsistence, seeking small animals found close to the communities. San José de Añushi follows, where people dedicate between 1 and 3 hours hunting per trip, Angamos and Carolina 3 to 5 hours, Nueva Esperanza 5 to 8 hours, and Paujil where most hunters dedicate 8 to 12 hours hunting. In Esperanza, El Chino, Libertad, Diamante / Siete de Julio, and San Francisco de Mercedes at least 50% of the hunters surveyed spend more than one day hunting, probably because prey is hard to find or because of commercial interests. The communities hunt year round, but most people said that the best time to hunt is during the dry season.

Table 10. *Information regarding shotgun access/ownership and financing*

Community	Do you receive financing?		Do you have access to a shotgun?		Do you own or borrow the shotgun?	
	Yes	No	Yes	No	Own	Borrow
Cuenca del Yavarí	**37.5**	**62.5**	**97.5**	**2.5**	**75.0**	**22.5**
Nueva Carolina	*	100.0	100.0	*	100.0	*
Nueva Esperanza	53.8	46.2	100.0	*	92.3	7.7
San Francisco de Mercedes	40.0	60.0	100.0	*	80.0	20.0
Angamos	33.3	66.7	100.0	*	55.6	44.4
Paujil	75.0	25.0	100.0	*	100.0	*
San José de Añushi	*	100.0	83.3	16.7	33.3	50.0
Tamshiyacu -Tahuayo	**17.1**	**80.0**	**88.6**	**11.4**	**45.7**	**45.7**
Libertad	42.9	57.1	100.0	*	28.6	71.4
Esperanza	12.5	87.5	75.0	25.0	37.5	50.0
Buena Vista	*	83.3	83.3	16.7	16.7	66.7
El Chino	100.0	*	100.0		*	100.0
San Pedro	14.3	85.7	85.7	14.3	57.1	28.6
Diamante / Siete de Julio	*	100.0	100.0	*	100.0	*

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=75)
This table does not include "no," "unknown," and "do not use" responses

Table 10 shows that most of the people interviewed have access to a shotgun. In Yavarí, most hunters own shotguns, while in Tamshiyacu-Tahuayo the number of people who own shotguns and the number of people who borrow are almost equal. People in the communities of El Chino, Paujil, and Nueva Esperanza receive the most financing. In many such cases, the bush meat goes almost entirely to market. The lenders do not pay the hunters well for the

meat, and instead provide more cartridges and other products, obliging the hunters to get more meat, forming a vicious cycle. The hunters end up selling all of the meat and their own families' nutrition suffers. These communities receiving the most financing are among the communities with the highest percentage of malnourished children, as shown in Table 2.

These data complement existing information presented in the publication Linking Conservation and Local People through Sustainable Use of Natural Resources, which says that the nutritional condition of children living within the Tamshiyacu-Tahuayo Communal Reserve is below Peru's national standard. Usually malnutrition is due to internal parasites. This publication goes on to say that high quality sources of protein are not available to the children because the heads of family sell the best meat in order to obtain income. The publication says that the proposed hunting management plan for RCTT would require families to keep female deer, peccaries, and large rodents for subsistence and prohibit their sale. In this way, children living within the reserved zone would have more opportunities to consume high-quality protein, which would contribute to better nutrition.[14]

Table 11. *Responses to questions regarding shotgun ammunition and number of animals hunted*

	How do you obtain shotgun cartridges?					**How many animals do you hunt?**		
Community	Buy	Trade	From Donations	Using financing	Do not use	One	Two	Three or more
Yavarí						**22.5**	**47.5**	**30.0**
Nueva Carolina	100.0	*	*	*	*	*	66.7	33.3
Nueva Esperanza	92.3	7.7	*	*	*	23.1	53.8	23.1
San Francisco de Mercedes	60.0	40.0	*	*	*	*	80.0	20.0
Angamos	66.7	33.3	*	*	*	11.1	44.4	44.4
Paujil	75.0	25.0	*	*	*	50.0	*	50.0
San José de Añushi	66.7	*	16.7	*	16.7	50.0	33.3	16.7
Tamshiyacu -Tahuayo						**11.4**	**34.3**	**54.3**
Libertad	71.4	14.3	*	14.3	*	14.3	14.3	71.4
Esperanza	75.0	12.5	*	*	12.5	23.1	53.8	23.1
Buena Vista	83.3	*	*	*	16.7	33.3	50.0	16.7
El Chino	100.0	*	*	*	*	*	*	100.0
San Pedro	85.7	*	*	*	14.3	*	57.1	42.9
Diamante / Siete de Julio	100.0	*	*	*	*	16.7	50.0	33.3

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=75)
This table does not include "no," "unknown," and "do not use" responses

The majority of the hunters buy their cartridges, although some trade meat to get them. The general tendency is to hunt several animals in a trip. In Paujil and San José de Añushi, half

of the hunters surveyed indicated that they hunt only one animal, mostly for subsistence. The highest percentages of hunters who indicated that they hunt two animals were in San Francisco de Mercedes, Nueva Carolina and San Pedro. In Libertad and El Chino, both in RCTT, they typically hunt three or more animals.

Table 12. *Species most often hunted in each community*

	Principal game species												
Community	White-lipped peccary	Collared Peccary	Deer	Tapir	Curassow	Spix's Guan	Monkeys	Paca	Guan	Cinereous Tinamou	Black Agouti	Armadillo	Other
Yavarí													
Nueva Carolina	50.0	*	*	8.0	17.0	17.0	*	8.0	*	*	*	*	*
Nueva Esperanza	32.0	27.0	15.0	20.0	2.0	*	7.0	*	2.0	*	2.0	*	*
San Francisco de Mercedes	11.0	28.0	17.0	22.0	*	17.0	*	*	6.0	*	*	*	*
Angamos	12.0	24.0	6.0	15.0	6.0	6.0	6.0	15.0	3.0	*	6.0	*	*
Paujil	33.0	*	*	13.0	7.0	7.0	7.0	13.0	*	*	13.0	*	7.0
San José de Añushi	9.0	27.0	14.0	*	*	9.0	14.0	9.0	*	*	9.0	*	9.0
Tamshiyacu-Tahuayo													
Libertad	*	26.0	22.0	4.0	*	4.0	9.0	9.0	*	17.0	4.0	*	4.0
Esperanza	21.0	37.0	*	*	*	5.0	5.0	26.0	*	*	*	5.0	5.0
Buena Vista	10.0	10.0	*	*	5.0	5.0	10.0	20.0	*	*	15.0	*	25.0
El Chino	25.0	25.0	*	*	*	25.0	*	*	*	*	25.0	*	*
San Pedro	25.0	29.0	4.0	13.0	4.0	13.0	4.0	13.0	*	*	*	*	*
Diamante / Siete de Julio	10.0	19.0	*	5.0	*	14.0	5.0	24.0	*	*	10.0	10.0	5.0

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=75)
This table does not include "no," "unknown," and "do not use" responses

Table 12 shows the principal game species. In Nueva Carolina, Nueva Esperanza, and Paujil they mainly hunt white-lipped peccary; in Esperanza collared peccary and paca are most sought after; hunters in Libertad mostly hunt deer; in San Francisco de Mercedes they hunt tapir; in El Chino they hunt Spix's guan and black agouti; and in Paujil they most often hunt monkeys. Crabb's 2003 publication states that monkeys and birds are hunted to replace economically viable bush meat.[15]

Regarding this topic, the following information, obtained during an interview with Dr. Bodmer, is pertinent. He said that the sustainability levels for each species are different. The collared peccary, white-lipped peccary, and deer can withstand subsistence hunting since they are prey for predators like jaguars, and pumas. When these species are hunted more intensely, they reproduce more frequently, but when they are hunted less, they reach their carrying capacity and their production rates drop. As soon as hunting increases again, they increase reproduction. Of course, they have their limits, but within their ranges these animals are most appropriate for hunting. If these animals are hunted, it does not mean that their populations will drop, on the contrary, they will try to maintain their population levels and reproduce more.

However, other animals like the South American tapir are completely different. The South American tapir reproduces very slowly, and it cannot withstand overhunting. The South American tapir is not an appropriate prey species because its population can quickly decline due to its slow reproductive rate. In this sense, it is extremely important to work with the local communities to show them which animals are most appropriate for hunting and which are not because of their slow reproduction rates, such as tapir, monkeys, and carnivores.[16]

We surveyed the hunters regarding the type of monkey species hunted, in an effort to determine whether or not the red uakari was exclusively targeted. As shown in Table 13, the red uakari is, in fact, not frequently hunted.

Table 13. *Responses regarding type of monkey hunted and use of hunting trails*

	Type of monkey hunted				**Hunting trail?**		**Type of hunting trail**		
Community	Common woolly monkey	Spider monkey	Monk saki	Other	Yes	No	Private	Family	Communal
Yavarí Basin									
Nueva Carolina					100.0	*	33.3	*	66.7
Nueva Esperanza	33.3	33.3	*	33.3	92.3	7.7	15.4	7.7	69.2
San Francisco de Mercedes					40.0	60.0	20.0	20.0	*
Angamos	66.7	33.3	*	*	100.0	*	33.3	11.1	55.6
Paujil	50.0	50.0	*	*	100.0	*	*	*	100.0
San José de Añushi	50.0	50.0	*	*	83.3	16.7	*	16.7	66.7
Tamshiyacu -Tahuayo									
Libertad	100.0	*	*	*	57.1	42.9	28.6	*	28.6
Esperanza	100.0	*	*	*	88.0	12.0	63.0	*	25.0
Buena Vista	*	*	50.0	50.0	83.3	16.7	50.0	*	33.3
El Chino					100.0	*	100.0	*	*
San Pedro	100.0	*	*	*	100.0	*	*	28.6	71.4
Diamante / Siete de Julio	*	*	*	100.0	83.3	16.7	50.0	*	16.7

* Those interviewed did not select from this alternative

Percentages based on number of people who said they hunted (N=75)
This table does not include "no," "unknown," and "do not use" responses

Hunters from Libertad, Esperanza, and San Pedro most often hunt common woolly monkeys. San José de Añushi and Paujil hunters most often hunt spider monkeys. Hunters in Buena Vista mentioned that they sometimes hunt the monk saki. The table shows that most hunters use trails, and most of those are communal trails. There are more private trials percentage-wise in El Chino and Esperanza.

Table 14. *Information regarding hunting grounds and distance to hunting grounds*

≈	Distance walked to reach hunting grounds				Hunting grounds			
Community	Less than 1 hour	1 to 3 hours	3 to 5 hours	More than 5 hours	Clay licks "Collpa"	Along a creek	Near trees with fruit	Forest
Yavarí Basin	**22.5**	**45.0**	**17.5**	**15.0**	**27.5**	**20.0**	*****	**52.5**
Nueva Carolina	33.3	33.3	33.3	*	33.3	*	*	66.7
Nueva Esperanza	38.5	53.8	7.7	*	23.1	23.1	*	53.8
San Francisco de Mercedes	20.0	40.0	*	40.0	20.0	*	*	80.0
Angamos	22.2	33.3	22.2	22.2	33.3	44.4	*	22.2
Paujil	*	*	50.0	50.0	50.0	25.0	*	25.0
San José de Añushi	*	83.3	16.7	*	16.7	*	*	83.3
Tamshiyacu -Tahuayo	**2.9**	**31.4**	**8.6**	**57.1**	**25.7**	**45.7**	**2.9**	**25.7**
Libertad	*	14.3	*	85.7	*	*	*	100.0
Esperanza	*	*	12.5	87.5	25.0	75.0	*	*
Buena Vista	*	50.0	*	50.0	16.7	66.6	*	16.7
El Chino	*	*	*	100.0	*	100.0	*	*
San Pedro	*	71.4	14.3	14.3	28.6	42.9	14.3	14.3
Diamante / Siete de Julio	16.7	33.3	16.7	33.3	66.7	33.3	*	*

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=75)
This table does not include "no," "unknown," and "do not use" responses

Table 14 shows the distance traveled to reach hunting grounds, which indicates availability of fauna near the communities. The longer the distance, the scarcer the fauna close to the community due either to overhunting or intensity of other human activities in the area. Nueva Carolina and Nueva Esperanza have the highest percentage of hunters who walk less than one hour to their hunting grounds; it is assumed that they primarily engage in mostly subsistence hunting. San José de Añushi and San Pedro have the highest percentages of hunters walking 1 to 3 hours, Paujil has the highest percentage traveling 5 hours, and Libertad, Esperanza, and El Chino have the highest percentages of hunters traveling five hours or more to reach their hunting grounds. The communities whose hunters most often hunt in clay licks are Diamante/Siete de Julio and Paujil. Hunters from

El Chino, Esperanza, and Buena Vista mostly hunt along creeks. Hunters from Libertad, San José de Añushi, and San Francisco de Mercedes hunt mostly in forests.

Table 15. *Perceptions regarding availability of hunted species*

	Has hunting decreased?		**Causes for the decrease in hunting**		
Community	Yes	No	Outside hunters	Overhunting	Other
Yavarí Basin	**70.0**	**30.0**	**22.5**	**32.5**	**7.5**
Nueva Carolina	33.3	66.7	*	*	*
Nueva Esperanza	76.9	23.1	23.1	38.5	7.7
San Francisco de Mercedes	20.0	80.0	20.0	*	*
Angamos	77.8	22.2	33.3	44.4	*
Paujil	100.0	*	50.0	25.0	*
San José de Añushi	83.3	16.7	*	50.0	16.7
Tamshiyacu - Tahuayo	**74.3**	**25.7**	**25.0**	**35.7**	**3.6**
Libertad	85.7	14.3	28.6	42.9	*
Esperanza	75.0	25.0	25.0	37.5	*
Buena Vista	83.3	16.7	50.0	33.3	*
El Chino	100.0	*	*	*	*
San Pedro	71.4	28.6	28.6	42.9	*
Diamante / Siete de Julio	50.0	50.0	*	33.3	16.7

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=75)
This table does not include "no," "unknown," and "do not use" responses

The locals' perceptions of the decreasing numbers of hunted species is shown in Table 15. The highest percentage of people who perceive a decrease in hunted fauna are from El Chino, Paujil, and Libertad. A greater percentage of hunters from Paujil and Buena Vista blame outside hunters for the decrease in available prey, while hunters from San José de Añushi blame overhunting.

Table 16. *Perceptions regarding decline in hunted species*

	Species that have most declined												
Community	White-lipped peccary	Collared peccary	Deer	Tapir	Curassow	Spix's Guan	Monkey	Paca	Guan	Cinereous Tinamou	Black agouti	Armadillo	Other
Yavarí Basin													
Nueva Carolina	50.0	*	*	8.0	17.0	17.0	*	8.0	*	*	*	*	*
Nueva Esperanza	32.0	27.0	15.0	20.0	2.0	*	*	*	2.0	*	2.0	*	*
San Francisco de Mercedes	11.0	27.0	17.0	22.0	*	17.0	*	*	6.0	*	*	*	*
Angamos	12.0	25.0	6.0	15.0	6.0	6.0	6.0	15.0	3.0	*	6.0	*	*
Paujil	33.0	*	*	13.0	7.0	7.0	7.0	13.0	*	*	13.0	*	7.0
San José de Añushi	9.0	27.0	14.0	*	*	9.0	14.0	9.0	*	*	9.0	*	9.0
Tamshiyacu -Tahuayo													
Libertad	*	27.0	22.0	4.0	*	4.0	9.0	9.0	*	17.0	4.0	*	4.0
Esperanza	21.0	37.0	*	*	*	5.0	*	27.0	*	*	*	5.0	5.0
Buena Vista	10.0	10.0	*	*	5.0	5.0	10.0	20.0	*	*	15.0	*	25.0
El Chino	25.0	25.0	*	*	*	25.0	*	*	*	*	25.0	*	*
San Pedro	25.0	28.0	4.0	13.0	4.0	13.0	*	13.0	*	*	*	*	*
Diamante / Siete de Julio	10.0	18.0	*	5.0	*	14.0	5.0	23.0	*	*	10.0	10.0	5.0

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=75)
This table does not include "no," "unknown," and "do not use" responses

Table 16 provides specifics regarding hunters' perceptions of diminished prey species. Hunters from Nueva Carolina and Paujil believe that white-lipped peccaries have diminished the most. Hunters from Esperanza and San Pedro claim that collared-peccary populations have declined the most. In Libertad, hunters say that deer have the most decreased numbers, while in Nueva Esperanza and San Francisco de Mercedes more hunters believe that the South American tapir population has declined the most. A fourth of the hunters from El Chino say Spix's Guan, another fourth say black agouti, and hunters from Esperanza say pacas. It is important to note that the species perceived to have diminished the most in each respective community is the one most often hunted by that community.

As we conducted the survey, we noted that in a few communities, most notably in El China and to a lesser degree in San Pedro and Diamante/Siete de Julio, the people surveyed seemed to negatively answer the hunting questions despite the reality that their hunting activities are common knowledge. This is a source of bias in the hunting data collected and it therefore misrepresents the hunting activities to some extent. We can assume that this tendency to deny hunting involvement is due to the fact that hunting is a sensitive topic in the area and people would just assume to remain anonymous. These communities has been the most involved and exposed to scientists and researchers,

NGOs, community hunting regulations, and tourism activities that encourage locals to manage and reduce their hunting levels.

Fishing

Fishing is extremely important for the ribereño people in the proposed protected area. Fish are a fundamental part of their diet. Most people fish for their own consumption, and the tendency is to catch just enough for the day. Local people fish all species; whatever they catch in the nets or on their fishing lines that can be eaten is kept. People fish in the rivers, creeks, oxbow lakes, and lakes throughout the region. They use fishing lines and hooks, nets, and circular fishing nets.

Some people fish for ornamental fish. They catch small colorful fish to sell in Iquitos or to sell to middlemen who take them to the exporting aquariums. There are not many people involved in the tropical fish pet trade because it requires special nets that are not easily acquired.

Table 17. *Responses to the question, "Do you fish?"*

	Do you fish?	
Community	Yes	No
Yavarí Basin	**85.7**	**14.3**
Nueva Carolina	100.0	*
Nueva Esperanza	82.4	17.6
San Francisco de Mercedes	80.0	20.0
Angamos	80.0	20.0
Paujil	100.0	*
San José de Añushi	100.0	*
Tamshiyacu -Tahuayo	**79.1**	**20.9**
Libertad	50.0	50.0
Esperanza	88.2	11.8
Buena Vista	80.0	20.0
El Chino	62.5	37.5
San Pedro	85.7	14.3
Diamante / Siete de Julio	90.9	9.1

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=166)
This table does not include "no," "unknown," and "do not use" responses

As shown in Table 17, most people in the region fish, especially in the Yavarí communities. The communities in which those surveyed all responded positively when asked if they fished were Nueva Carolina, and the two native communities of Paujil and San José de Añushi. The communities with less fishing inhabitants are San Francisco de las Mercedes and Angamos. In the sector of Tamshiyacu-Tahuayo, the communities of Diamante/Siete de Julio, Esperanza and San Pedro had the most people who fished, while in Libertad and El Chino there were less people who indicated that they fished.

Table 18. *Information regarding fishing habits*

	Fishing frequency (per week)				Time dedicated to fishing (hours)						Best fishing season	
Community	Once	Twice	Three times	Four times or more	Less than 1	1 to 3	3 to 5	5 to 8	8 to 12	More than 12	Rainy	Dry
Yavarí Basin	**27.1**	**29.2**	**14.6**	**29.2**	**2.1**	**33.3**	**25.0**	**16.7**	**8.3**	**14.6**	**39.6**	**60.4**
Nueva Carolina	33.3	33.3	33.3	*	33.3	33.3	33.3	*	*	*	33.3	66.7
Nueva Esperanza	42.9	28.6	7.1	21.4	*	35.7	28.6	14.3	14.3	7.1	42.9	57.1
San Francisco de Mercedes	25.0	25.0	*	50.0	*	50.0	25.0	25.0	*	*	*	100.0
Angamos	25.0	18.8	12.5	43.8	*	25.0	25.0	12.5	6.3	31.3	31.3	68.8
Paujil	25.0	25.0	*	50.0	*	25.0	25.0	25.0	*	25.0	50.0	50.0
San José de Añushi	*	57.1	42.9	*	*	42.9	14.3	28.6	14.3	*	71.4	28.6
Tamshiyacu -Tahuayo	**46.0**	**25.3**	**9.2**	**19.5**	**5.7**	**21.8**	**10.3**	**9.2**	**13.8**	**39.1**	**41.4**	**57.5**
Libertad	20.0	*	40.0	40.0	*	40.0	20.0	*	20.0	20.0	20.0	80.0
Esperanza	70.0	23.3	*	6.7	*	20.0	6.7	10.0	10.0	53.3	40.0	60.0
Buena Vista	50.0	20.0	15.0	15.0	5.0	20.0	10.0	*	10.0	55.0	50.0	45.0
El Chino	40.0	40.0	10.0	10.0	10.0	*	*	10.0	40.0	40.0	60.0	40.0
San Pedro	16.7	50.0	*	33.3	16.7	25.0	16.7	25.0	8.3	8.3	50.0	50.0
Diamante / Siete de Julio	20.0	10.0	20.0	50.0	10.0	40.0	20.0	10.0	10.0	10.0	10.0	90.0

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=135)
This table does not include "no," "unknown," and "do not use" responses

As shown in Table 18, the communities with the highest percentage of fishermen who fish only once per week are Esperanza, Buena Vista and Nueva. San José de Añushi and San Pedro have the highest percentages of fishermen who fish twice per week. And, Diamante/Siete de Julio, Paujil and San Francisco de Mercedes have the highest percentages of fishermen who said they fish four times or more per week. Very few people said that they fish for less than one hour at a time. Most people said that they fish between 1 to 3 hours or 3 to 5 hours at a time. The fishermen in San Francisco de Mercedes had the highest percentage of responses in the 3 to 5 hour period, while San José de Añushi had the highest percentage of responses in the 5 to 8 hour time period, and El Chino had the highest percentage of responses between 8 to 12 hours. More than 50% of those surveyed in Esperanza and Buena Vista responded that they dedicate more than one day fishing. Overall, the majority of fishermen responded that they fish during the dry season, and to a lesser degree during the rainy season.

Table 19. *Types of gear used*

Community	Fishing gear used				
	Nylon Lines and Hooks	Circular nets	Nets	Barbasco poison	Other
Yavarí Basin	**81.1**	**2.1**	**14.6**	**2.1**	*****
Nueva Carolina	100.0	*	*	*	*
Nueva Esperanza	92.9	*	7.1	*	*
San Francisco de Mercedes	75.0	25.0	*	*	*
Angamos	62.5	*	31.3	6.2	*
Paujil	100.0	*	*	*	*
San José de Añushi	85.7	*	14.3	*	*
Tamshiyacu - Tahuayo	**31.0**	**8.0**	**58.6**	*****	**2.3**
Libertad	80.0	*	20.0	*	*
Esperanza	6.7	6.7	83.3	*	3.3
Buena Vista	5.0	25.0	65.0	*	5.0
El Chino	10.0	*	90.0	*	*
San Pedro	75.0	*	25.0	*	*
Diamante / Siete de Julio	100.0	*	*	*	*

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=135)
This table does not include "no," "unknown," and "do not use" responses

In Yavarí, most people responded that they use nylon-fishing lines and hooks to fish, while in Tamshiyacu-Tahuayo most people said that they use nets. Fishing with lines and hooks has a natural restricted level of extraction and therefore less impact on the aquatic fauna, while fishing with nets captures more and causes a greater impact. Therefore, fishing intensity is significantly higher in Tamshiyacu-Tahuayo than in Yavarí.

Table 20. *Types of fish most often caught*

Community	Fish species												
	Piraña	Gamitana	Doncella	Carachama	Boquichico	Palometa	Zungaro	Sábalo	Sardina	Mota	Huasaco	Bujurqui	Other
Yavarí Basin													
Nueva Carolina	16.7	*	*	*	16.7	16.7	*	16.7	16.7	*	*	*	16.7
Nueva Esperanza	11.4	*	2.9	2.9	8.6	20.0	14.3	14.3	2.9	*	5.7	2.9	14.3
San Francisco de Mercedes	3.7	3.7	*	*	3.7	14.8	18.5	11.1	7.4	7.4	7.4	7.4	14.8
Angamos	5.2	*	*	3.4	8.6	8.6	19.0	20.7	6.9	6.9	3.4	3.4	13.8
Paujil	8.3	*	*	*	16.7	8.3	25.0	16.7	*	8.3	8.3	*	8.3
San José de Añushi	4.5	*	4.5	*	9.1	13.6	9.1	18.2	*	4.5	9.1	4.5	22.7
Tamshiyacu - Tahuayo													
Libertad	3.8	*	*	*	3.8	15.4	3.8	7.7	7.7	3.8	7.7	15.4	30.8
Esperanza	3.8	2.6	*	3.8	29.5	9.0	10.3	12.8	11.5	1.3	2.6	1.3	11.5
Buena Vista	2.9	2.9	*	7.1	15.7	14.3	4.3	8.6	12.9	*	7.1	11.4	12.9
El Chino	*	10.0	2.5	15.0	22.5	7.5	7.5	17.5	5.0	*	5.0	7.5	*
San Pedro	8.5	4.5	2.8	2.3	2.8	21.6	10.2	9.7	13.6	2.3	5.7	5.7	10.2
Diamante / Siete de Julio	*	*	6.3	9.4	6.3	12.5	12.5	21.9	3.1	*	*	12.5	15.6

* Those interviewed did not select from this alternative
Percentages based on number of people who said they hunted (N=135)
This table does not include "no," "unknown," and "do not use" responses

Boquichico, la palometa, el zungaro and el sábalo are caught most often in relatively equal numbers.

Table 21. *Information regarding fishing zones and distance to fishing zones*

	Fishing zone			Distance to fishing zone (in hours)			
Community	River	Creek	Oxbow Lake	Less than 1	1 to 3	3 to 5	More than 5
Cuenca del Yavarí	**54.2**	**18.8**	**27.1**	**33.3**	**54.2**	**8.3**	**4.2**
Nueva Carolina	33.3	66.7	*	66.7	33.3	*	*
Nueva Esperanza	78.6	14.3	7.1	35.7	42.9	7.1	14.3
San Francisco de Mercedes	50.0	*	50.0	50.0	50.0	*	*
Angamos	37.5	12.5	50.0	18.8	62.5	18.8	*
Paujil	50.0	25.0	25.0	50.0	50.0	*	*
San José de Añushi	57.1	28.6	14.3	28.6	71.4	*	*
Tamshiyacu - Tahuayo	**34.5**	**17.2**	**48.3**	**41.4**	**46.0**	**3.4**	**9.2**
Libertad	20.0	80.0	*	60.0	20.0	*	*
Esperanza	10.0	6.7	83.3	33.3	63.3	*	3.3
Buena Vista	40.0	*	60.0	25.0	45.0	10.0	20.0
El Chino	40.0	10.0	50.0	30.0	70.0	*	*
San Pedro	58.3	41.7	*	58.3	25.0	8.3	8.3
Diamante / Siete de Julio	70.0	30.0	*	80.0	10.0	*	10.0

* Those interviewed did not select from this alternative
Percentages based on those surveyed who responded that they fished (N=135)
This table does not include "no" or "I don't know" responses

In Yavarí, most people responded that they fish in the rivers; while in Tamshiyacu-Tahuayo they fish in the oxbow lakes. The community with the highest percentage of fishermen fishing in the rivers is Nueva Esperanza, while Libertad has the highest percentage of fishermen in the creeks, and Esperanza and Buena Vista have the highest percentage who fish in the oxbow lakes. Regarding distance (measured in hours) to get to the fishing zones, Diamante/Siete de Julio had the highest percentage of fishermen that need less than one hour to reach their fishing grounds, whereas in San José de Añushi and El Chino fishermen said they travel between 1 and 3 hours.

Table 22. *Responses regarding sizes of fish caught*

Community	Large fish caught				Small fish caught			
	Does not fish for large fish	1 to 3	4 to 6	7 or more	Does not fish for small fish	1 to 10	11 to 20	21 or more
Yavarí Basin	**12.5**	**31.3**	**29.2**	**27.1**	*****	**10.4**	**47.9**	**41.7**
Nueva Carolina	33.3	*	33.3	33.3	*	*	66.7	33.3
Nueva Esperanza	28.6	14.3	28.6	28.6	*	7.1	28.6	64.3
San Francisco de Mercedes	*	25.0	75.0	*	*	*	100.0	*
Angamos	6.3	43.8	12.5	37.5	*	12.5	37.5	50.0
Paujil	*	50.0	50.0	*	*	25.0	50.0	25.0
San José de Añushi	*	42.9	28.6	28.6	*	14.3	71.4	14.3
Tamshiyacu - Tahuayo	**19.5**	**41.4**	**13.8**	**23.0**	**3.4**	**8.0**	**23.0**	**63.2**
Libertad	40.0	40.0	20.0	*	20.0	*	60.0	20.0
Esperanza	20.0	30.0	10.0	36.7	3.3	3.3	13.3	76.7
Buena Vista	20.0	30.0	25.0	20.0	*	15.0	15.0	65.0
El Chino	20.0	40.0	20.0	20.0	*	10.0	10.0	80.0
San Pedro	8.3	66.7	8.3	16.7	*	16.7	50.0	33.3
Diamante / Siete de Julio	20.0	70.0	*	10.0	10.0	*	30.0	60.0

* Those interviewed did not select from this alternative
Percentages based on those surveyed who responded that they fished (N=135)
This table does not include "no" or "I don't know" responses

Table 22 shows that San Pedro, Diamante/Siete de Julio, San Francisco de Mercedes, and Paujil have the highest percentages of fishermen who catch large fish, while San Francisco de Mercedes, San José de Añushi, Esperanza and El Chino have the largest percentage who catch small fish. San Francisco de Mercedes' fishermen catch both large and small fish, which may indicate that the fisheries resource in the zone is in optimal conservation conditions.

Table 23. *Perceptions regarding species' population declines*

	Are there less fish?		Which species are in decline?							Causes of the declines			
Community	Yes	No	Gamitana	Paiche	Boquichico	Palometa	Zungaro	Sábalo	All	Use of Barbasco	Overfishing	Outside fishermen	Other
Yavarí Basin	**50.0**	**50.0**								**6.3**	**27.1**	*****	**12.5**
Nueva Carolina	33.3	66.7	*	*	*	*	*	50.0	50.0	*	*	*	*
Nueva Esperanza	35.7	64.3	*	*	50.0	*	50.0	*	*	*	14.3	*	7.1
San Francisco de Mercedes	*	100.0	*	*	33.3	*	*	66.7	*	*	*	*	*
Angamos	75.0	25.0	4.3	*	13.0	26.1	17.4	34.8	4.3	12.5	37.5	*	25.0
Paujil	75.0	25.0	*	*	*	*	50.0	50.0	*	*	75.0	*	*
San José de Añushi	42.9	57.1	50.0	*	*	12.5	12.5	25.0	*	14.3	28.6	*	14.3
Tamshiyacu -Tahuayo	**78.2**	**21.8**								**3.4**	**40.2**	**21.8**	**6.9**
Libertad	20.0	80.0	66.7	*	*	*	33.3	*	*	*	20.0	*	*
Esperanza	90.0	10.0	15.4	11.5	19.2	*	38.5	3.8	11.5	6.7	46.7	23.3	10.0
Buena Vista	75.0	25.0	30.0	20.0	6.7	10.0	10.0	23.3	*	*	35.0	35.0	*
El Chino	100.0	*	48.1	11.1	3.7	7.4	14.8	11.1	3.7	*	50.0	40.0	*
San Pedro	75.0	25.0	40.0	13.3	*	6.7	20.0	6.7	13.3	*	33.3	8.3	16.7
Diamante / Siete de Julio	60.0	40.0	37.5	12.5	12.5	*	25.0	12.5	*	10.0	40.0	*	10.0

* Those interviewed did not select from this alternative
Percentages based on those surveyed who responded that they fished (N=135)
This table does not include "no" or "I don't know" responses

As shown in Table 23, in Yavarí, fishermen's opinions regarding whether or not fish populations are declining were split: half said that they are declining and half said they are not. The communities of Angamos and Paujil had higher percentages of fishermen who said that populations are declining and San Francisco de Mercedes had the highest percentage of fishermen who said that the populations are not declining. In Tamshiyacu-Tahuayo, the majority (78.2%) of the fishermen responded that "yes," fishing has declined. The communities of El Chino and Esperanza had the highest percentages of fishermen who said that populations are declining and Libertad had the highest percentage of fishermen who said that fishing is not declining. According to fishermen in Yavarí, sabado and gamitana have declined the most and in Tamshiyacu-Tahuayo, more fishermen said zungaro has declined the most. In both sectors, the majority of fishermen blamed overfishing for these declines.

Collecting

Collecting of non-timber forest products such as fruit, bark, vines, seeds, resins, leaves, and medicinal plants is not universally widespread in the study area; those who do gather these products do so to cover their basic needs, mostly for food and housing. The market for these products is regional. In Yavarí collecting is done almost exclusively to cover basic needs

and in Tamshiyacu-Tahuayo, which is closer to Iquitos, more products are collected to sell because there is greater demand.

Most people confirmed that they usually gather ripe fruit. Because of the diversity and different ripening seasons, there is fruit year round. Because in Yavarí the fruit is for family consumption, collection is not as systematic as in Tamshiyacu-Tahuayo, where palm fruit is collected and sold in Iquitos.

Non-timber forest product collection has large economic potential and is currently unregulated. The largest problem is unsustainable aguaje palm harvesting techniques; the harvester cuts and kills the entire palm to get the aguaje even though alternative methods exist that do not kill the tree.

Table 24. *Responses to the question, "Do you gather timber?"*

	Do you gather?		**Do you gather when you hunt or fish?**		**Principal non-timber forest product collected**				
Community	Yes	No	Yes	No	Bark	Leaves	Medicinal Plants	Fruits	Seeds
Cuenca del Yavarí	**51.8**	**48.2**	**55.2**	**44.8**	**3.5**	**3.5**	**37.8**	**55.2**	*
Nueva Carolina	66.7	33.3	*	100	*	*	50.0	50.0	*
Nueva Esperanza	41.2	58.8	28.6	71.4	*	*	*	100.0	*
San Francisco de Mercedes	40.0	60.0	*	100.0	*	50.0	50.0	*	*
Angamos	45.0	55.0	77.8	22.2	*	*	33.3	66.7	*
Paujil	100.0	*	75.0	25.0	*	*	75.0	25.0	*
San José de Añushi	71.4	28.6	80.0	20.0	20.0	*	60.0	20.0	*
Tamshiyacu -Tahuayo	**30.9**	**69.1**	**64.7**	**35.3**	**20.6**	**17.6**	**8.8**	**50.0**	**2.9**
Libertad	30.0	70.0	100.0	*	*	33.3	*	66.7	*
Esperanza	29.4	70.6	50.0	50.0	20.0	10.0	30.0	40.0	*
Buena Vista	24.0	76.0	83.3	16.7	*	*	*	100.0	*
El Chino	12.5	87.5	50.0	50.0	50.0	*	*	50.0	*
San Pedro	50.0	50.0	42.9	57.1	42.9	28.6	*	14.3	14.3
Diamante / Siete de Julio	54.5	45.6	83.3	16.7	16.7	33.3	*	50.0	*

* Those interviewed did not select from this alternative

Percentages on first question based on total number surveyed (N=166), remaining questions based on the number that said "yes" they gathered (N=63)

Table 24 shows that the communities with the most tendencies to gather non-timber forest products are Paujil and San José de Añushi, both Matsé native communities. The communities with least collection are El Chino and Buena Vista. In order to determine if collecting is conducted as an exclusive activity or if it is done in combination with other activities, we asked whether the person gathered other products when hunting or fishing. The results show that the majority do gather when hunting or fishing in Libertad, Buena Vista and Diamante/Siete de Julio. In the communities of Nueva Carolina, San Francisco de

Mercedes and Nueva Esperanza fewer respondents say that they gather in combination with other activities. Some people mentioned that when they are hunting, if they see ripe fruit, they remember the location in order to return later to harvest those fruits. Bark is harvested most by community members of In San Pedro bark is the most harvested; in Paujil and San José de Añushi, medicinal plants; and in Nueva Esperanza, Buena Vista, and to a lesser degree in Libertad and Angamos, they harvest fruit.

Table 25. *Time spent collecting, type of place, and time spent reaching harvest area*

	Time spent collecting (in hours)						**Place**		**Distance to harvest area (in hours)**			
Community	Less than 1	1 to 3	3 to 5	5 to 8	8 to 12	More than 12	A specific place	Walk around to find the product	Less than 1	1 to 3	3 to 5	5 or more
Yavarí Basin	**20.7**	**48.3**	**10.3**	**6.9**	**10.3**	**3.4**	**37.9**	**55.2**	**31.0**	**48.3**	**10.3**	**10.3**
Nueva Carolina	100.0	*	*	*	*	*	50.0	50.0	100.0	*	*	*
Nueva Esperanza	42.9	42.9	*	*	14.3	*	71.4	28.6	57.1	42.9	*	*
San Francisco de Mercedes	*	50.0	*	*	50.0	*	*	100.0	*	50.0	50.0	*
Angamos	11.1	44.4	22.2	11.1	11.1	*	33.3	55.6	11.1	77.8	*	11.1
Paujil	*	50.0	*	25.0	*	25.0	*	75.0	*	25.0	25.0	50.0
San José de Añushi	*	80.0	20.0	*	*	*	40.0	60.0	40.0	40.0	20.0	*
Tamshiyacu -Tahuayo	**29.4**	**47.1**	**5.9**	**8.8**	**5.9**	**2.9**	**41.2**	**52.9**	**58.8**	**32.4**	**2.9**	**5.9**
Libertad	*	100.0	*	*	*	*	*	100.0	33.3	66.7	*	*
Esperanza	40.0	20.0	*	20.0	20.0	*	70.0	20.0	60.0	30.0	10.0	*
Buena Vista	33.3	66.7	*	*	*	*	33.3	66.7	50.0	33.3	*	16.7
El Chino	50.0	*	*	*	*	50.0	50.0	50.0	50.0	*	*	50.0
San Pedro	14.3	57.1	14.3	14.3	*	*	28.6	57.1	71.4	28.6	*	*
Diamante / Siete de Julio	33.3	50.0	16.7	*	*	*	33.3	66.7	66.7	33.3	*	*

* Those interviewed did not select from this alternative
Based on the number that said yes they gathered (N=63)
This table does not include "no" or "I don't know" responses

Table 25 indicates that members of Nueva Carolina spend the least amount of time collecting. Most harvesters from the communities of Libertad and San José de Añushi indicated that they spend between 1 and 3 hours collecting. In general, many people do not have a specific harvest location; they walk around until they find what they are looking for. The communities with the highest percentages employing this method are from Libertad, San Francisco de Mercedes and Paujil. On the other hand, people from the communities of Nueva Esperanza and Esperanza indicated that they collect from specific locations. Nueva Carolina, San Pedro and Diamante/Siete de Julio have the shortest distances to reach their harvesting locations, followed by Angamos, which has the highest percentage of people who dedicate between 1 and 3 hours to get to their harvest location. The rest of the communities' responses were homogenously distributed.

Two people preparing natural ungurahui fruit juice

The sapote fruit collected from the forest

Timber

People in the region extract timber for domestic use, mainly to build their homes, and to sell small quantities when they have pressing financial needs. Currently, the locals do not engage in large-scale logging. Small and medium-scale loggers, mostly from Iquitos, carry out systematic timber extraction or provide financing for others to do the work for them.

The majority of those involved in logging activities in the region work as low-paid laborers contracted by middlemen or financers. People involved in timber extraction are not dedicated loggers; rather, they engage in timbering activities on a temporary basis to increase family finances. The financer usually gives the laborers the specifications regarding how to extract the timber, what type he wants, and how much. Some timber financers also buy animal skins, bush meat, or whatever else is offered to them.

Table 26. *Responses to timber extraction questions*

	Extract timber?		Distance to harvest area (in hours)				Receive financing?	
Community	Yes	No	Less than 1	1 to 3	3 to 5	5 or more	Yes	No
Cuenca del Yavarí	**14.3**	**85.7**	**12.5**	**12.5**	*****	**75.0**	**87.5**	**12.5**
Nueva Carolina	*	100.0	*	*	*	*	*	*
Nueva Esperanza	5.9	94.1	100.0	*	*	*	*	100.0
San Francisco de Mercedes	20.0	80.0	*	100.0	*	*	100.0	*
Angamos	20.0	80.0	*	*	*	100.0	100.0	*
Paujil	50.0	50.0	*	*	*	100.0	100.0	*
San José de Añushi	*	100.0	*	*	*	*	*	*
Tamshiyacu -Tahuayo	**7.3**	**92.7**	**25.0**	**37.5**	**12.5**	**25.0**	**12.5**	**87.5**
Libertad	50.0	50.0	*	40.0	20.0	40.0	20.0	80.0
Esperanza	2.9	97.1	100.0	*	*	*	*	100.0
Buena Vista	4.0	96.0	100.0	*	*	*	*	100.0
El Chino	*	100.0	*	*	*	*	*	*
San Pedro	7.1	92.9	*	100.0	*	*	*	100.0
Diamante / Siete de Julio	*	100.0	*	*	*	*	*	*

* Those surveyed did not select from this alternative
First question based on total number surveyed (N=166), remaining questions based on the number that said "yes" they harvested timber (N=16)

Overall, not many people from the region responded positively when asked whether or not they extracted timber (only 14.3% said "yes"). Those who responded "yes" show the following tendencies: Libertad and Paujil had the highest percentages of yes responses. People who travel the shortest distances to harvest timber are from Nueva Esperanza, Esperanza and Buena Vista, most people from San Francisco de Mercedes and San Pedro indicated that they travel between 1 and 3 hours, while people from Angamos and Paujil travel the longest distances. Angamos and Paujil are also the communities that receive the most financing, which probably facilitates longer and farther expeditions.

Table 27. *Type of wood harvested*

Wood	Frequency	Percentage
Mahogany	7	43.8
Cedar	4	25
Tornillo	2	12.5
Other	3	18.8
Total	**16**	**100**

As shown in Table 27, mahogany and cedar are the species of choice. It is known that these trees are not found in the most accessible portions of the proposed protected area.

To find them, one must travel further into the forest, usually near creek headwaters. The fact that some people mentioned mahogany, implies that they have traveled into relatively isolated areas to harvest it since the widespread view is that mahogany no longer exists in the areas close to the communities. This illustrates the power of timber harvest; people will travel to the farthest, inaccessible regions in search of precious wood and disrupt fauna and habitat along the way.

Agriculture

Local people often carry out several activities in order to survive. Agriculture is one of their main economic activities. Obstacles to productive agriculture in the region include poor soils, crop plagues, high transportation costs, small market for the products, low competitive capacity, and no technical support. The overwhelming land use tendency is slash and burn agriculture. After a short time the farmer must search for new land because his farm stops producing; and therefore he contributes to the ever-expanding agriculture frontier and deforestation.

Table 28. *Responses to questions regarding farm possession*

	Do you have farmland?		**How many farmland plots do you have?**			
Community	Yes	No	One	Two	Three	Four or more
Yavarí Basin	**87.5**	**12.5**	**20.4**	**34.7**	**20.4**	**24.5**
Nueva Carolina	100.0	*	*	*	*	100.0
Nueva Esperanza	88.2	11.8	20.0	33.3	13.3	33.3
San Francisco de Mercedes	60.0	40.0	33.3	*	33.3	33.3
Angamos	85.0	15.0	29.4	29.4	35.3	5.9
Paujil	100.0	*	*	25.0	25.0	50.0
San José de Añushi	100.0	*	14.3	85.7	*	*
Tamshiyacu -Tahuayo	**91.8**	**8.2**	**12.9**	**29.7**	**29.7**	**27.7**
Libertad	40.0	60.0	*	25.0	75.0	*
Esperanza	100.0	*	11.8	29.4	35.3	23.5
Buena Vista	92.0	8.0	8.7	30.4	17.4	43.5
El Chino	100.0	*	12.5	31.3	31.3	25.0
San Pedro	92.9	7.1	30.8	30.8	15.4	23.1
Diamante / Siete de Julio	100.0	*	9.1	27.3	36.4	27.3

* Those surveyed did not select from this alternative
First question based on total number surveyed (N=166), remaining questions based on the number that said "yes" they had a farm (N=150)

Table 28 shows that the majority of those surveyed have farmland plots--90% indicated that they farmed. The communities least involved in farming are Libertad and San Francisco de Mercedes, presumably because they spend more time hunting. Regarding the number of farms, or farmland plots, the percentages are fairly equally distributed between two, three, and four farms. The percentage is less for those people whom posses only one farmland plot. The community with the highest percentage of two-farm

possession is San José de Añushi, of three-farm possession is Libertad and four- or more farm possession is Nueva Carolina.

Table 29. *Types of crops cultivated*

Community	Types of crops cultivated									
	Yucca	Maize	Plantain	Papaya	Sweet Potato	Sugar Cane	Citrus Fruit	Rice	Pineapple	Other
Yavarí Basin										
Nueva Carolina	25.0	*	37.5	*	*	37.5	*	*	*	*
Nueva Esperanza	31.9	6.4	31.9	2.1	2.1	25.5	*	*	*	*
San Francisco de Mercedes	16.7	11.1	11.1	16.7	5.6	11.1	5.6	*	11.1	11.1
Angamos	27.4	11.3	29.0	3.2	6.5	11.3	*	8.1	*	3.2
Paujil	26.7	13.3	40.0	6.7	6.7	*	*	*	*	6.7
San José de Añushi	30.4	13.0	30.4	*	8.7	17.4	*	*	*	*
Tamshiyacu - Tahuayo										
Libertad	16.7	*	22.2	11.1	*	16.7	5.6	*	27.8	*
Esperanza	30.2	25.5	24.5	3.7	*	7.5	1.9	0.9	3.8	1.9
Buena Vista	27.4	20.2	25.0	3.6	2.4	9.5	2.4	*	4.8	4.8
El Chino	35.1	18.9	18.9	*	2.7	5.4	*	*	5.4	13.5
San Pedro	10.2	2.3	15.6	10.9	0.8	26.6	5.5	3.1	12.5	12.5
Diamante / Siete de Julio	26.8	4.9	26.8	*	*	9.8	2.4	7.3	4.9	17.1

* Those surveyed did not select from this alternative
Based on the number that said yes they had a farm (N=150)
This table does not include "no" or "I don't know" responses

Generally speaking, the communities surrounding the proposed protected area mostly cultivate yucca and plantain followed by maize and sugar. Other products like sweet potatoes, papayas, pineapples, rice, and citrus fruits are cultivated to a lesser degree.

Most people in the zone cultivate a small plot, enough to produce food for their own families. Agriculture is mostly subsistence for domestic consumption. While waiting to harvest their crops, most people supplement their diet with fish and bush meat. Usually, locals have several plots at different stages of production so that they can harvest year-round. People who produce more than they need sell the excess, mostly in Angamos or Islandia in Yavarí; in Tamshiyacu-Tahuayo, locals sell their excess in Iquitos.

Depending on the communities' geography, the farmers either walk or canoe (or both) to their plots. The distance to the farmland plot determines the farmers' daily schedule. If the farm is far away, the farmer works all day, while if it is nearby his schedule is variable and partial.

Table 30. *Specifics on farmland*

Community	Location of first farm		Location of second farm		Location of third farm		Type of land, farm 1		Type of land, farm 2		Type of land, farm 3	
	Close to town	Far from town	Close to town	Far from town	Close to town	Far from town	Highland	Flood land	Highland	Flood land	Highland	Flood land
Cuenca del Yavarí	**83.3**	**14.6**	**64.9**	**35.4**	**55.0**	**45.0**	**98.0**	**2.0**	**94.9**	**5.1**	**95.5**	**4.5**
Nueva Carolina	100.0	*	100.0	*	100.0	*	100.0	*	100.0	*	100.0	*
Nueva Esperanza	42.9	50.0	30.0	70.0	*	100.0	93.3	6.7	91.7	8.3	85.7	14.3
San Francisco de Mercedes	100.0	*	100.0	*	100.0	*	100.0	*	100.0	*	100.0	*
Angamos	100.0	*	83.3	16.7	71.4	28.6	100.0	*	100.0	*	100.0	*
Paujil	100.0	*	25.0	75.0	33.3	66.7	100.0	*	75.0	25.0	100.0	*
San José de Añushi	100.0	*	83.3	16.7	*	*	100.0	*	100.0	*	*	*
Tamshiyacu - Tahuayo	**67.3**	**32.7**	**67.0**	**33.0**	**50.9**	**49.1**	**69.3**	**30.7**	**69.3**	**30.7**	**75.9**	**24.1**
Libertad	50.0	50.0	50.0	50.0	*	100.0	100.0	*	100.0	*	100.0	*
Esperanza	52.9	47.1	50.0	50.0	35.0	65.0	52.9	47.1	60.0	40.0	70.0	30.0
Buena Vista	69.6	30.4	71.4	28.6	71.4	28.6	60.9	39.1	57.1	42.9	64.3	35.7
El Chino	68.7	31.3	71.4	28.6	55.6	44.4	62.5	37.5	57.1	42.9	66.7	33.3
San Pedro	92.3	7.7	88.9	11.1	75.0	25.0	100.0	*	100.0	*	100.0	*
Diamante / Siete de Julio	81.8	18.2	90.0	10.0	57.1	42.9	100.0	*	100.0	*	100.0	*

* Those surveyed did not select from this alternative
Based on the number that said yes they had a farm (N=150)
This table does not include "no" or "I don't know" responses

Table 30 shows that a large percentage of farms are located close to the communities. The highest percentage of farmers from the communities of Libertad, Nueva Esperanza and Esperanza indicated that their farms are the farthest from the communities. Most people responded that their farms are located on highlands, not in the flood lands. The communities of Esperanza, Buena Vista and El Chino had the highest percentage of farms located in low, flood lands.

The majority of the farmers stated that they open up new farmland every year. Some farmers from larger communities cut regrowth and secondary forests. In other places, where possible, the farmers cut overgrown grass and weeds. On average, they open up one or one and a half hectares and plant it entirely. Because these rainforest soils are extremely poor, the farmers have to rotate crops every year, usually endangering virgin forest.

Table 31. *Specifics on opening new farmland*

Community	How often do you open up new farmland?				Size of new farm plot			Do you use regrowth areas?		Do you plant on the beaches?	
	Once a year	Twice a year	Three times a year	Other	1/2 hectares	1 hectare	2 or more hectares	Yes	No	Yes	No
Yavarí Basin	**65.3**	**22.4**	**2.0**	**10.2**	**38.8**	**55.1**	**6.1**	**89.8**	**10.2**	**55.1**	**44.9**
Nueva Carolina	100.0	*	*	*	66.7	33.3	*	100.0	*	33.3	66.7
Nueva Esperanza	53.3	26.7	6.7	13.3	66.7	33.3	*	86.7	13.3	66.7	33.3
San Francisco de Mercedes	33.3	66.7	*	*	33.3	66.7	*	100.0	*	*	100.0
Angamos	70.6	17.6	*	11.8	11.8	70.6	17.6	88.2	11.8	70.6	29.4
Paujil	100.0	*	*	*	25.0	75.0	*	100.0	*	50.0	50.0
San José de Añushi	57.1	28.6	*	14.3	42.9	57.1	*	85.7	14.3	28.6	71.4
Tamshiyacu - Tahuayo	**60.4**	**26.7**	**4.0**	**8.9**	**24.8**	**60.4**	**12.9**	**88.1**	**11.9**	**64.4**	**35.6**
Libertad	50.0	25.0	25.0	*	25.0	75.0	*	100.0	*	*	100.0
Esperanza	47.1	38.2	2.9	11.8	14.7	67.6	14.7	88.2	11.8	67.6	32.4
Buena Vista	56.5	21.7	8.7	13.0	34.8	43.5	21.7	95.7	4.3	82.6	17.4
El Chino	87.5	12.5	*	*	43.7	56.3	*	87.5	12.5	81.3	18.7
San Pedro	61.5	23.1	*	15.4	23.1	53.8	15.4	92.3	7.7	38.5	61.5
Diamante / Siete de Julio	72.7	27.3	*	*	9.1	81.8	9.1	63.6	36.4	45.5	54.5

* Those surveyed did not select from this alternative
Based on the number that said yes they had a farm (N=150)
This table does not include "no" or "I don't know" responses

Table 31 shows that the majority of people surveyed open up farmland every year, followed by those who open up farmland every other year, and finally a small percentage that open up farmland every three years or more. The highest percentages of farmers opening up farmland every year are found in the communities of Nueva Carolina and Paujil. The highest percentage of farmers opening up farmland every other year is in San Francisco de Mercedes. Most people establish one-hectare farms, some open ½ hectare farms, and very few establish farms 2 hectares or more. Nueva Carolina and Nueva Esperanza have the highest percentages of people opening ½ hectares; Diamante/Siete de Julio, Libertad and Paujil have the highest percentages of people opening up 1 hectare, and Buena Vista has the highest percentage of people who say they open up two or more hectares.

Most people also indicated that they use regrowth areas to open up new farmland, the highest percentages are found in Nueva Carolina, San Francisco de Mercedes, Paujil and Libertad. Only slightly over 50% plant on the beaches, and this occurs more in Tamshiyacu-Tahuayo than in Yavarí. The

communities with the highest percentages of farmers planting on the beaches are Buena Vista, El Chino and Angamos.

According to José Lozano Marín, a regional government official in Angamos, agriculture in the region is currently for subsistence; people are planting and harvesting to survive. He said that the regional government in Angamos wants to help regional agriculture and improve production. He said that they are promoting rice cultivation, and in their last campaign they produced 25 tons of rice, which is a lot for Angamos. He said they want to increase production to 50 tons and then eventually reach their ultimate goal of 100 tons of rice. He also said they want people to plant plantains to make flour, which the municipal government has already agreed to buy for their *vaso de leche* school nutrition program or for school breakfast programs. The official goes on to say that the problem with the native people is that they only harvest enough for themselves. He wonders if they will always live this way, harvesting just enough to eat. The subregion is encouraging agriculture: they have planted rice and maize and will also promote using lowlands and communal farmlands so that they might have excess harvest to actually sell on the local market.[17]

Table 32. *Information regarding farm animals*

	Animals raised			
Community	None	Hens/Chickens	Pigs	Other
Yavarí Basin	**10.7**	**73.2**	**8.9**	**1.8**
Nueva Carolina	*	100.0	*	*
Nueva Esperanza	17.6	70.6	*	*
San Francisco de Mercedes	*	20.0	60.0	*
Angamos	10.0	75.0	10.0	5.0
Paujil	*	100.0	*	*
San José de Añushi	14.3	85.7	*	*
Tamshiyacu - Tahuayo	**15.5**	**81.8**	**2.7**	*****
Libertad	70.0	30.0	*	*
Esperanza	5.9	88.2	5.9	*
Buena Vista	20.0	80.0	*	*
El Chino	6.3	93.7	*	*
San Pedro	7.1	85.8	7.1	*
Diamante / Siete de Julio	9.1	90.9	*	*

* Those surveyed did not select from this alternative
Based on the number that said yes they had a farm (N=150)
This table does not include "no" or "I don't know" responses

Most people surveyed raise hens and chickens. Some of those surveyed raise pigs or other animals, but to a lesser degree. There were very few cattle in the surveyed towns. Nonetheless, cattle are spread out in the communities of the Tamshiyacu River, and forest impact is notable. This same region has seen large deforestation for establishing extensive cattle pastures. As one resource notes, "There are more cattle than people in Tamshiyacu River."[18]

Cattle ranching in the Tamshiyacu River sector

Buffalo have been introduced in the region

Commercial activities

There is very little commercial activity around the proposed protected area in the Yavarí zone. Angamos is the region's commercial center. There are several stores and businesses that offer basic products. Rural inhabitants bring their products to Angamos to sell or trade for basic provisions to bring back to their communities. In the Tamshiyacu-Tahuayo zone, Fernando Lores district, there is more commercial activity. This is because the communities in the zone are closer to the district capital and Iquitos, which is a major city and is the commercial center of the entire region. Unlike Yavarí, there is collective public river transportation in Tamshiyacu-Tahuayo on a fixed schedule that facilitates business.

For the most part, rural inhabitants travel to Iquitos only when they have something to sell. The sale allows them to pay their travel costs and purchase basic necessities like salt, sugar, cooking oil, soap, and kerosene. The district capitals play an important role since they attract business, mostly from the nearby rural communities. People that sell their products in the district capitals do so frequently and on a small-scale. These people usually do not go to Iquitos to sell because it is farther and they are part of the district market. The communities of Nueva Carolina and Nueva Esperanza conduct their business in Islandia, and to some extent in the border towns of Benjamín Constant, Tabatinga and Leticia. The communities of the upper Yavarí depend on Angamos. According to locals, every so often deliveries from Tabatinga arrive in Angamos, with lower prices than in Iquitos. In RCTT, commercial activity is centered in Iquitos, but there are some people who bring their products to Tamshiyacu and other communities along the Tamshiyacu River.

Table 33. *Information regarding commerce*

	Do you sell?		Place of sale				Form of payment	
Community	Yes	No	In the community	In a neighboring community	In Iquitos	Other	With money	Trade for other products
Yavarí Basin	**71.4**	**28.6**	**55.0**	**17.5**	**2.5**	**25.0**	**65.0**	**35.0**
Nueva Carolina	66.7	33.3	50.0	*	*	50.0	50.0	50.0
Nueva Esperanza	82.4	17.6	92.9	*	*	7.1	42.9	57.1
San Francisco de Mercedes	80.0	20.0	25.0	50.0	25.0	*	50.0	50.0
Angamos	50.0	50.0	70.0	10.0	*	20.0	90.0	10.0
Paujil	100.0	*	*	50.0	*	50.0	50.0	50.0
San José de Añushi	85.7	14.3	*	33.3	*	66.7	100.0	*
Tamshiyacu - Tahuayo	**73.6**	**26.4**	**12.3**	**8.7**	**79.0**	*****	**95.1**	**2.5**
Libertad	70.0	30.0	57.1	*	42.9	*	71.4	28.6
Esperanza	76.5	23.5	*	*	100.0	*	100.0	*
Buena Vista	72.0	28.0	16.7	*	83.3	*	94.4	*
El Chino	75.0	25.0	*	8.3	91.7	*	100.0	*
San Pedro	64.3	35.7	11.1	22.2	66.7	*	88.9	*
Diamante / Siete de Julio	81.8	18.2	22.2	44.4	33.3	*	100.0	*

* Those surveyed did not select from this alternative
Based on the number that said yes they engage in commercial activities (N=121)
This table does not include "no" or "I don't know" responses

The majority of those surveyed sell their products. In Tamshiyacu-Tahuayo, the majority of those surveyed prefer to sell their products in Iquitos, and some prefer to sell in their own communities. The majority of rural inhabitants receive money for their products; however, trade is still an important form of business in Yavarí. Ninety-five percent of those surveyed in Tamshiyacu-Tahuayo are paid money for their products, and therefore more people are involved in commerce, while in areas where trade is the common form of payment, there is less commerce. In traditional trade, product value is more subjectively determined than in the modern marketplace, often undervaluing the product, which is a disadvantage for the rural inhabitant.

Tables 34, 35, 36 and 37 show the products principally sold by those surveyed. The principal agricultural products sold include plantain, yucca, and maize. The principal fish products include boquichico, palometa and zúngaro. The principal types of bush meat include collared peccary, white-lipped peccary, and deer. On a much lower scale, the principal collected products sold are palm fronds (for roofs) and aguaje fruit. Comparing percentages, agricultural products are sold the most, followed by bush meat, and to a lesser degree, fish.

Table 34. *Percentages of agricultural products sold*

Community	Principally sold agricultural products												
	Rice	Fariña	Hen	Maize	Peanut	Palta	Papaya	Pineapple	Plantain	Sachapap	Watermelon	Yucca	Other
Yavarí Basin													
Nueva Carolina	*	*	*	*	*	*	*	25.0	50.0	*	*	25.0	*
Nueva Esperanza	5.3	5.3	5.3	15.8	*	*	*	*	42.1	*	*	26.3	*
San Francisco de Mercedes	*	33.3	*	*	*	*	*	*	33.3	*	*	33.3	*
Angamos	13.0	*	*	13.0	4.3	*	4.3	*	30.4	*	*	26.1	8.7
Paujil	*	*	*	*	*	*	20.0	10.0	30.0	*	*	20.0	20.0
San José de Añushi	*	*	*	*	5.6	*	22.2	11.1	33.3	*	*	27.8	*
Tamshiyacu -Tahuayo													
Libertad	*	*	*	*	*	*	*	*	100.0	*	*	*	*
Esperanza	*	7.9	*	15.9	1.6	6.3	6.3	3.2	22.2	*	*	27.0	6.3
Buena Vista	*	8.9	*	11.1	*	*	4.4	2.2	26.7	2.2	2.2	28.9	13.3
El Chino	*	3.3	*	16.7	*	*	3.3	*	30.0	*	3.3	36.7	6.7
San Pedro	*	*	*	5.3	*	*	5.3	15.8	26.3	10.5	*	26.3	10.5
Diamante / Siete de Julio	9.1	*	4.5	*	*	*	*	*	40.9	*	*	22.7	22.7

* Those surveyed did not select from this alternative

Based on the number that said yes they engage in commercial activities (N=121)

This table does not include “no” or “I don’t know” responses

Table 35. *Percentages of fish products sold*

Community	Principally sold fish products												
	Boquichico	Gamitana	Doncella	Zungaro	Palometa	Lisa	Tucunare	Sábalo	Sardina	Paice	Huasco	Bujurqui	Other
Yavarí Basin													
Nueva Carolina	33.3	*	*	*	33.3	*	33.3	*	*	*	*	*	*
Nueva Esperanza	10.0	*	*	30.0	10.0	*	10.0	10.0	*	20.0	*	10.0	*
San Francisco de Mercedes	20.0	*	*	40.0	*	*	*	*	*	*	40.0	*	*
Angamos	10.0	*	*	10.0	30.0	10.0	*	20.0	*	*	*	*	20.0
Paujil	*	*	*	40.0	*	*	20.0	40.0	*	*	*	*	*
San José de Añushi	*	*	*	*	*	*	*	*	*	*	*	*	*
Tamshiyacu - Tahuayo													
Libertad	*	*	*	*	*	*	*	*	*	*	*	*	*
Esperanza	34.1	*	*	9.1	13.6	5.0	6.8	2.3	4.5	*	2.3	2.3	20.0
Buena Vista	31.3	6.3	*	*	31.3	*	*	*	6.3	6.3	6.3	12.5	*
El Chino	38.9	*	*	5.6	16.7	*	*	5.6	16.7	*	5.6	5.6	5.6
San Pedro	22.2	*	11.1	11.1	22.2	11.1	*	22.2	*	*	*	*	*
Diamante / Siete de Julio	*	*	*	*	*	*	*	*	*	*	*	*	*

* Those surveyed did not select from this alternative
Based on the number that said yes they engage in commercial activities (N=121)
This table does not include “no” or “I don’t know” responses

Table 36. *Percentages of hunting products sold*

Community	Principally sold products from hunting									
	Collard-Peccary	White-lipped peccary	Paca	Tapir	Armadillo	Deer	Monkey	Skins	Birds	Other
Cuenca del Yavarí										
Nueva Carolina	40.0	40.0	*	20.0	*	*	*	*	*	*
Nueva Esperanza	43.8	25.0	*	6.3	*	15.6	*	3.1	3.1	3.1
San Francisco de Mercedes	33.3	25.0	8.3	8.3	*	25.0	*	*	*	*
Angamos	33.3	16.7	8.3	8.3	*	8.3	*	*	8.3	16.7
Paujil	43.0	14.3	*	*	*	14.3	14.3	*	*	14.3
San José de Añushi	44.4	33.3	11.1	*	*	11.1	*	*	*	*
Tamshiyacu - Tahuayo										
Libertad	31.6	26.3	10.5	5.3	*	26.3	*	*	*	*
Esperanza	28.6	28.6	28.6	*	*	14.3	*	*	*	*
Buena Vista	50.0	*	*	*	50.0	*	*	*	*	*
El Chino	50.0	*	50.0	*	*	*	*	*	*	*
San Pedro	40.0	*	40.0	*	*	20.0	*	*	*	*
Diamante / Siete de Julio	50.0	*	50.0	*	*	*	*	*	*	*

* Those surveyed did not select from this alternative
Based on the number that said yes they engage in commercial activities (N=121)
This table does not include “no” or “I don’t know” responses

Table 37. *Collected products most often sold*

Community	Products									
	Medicinal Plants	Leaves	Aguaje Palm	Shimbillo	Bark	Fruit	Huacapurana	Huasai	Hunguraui	Other
Yavarí Basin										
Nueva Carolina	*	*	*	*	*	*	*	*	*	*
Nueva Esperanza	*	*	*	*	50.0	*	50.0	*	*	*
San Francisco de Mercedes	*	100.0	*	*	*	*	*	*	*	*
Angamos	*	*	*	*	*	33.3	*	33.3	33.3	*
Paujil	*	*	66.7	*	*	*	*	*	33.3	*
San José de Añushi	*	*	100.0	*	*	*	*	*	*	*
Tamshiyacu - Tahuayo										
Libertad	*	*	*	*	*	*	*	*	*	*
Esperanza	*	*	*	*	50.0	*	*	*	*	50.0
Buena Vista	50.0	*	*	50.0	*	*	*	*	*	*
El Chino	*	*	*	*	*	*	*	*	*	*
San Pedro	*	100.0	*	*	*	*	*	*	*	*
Diamante / Siete de Julio	*	100.0	*	*	*	*	*	*	*	*

* Those surveyed did not select from this alternative
Based on the number that said yes they engage in commercial activities (N=121)
This table does not include "no" or "I don't know" responses

By selling or trading their products, inhabitants can obtain other products to fulfill their necessities. The following table summarizes the main products purchased by local community members surveyed during our field evaluation.

Native inhabitant selling bush meat in a store in Angamos

Table 38. *Products most often purchased*

Community	Products													
	Fuel	Clothes	Food	Medicine	Fishing gear	Ammunition	Alcohol	Matches	Machete / Ax	Batteries	Cooking Utensils	School Supplies	Cleaning supplies	Other
Cuenca del Yavarí														
Nueva Carolina	16.7	*	33.3	*	*	*	*	16.7	*	*	16.7	*	*	16.7
Nueva Esperanza	8.2	18.4	26.5	*	2.0	12.2	2.0	10.2	*	6.1	4.1	*	10.2	*
San Francisco de Mercedes	5.9	5.9	23.5	*	*	23.5	5.9	5.9	*	23.5	*	*	5.9	*
Angamos	9.1	6.1	33.3	6.1	3.0	6.1	3.0	3.0	6.1	12.1	3.0	*	*	9.1
Paujil	6.3	25.0	12.5	13.0	19.0	6.0	*	6.0	6.0	*	6.3	*	*	*
San José de Añushi	13.6	27.3	13.6	*	*	4.5	*	13.6	*	9.1	4.5	*	13.6	*
Tamshiyacu - Tahuayo														
Libertad	11.5	11.5	23.1	*	*	11.5	3.8	15.4	*	15.4	*	*	7.7	*
Esperanza	18.3	14.0	28.0	3.2	*	2.2	*	15.1	1.1	6.5	2.2	1.1	4.3	4.3
Buena Vista	21.9	16.4	24.7	2.7	*	*	*	13.7	*	2.7	1.4	5.5	4.1	6.8
El Chino	17.8	17.8	26.7	4.4	*	*	2.2	11.1	*	6.7	8.9	*	2.2	2.2
San Pedro	15.6	18.8	25.0	*	6.3	9.4	*	12.5	*	3.1	3.1	*	*	6.3
Diamante / Siete de Julio	15.2	12.1	30.3	*	*	3.0	3.0	15.2	*	6.1	3.0	3.0	6.1	3.0

* Those surveyed did not select from this alternative
Based on the number that said yes they engage in commercial activities (N=121)
This table does not include "no" or "I don't know" responses

Products purchased most often include food, clothing, and fuel. The other products are in demand, but to a lesser degree.

Table 39. *More purchasing-related questions*

	Where do you make your purchases?				From who do you buy?			
Community	In the community	In neighboring community	In Iquitos	Other	Store/Whole sale	Financer	Businessmen/ Dealer	Other
Yavarí Basin	**52.5**	**17.5**	**5.0**	**25.0**	**70.0**	**7.5**	**17.5**	**5.0**
Nueva Carolina	50.0	50.0	*	*	*	*	50.0	50.0
Nueva Esperanza	92.9	*	*	7.1	57.1	7.1	35.7	*
San Francisco de Mercedes	*	75.0	25.0	*	75.0	25.0	*	*
Angamos	70.0	*	10.0	20.0	80.0	10.0	*	10.0
Paujil	*	50.0	*	50.0	75.0	*	25.0	*
San José de Añushi	*	16.7	*	83.3	100.0	*	*	*
Tamshiyacu -Tahuayo	**9.9**	**6.2**	**84.0**	*****	**74.1**	**2.5**	**19.8**	**3.6**
Libertad	57.1	*	42.9	*	85.7	14.3	*	*
Esperanza	*	*	100.0	*	73.1	3.8	23.1	*
Buena Vista	*	5.6	94.4	*	94.4	*	5.6	*
El Chino	33.3	*	66.7	*	75.0	*	25.0	*
San Pedro	*	22.2	77.8	*	44.4	*	44.4	11.2
Diamante / Siete de Julio	*	22.2	77.8	*	55.6	*	22.2	22.2

* Those surveyed did not select from this alternative
Based on the number that said yes they engage in commercial activities (N=121)
This table does not include "no" responses or "I don't know" responses.

Most of the people in the Yavarí zone make purchases in their own communities or in neighboring ones. Most of the people surveyed from Tamshiyacu-Tahuayo make their purchases in Iquitos. In general, most people surveyed buy from stores or wholesalers, than from businessmen or dealers.

Table 40. *Work-related questions*

	Have you worked outside of your community?		What has been your occupation?									
Community	Yes	No	Chainsaw operator	Fisherman	Teacher	Salesman	In Timber	Agriculture	Ranching	Carpentry	Security guard	Other
Cuenca del Yavarí	**50.0**	**50.0**										
Nueva Carolina	66.7	33.3	*	*	*	*	50.0	*	*	*	*	50.0
Nueva Esperanza	52.9	47.1	11.1	11.1	*	*	55.6	*	*	*	*	22.2
San Francisco de Mercedes	80.0	20.0	25.0	*	*	*	75.0	*	*	*	*	*
Angamos	50.0	50.0	*	*	*	*	10.0	40.0	10.0	*	10.0	30.0
Paujil	75.0	25.0	*	*	*	*	33.3	33.3	*	*	*	33.3
San José de Añushi	*	100.0	*	*	*	*	*	*	*	*	*	*
Tamshiyacu -Tahuayo	**45.0**	**55.0**										
Libertad	50.0	50.0	*	*	*	*	20.0	*	20.0	20.0	*	40.0
Esperanza	41.2	58.8	14.3	14.3	7.1	*	*	*	*	*	7.1	57.1
Buena Vista	36.0	64.0	11.1	11.1	*	22.2	11.1	*	*	*	*	44.4
El Chino	50.0	50.0	*	12.5	*	*	25.0	*	*	*	*	62.5
San Pedro	57.1	42.9	12.5	*	*	12.5	*	25.0	*	*	*	50.0
Diamante / Siete de Julio	54.5	45.5	*	*	*	*	*	16.7	*	*	*	83.3

* Those surveyed did not select from this alternative
Based on total number surveyed, expressed in percentages.
This table does not include "no" responses or "I don't know" responses.

As shown in Table 40, approximately half of the people surveyed have worked outside of the community. The table also shows the survey participants' occupations. The most often cited occupation is timber work, followed by agriculture, and then chainsaw operation.

Telecommunications and other sources of information

People rely almost exclusively on the radio for information. It is the fastest and most immediate way to maintain contact with the rest of the country, and allows these rural inhabitants to break their isolation to a certain degree. Due to the area's economic situation, not every inhabitant owns his or her own radio, but usually a neighbor or relative has one to borrow.

Table 41. *Percentages of radio listening*

	Do you listen to the radio?		Principal stations				Preferred programs				
Community	Yes	No	Panamericana	La Voz de la Selva	Astoria	Atlántida	News	Music	Sports	Personal messages	Other
Yavarí Basin	**71.4**	**28.6**	**5.0**	**65.0**	**5.0**	**22.5**	**70.0**	**10.0**	**5.0**	**10.0**	**5.0**
Nueva Carolina	66.7	33.3	*	100.0	*	*	100.0	*	*	*	*
Nueva Esperanza	70.6	29.4	8.3	83.3	*	8.3	41.7	16.7	8.3	16.7	16.7
San Francisco de Mercedes	40.0	60.0	*	50.0	*	50.0	100.0	*	*	*	*
Angamos	85.0	15.0	5.9	58.8	5.9	23.5	82.4	*	5.9	11.8	*
Paujil	100.0	*	*	50.0	*	50.0	50.0	50.0	*	*	*
San José de Añushi	42.9	57.1	*	33.3	33.3	33.3	100.0	*	*	*	*
Tamshiyacu -Tahuayo	**80.9**	**19.1**	**5.6**	**16.9**	**50.6**	**15.7**	**85.4**	**10.1**	*****	**1.1**	**3.4**
Libertad	30.0	70.0	33.3	33.3	33.3	*	66.7	*	*	*	33.3
Esperanza	94.1	5.9	6.3	6.3	46.9	25.0	87.5	12.5	*	*	*
Buena Vista	84.0	16.0	*	9.5	66.7	4.8	90.5	9.5	*	*	*
El Chino	81.3	18.8	*	7.7	84.6	7.7	84.6	*	*	*	15.4
San Pedro	78.6	21.4	18.2	36.4	*	36.4	90.9	9.1	*	*	*
Diamante / Siete de Julio	81.8	18.2	*	55.6	44.4	*	66.7	22.2	*	11.1	*

* Those surveyed did not select from this alternative
First question based on total number surveyed, remaining based on those surveyed who responded "yes" they listened to the radio (129 cases).
This table does not include "no" responses or "I don't know" responses.

Approximately 75% of those surveyed responded that they listen to the radio. The most popular radio stations include "La Voz de la Selva" and "Radio Astoria." The least popular station is "Radio Atlántida." Overall, the people in Tamshiyacu-Tahuayo prefer "Radio Astoria" while the people in Yavarí prefer "La Voz de la Selva." Most people (80%) preferred to listen to the news; this demand for news shows their desire and need to be connected to national dynamics.

Table 42. *Institutions that provide/provided information and seminars*

Community	Institutions									
	ADAR	Biologists	CARE	Regional Health Department	Subregional Government	Religious Groups	Health and Sanitation Agents	Aguaje palm Project	WCS	Other
Cuenca del Yavarí	*	**16.7**	*	**38.9**	**5.6**	*	**16.7**	*	**5.6**	**16.7**
Nueva Carolina	*	100.0	*	*	*	*	*	*	*	*
Nueva Esperanza	*	25.0	*	25.0	*	*	12.5	*	12.5	25.0
San Francisco de Mercedes	*	*	*	*	*	*	*	*	*	*
Angamos	*	*	*	33.3	33.3	*	33.3	*	*	*
Paujil	*	*	*	66.7	*	*	33.3	*	*	*
San José de Añushi	*	*	*	66.7	*	*	*	*	*	33.3
Tamshiyacu - Tahuayo	**49.1**	*	**9.4**	**9.4**	*	**5.7**	**11.3**	**5.7**	**5.7**	**3.8**
Libertad	*	*	*	*	*	*	*	*	100.0	*
Esperanza	40.0	*	13.3	13.3	*	6.7	20.0	*	*	6.7
Buena Vista	63.6	*	*	9.1	*	9.1	9.1	*	*	9.1
El Chino	61.5	*	23.1	7.7	*	*	7.7	*	*	*
San Pedro	55.6	*	*	*	*	*	11.1	22.2	11.1	*
Diamante / Siete de Julio	*	*	*	25.0	*	25.0	*	25.0	25.0	*

* Those surveyed did not select from this alternative
Information based on those surveyed who responded "yes" they received seminars/information from institutions (71 cases)
This table does not include "no" responses or "I don't know" responses.

Table 42 shows the principal institutions that have, or have had, presence in the communities and have presented seminars providing information to the community members. People from Tamshiyacu-Tahuayo have been exposed to a variety of institutions more often than the people living in Yavarí. The highest percentages have received seminars from health related institutions, like the Regional Health Department, sanitary agents, and ADAR. The inhabitants of Libertad apparently have received seminars in other communities.

THREATS

Yavarí and Yavarí-Mirín Rivers Sector

The forests of the Yavarí River Valley face the same threats endangering all of the Amazonian forests: colonization, uncontrolled deforestation, inadequate management of the forestry industry, and unsustainable hunting practices that usually follow colonists. These threats are not yet strong or immediate in Yavarí because for one, human population is still low, and two, the forestry concessions planned for Yavarí-Mirín have not yet begun operating. Nonetheless, these threats could quickly escalate in a matter of months and

seriously endanger the region, given the history of migration, logging, and commercial hunting on both sides of the Peruvian-Brazilian border.[19]

Logging

The main threat to the proposed protected area is timber extraction. First, there are illegal loggers working deep within the proposed protected area systematically extracting timber. Second, the forestry concessions granted along the left margin of the Yavarí and Yavarí-Mirín Rivers pose a threat.

Problems related to timber extraction are complex. Forestry activities represent an important component to the region's industrial development and therefore economic interest in the activity is high. However, there are many factors contributing to forest degradation, such as overharvest, inappropriate extraction methods, lack of control, general ignorance regarding forestry norms and regulations, and lack of training on alternative resource management options.

The Forestry and Wildlife Law (Law 27308) and its corresponding regulations define Peru's forestry concessions system.[20] It says that forestry concessions are intended for commercial timber activities and it promotes forest management, use of different wood species, and integrated timber use. The Forestry and Wildlife Agency within the National Institute of Natural Resource (INRENA) is responsible for controlling and supervising the concessions system.

In the department of Loreto, INRENA passed Director's Resolution (*Resolution Jefatural*) No. 132-2003-INRENA which formed an Ad hoc commission to manage the promotion process and to grant the permanent forestry concessions in Loreto. According to the resolution, the ad hoc commission is supposed to elaborate and approve the basis and concession bidding plan, post public notice and unite the bidders, receive and evaluate the technical and economic offers, and grant the concessions to those selected.

There was no public consultation process when Loreto's concession system was designed or established. "The process was impenetrable. It was not participatory. Neither the main institutions working in the region nor the inhabitants were not informed."[21] Because of this, it is not possible that the technicians responsible for the concession process have all of the needed information. For example, they did not know that the red uakari inhabited the area on the other side of the Yavarí- Mirín River, in the same area where they have located the concessions. The technicians' lack of information have created a problem when it comes to conserving this species.

Initially, the proposed protected area extended from the Soledad Creek (close to Angamos), down to Yavarí River, all the way to the mouth of the Yavarí-Mirín River, bordered the banks of Esperanza River, and out to the headwaters of the Orosa and Manití Rivers. It included the entire Tamshiyacu-Tahuayo Regional Communal Reserve. Its original proposed size was 1,105,517.50 hectares.

The left banks of the Yavarí-Mirín and lower Yavarí rivers have been designated as *permanent productive forests for timber extraction* and forestry concessions will be established after a competitive bidding process. The concessions overlap with a significant portion of the proposed protected area. Because Loreto's regional government and INRENA refused to remove the concessions from this area, the size of the proposed protected area has been reduced and the 285,609.23 hectares once the concessions were removed. The new area covers 819,908.27 hectares. It should also be noted that the proposed protected area is currently considered as *productive forest reserve*, which means that forestry concessions could be granted in the future.
Because the area has been reduced in size due to these concessions, the Yavarí-Mirín River is now the northeastern border; the concessions are on the river's left banks and the future protected area on its right banks. Forestry concessions on the other side of the river do not guarantee conservation for the proposed protected area. Dishonest loggers might leave their concessions and cross the river to harvest valuable trees or poach animals from within. In addition, the concessions will bring more people to the region; not only those involved with the timber industry, but people offering services like businesspeople, transportation providers, and financers. As has been seen in other logging areas, it is likely that warehouses and even new settlements along the river will be established because people will be eager to set up businesses to try to meet these loggers' demands. Human presence will increase pressure on the future protected area's natural resources.

Concessions located further within the center of the *productive forest*, inaccessible from the river, are also worrisome. Concessionaires will have to build forestry roads and highways to reach their land. Larger, more sophisticated operations, with more financial capital and equipment, will build roads and open up the forest. It is well known, and has been seen throughout the Amazon, that forestry roads facilitate access for hunters, other resources extractors, colonists, and migratory farmers who settle along the roads.

Most public authorities assume that concessionaires will care for their concessions and try to keep them in production, helping to better manage the resources. Yet, one can suppose that once the timber extractor has removed all of the valuable wood from his land and has recovered his investment, his interest to continue investment in its security and care will decline. The director of WCS-Peru predicts that the concessions will be abandoned a few years after they are granted. He bases this statement on the actual tendencies of industrial loggers: harvest what is available at the moment, recover the investment, and leave.[22]

The WCS-Peru Director suggests that the forestry resources in the zone are not as good as people think. In an interview he said that if a forestry resources evaluation was conducted in the zone, the results would show that there are limited resources; many people from Iquitos or loggers currently trying to win concessions think that there is abundant wood in the zone. That just isn't true. There has been logging for decades by loggers like Joaquín Abenzur, Victoriano López, and in the last two decades by Germán Elalú, Augusto Ching, Navas and many others. Along the periphery, between 5 and 10 km the precious woods are gone. The loggers that know this are trying to extract the remaining valuable wood, like cedar, found at the headwaters of the Orosa, Manití and

Yavarí-Mirín rivers. Whatever else is left will need a huge financial investment to extract, which is cost-prohibitive and not worth the effort.[23] The environmental manager with the regional government has an opposing view. She said that most people bidding for concessions have visited the concession sites, and therefore understand the situation. They know which sites they want and where they are located, that is why they are bidding.[24]

According to local inhabitants, accessible, valuable wood has already been extracted from the area on the Peruvian side of the border. They say that there are still valuable timber resources on the Brazilian side of Yavarí. Peruvian forestry concessions could therefore also threaten timber resources on the Brazilian side of the Yavarí River. Loggers could just as easily cross this river and enter Brazilian territory as they could cross the Yavarí-Mirín River to enter the proposed protected area in search of precious wood. Illegally extracted wood from Brazil would be "legal" because the loggers could say it was from their concession; it would be impossible to prove its origin. This situation is even more complicated when one considers that many of the financers and logging barons are Brazilians or Colombians that contract Peruvian laborers to extract timber. Or, likewise, Peruvian loggers could finance Brazilian laborers to log their side of the river and then provide their concessionary documentation "legalizing" the wood.

The Forestry Law declared a 10-year closed logging season on mahogany (*Switenia macrophylla*) and cedar (*Cederla odorata*) in the river basins of the Putumayo, Yavarí, Tamaya and Purús; as well as in other declared areas or areas to be named by supreme decree.[25] As has been verified in the field, cedar extraction continues despite this ban. Still, this legal act provides the necessary backing to enforce better control when it comes to transporting this species down the Yavarí River. However, Article 24 of the Forestry and Wildlife Law goes on to exclude concessions from this ban, as long as the concession's management plan includes species conservation. Article 278 of the Forestry and Wildlife Law's Regulations, Supreme Decree 014-2001-AG further emphasizes concessionary exclusion. It says: "Use units unaffected by logging bans. The closed logging season does not apply to the areas included in the forestry and wildlife concession areas recognized by this Law and these Regulations, or to communal areas or private lands subjected to management plans." This rule makes it impossible to restrict extraction of these species in Yavarí, where concessions have been established.

There are two industrial sawmills, with immense equipment and far-reaching operations in Islandia and Petrópolis, communities located at the mouth of the Yavarí River. These sawmills demand the majority of the wood in the zone. The wood processed there is destined for the international market. The mills receive mostly cedar (despite the legal restriction) as well as tornillo and virola among others.

The situation is further complicated by the fact that INRENA has closed its office in Angamos due to financial problems and all forestry control in the zone depends entirely on INRENA's office in Islandia, which is very far from the actual extraction sites. Under these circumstances, only the police and the communities are left to control wood trafficking. Unfortunately, neither have the capacity to do so effectively.

According to a technician with the National Police, the border police station at Nueva Carolina was established to control illegal wood trafficking and drug trafficking, to detect terrorist activity, and to prevent Brazilian colonists from settling Peruvian territory. However, as we learned from the technician, this post is seriously hindered by logistic limitations. They do not have fuel or good motors. The have a "putt-putt" 16 HP motor and only receive 15 gallons of gasoline per month. This is just enough to patrol the mouth of the Mirín River. Yet, Nueva Carolina has jurisdiction all the way to Limonero, which is 8 hours away using a 40 HP motor down the Yavarí. Upriver on the Mirín River the station covers everything up to the community of San Francisco de Mercedes. The rest of the Yavarí River, upriver to Colonia Angamos, is covered by Colonia Angamos' border police control station. For natural resource control and security, the police conduct investigations and then inform the police command; the command station then informs the ecological police who, in coordination with INRENA, carry out the intervention operation. To do so, they must coordinate with INRENA's regional office in Iquitos who then coordinates with Islandia's INRENA office, who finally plans the operation with the Nueva Carolina station.[26]

Brazil is worried about illegal wood extraction along Yavarí. Brazil applies control and restrictive timbering measures. Despite this, it is very difficult to verify if the wood is coming from the Brazilian side or the Peruvian side. There was one recent incident in which Brazilian loggers sold wood to Peruvian loggers who transported it out along the river using their documents. The Peruvians wanted to transport the wood, then sell it and pay back the Brazilians, but they did not accept the deal. They denounced the Peruvians to the Brazilian control station and the wood was confiscated after a Brazilian military operative. Even the Regional Governmental had to get involved to analyze this situation.

Within the native Matsé communities in the southern portion of the proposed protected area, the biggest problem is logging pressures on the young people. Loggers encourage young people to try to convince the elders to exploit their timber resources. They also try to win over the young people, to establish a relationship with the future community leaders so that they can receive logging rights in the future. Loggers in the zone, either within the communal territory or around it, represent a threat to the proposed protected area. Native communities can extract timber from their territories. Usually, the communities establish agreements with outside loggers who provide technological and financial support and who will take care of all the paperwork to solicit logging permits in the community's name. While this has not actually happened in the Matsé community, it is certainly possible in the future. If loggers are present in the communal territories they can more easily gain access to the proposed protected area to extract timber and "legalize" it by claiming that it came from the native territory where the community has received permission.

New sustainable development systems and better control could be achieved if Peru establishes a Yavarí protected area. This is practically guaranteed on the Brazilian side with the Yavarí Indigenous Reserve, 7 million hectares of intact forest, the second largest indigenous reserve in the world. The Brazilian military bases and the Indigenous Foundation

(FUNAI) take care of the zone. Of course, the Brazilians also have problems, but the Peruvian authorities do not protect the area as well the Brazilians do.

Forestry concessions located within the *permanent productive forests for timber extraction* are controversial, to say the least. First and foremost, they have been designated in areas with community presence. The fact that these communities existed was not considered when locating the concessions. For example, the community of Carolina now actually overlaps the forestry concessions. The community of Nueva Esperanza is now located within an area designated as *productive forest reserve*, which also overlaps with the proposed protected area, and is surrounded by forestry concessions. In lower Yavarí, the concessions overlap all 16 existing communities, most of which do not have corresponding territorial titles even though they have been settled for many years. The concessions will limit these communities' ability to improve and develop because they will not be able to carry on with their productive activities, which extend much further than their towns' centers. In light of this situation, the Yavarí district mayor is soliciting the suspension or exclusion of 27 forestry use units that in one way or the another affect the communities.[27]

The Yavarí district mayor believes that the assignation of the forestry concessions was a poorly designed project. He thinks that the project should be voided because it was based on secondary information instead of primary information that should have been gathered directly through visits to the sites, towns, and communities. He said that this was work of the Ministry and they relied on satellite images; he said that is not correct, they should have consulted with local governments. "Thank God that these concessions have been postponed, hopefully this project will be suspended altogether and a new project will be developed that will help the Amazonian communities grow, using our natural resources in a less environmentally damaging way," he said.

The provincial municipalities of Ramón Castilla, San Pablo, Putumayo and Torres Causana have created the Association of Loreto Border Municipalities (*la Asociación de Municipalidades Fronterizas de la Región Loreto* [AMUFREL]). AMUFREL is fighting the forestry concessions. Since the Association of Loreto Municipalities (AMRELOR) did not take on the fight, the border municipalities formed their own association. They believe that these forestry concessions go against national security since they are along the border with Brazil, and the national government is responsible for border issues. The Yavarí district mayor believes that concessions should not be granted in border territories, but with these concessions they have gone way out of line.[28]

Regarding the postponement of the concession assignments, the environmental manager of the regional government confirmed that there were complaints filed because many concessions overlapped previously claimed land. She said that they created a commission and that the INRENA agents had to come to verify that the project had been postponed. They had been working to stop the concessions because of conflicting land claims. Due to logistics they could not cover everything, but because of their efforts the concessions were postponed.[29] INRENA postponed granting the concessions on repeated occasions. When they were finally granted on April 7, 2004, there were appeals, opposition, and even cases of violence.

When we conducted our field evaluation for this report, we verified illegal extraction from Esperanza River, a tributary of the Yavarí-Mirín River. The following information illustrates the difficulties with illegal logging in the zone.

According to the president of Nueva Esperanza, there are illegal loggers extracting timber without the corresponding permits. He has requested support from the authorities to see what can be done to stop the logging. He mentioned that in recent years, this is the second time that such a large amount of timber was extracted from the area. The first time, Mr. Waldir Tello was responsible for the illegal logging—without any concessionary rights—and the police did not do anything. They took the wood, all of it cedar, to Islandia where they put it on a barge and sold it.[30]

During our field evaluation, we verified that timber was being extracted from Esperanza River. We reached a point (S 04° 07' 09'' W 072° 11' 04'') with local authorities from Nueva Esperanza and the National Police from the Carolina Station, which belongs to the 5th police company and reports to the border captain, who had an inspection warrant.[31] This warrant, according to the officials, will be sent to the captain who will delegate the next steps and provide follow-up to the case.

According to timber laborers interviewed on site, Jaime Becerra owns the wood. His base of operation is in Iquitos. In total, there were 700 logs of cedar; 200 logs were floating down first and the remaining 500 were upriver waiting to be floated out. The loggers were divided in six groups of five people each to cover more ground. They were working in: Panguana Creek, Esperanza Creek, Marañón Creek, Cedruy Creek, Zapallijal Creek, Shihuango Creek, Paujil Creek and Paña Creek. These loggers also told us that there were other loggers in the area, but they did not know whom.

Wood in Esperanza Creek

Loggers showed police and other witnesses an unofficial map titled, "Location of Timber Extraction Sites within the Productive Forests of the Yavarí River and Esperanza Creek Area," dated July 2003, but it did not have any official seal or signature. There were six such extraction sites on the map: Number 359 belonged to Jaime Becerra Reátegui, Number 368 to José Luis Becerra Reátegui, Number 483 to Isela Horna Flores, Number 484 to INMADER MOSIHE E.I.R.L, Number 523 to MOISÉS E.I.R.L, and Number 369 to Diana Cristina Becerra Felipe. These extraction sites correspond to forestry concession lots that have yet to be auctioned; they have not been assigned to any bidder. According to other sources, Jaime Becerra was also illegally extracting timber from Pacaya Samiria (a national reserve in Loreto), from Puinahua River.

An INRENA agent from Iquitos explained the legal procedures. He told us that this kind of illegal act is

considered a misdemeanor. To be considered a criminal offense, a denouncement must be made within the courts. Likewise, the denouncement could be made to an INRENA official who would then pass the case onto the ecological police to carry out. Even a citizen could make the denouncement depending on the magnitude of damage and the effects. All local communities, whether they are composed of native people, ribereños or farmers, have certain powers to intervene as soon as they are officially recognized as communities and have a local authority in place (i.e., the lieutenant governor, or in the case of the native communities, their highest authority Apu). They have the power to detain the product and the responsibility to contact INRENA so they can take over the investigation and later seize the product or fine the perpetrator.[32]

Not only were we able to witness illegal timber extraction from Esperanza River, several sources also informed us that it has been occurring regularly. One INRENA official from Iquitos said that logging in that region is definitely illegal, but a permanent phenomenon there. INRENA's Iquitos office coordinates with Islandia's to try and detain such activity, but their capacity is limited and it is difficult to succeed.[33] Another INRENA representative in Iquitos, Sixto Luna Pinchi, learned of illegal logging that had occurred on March 17, nearly a month later on April 15. He commented that the wood had to be extracted illegally because there were no contracts, concessions, or permits from that area.[34]

According to a member of the ad hoc commission in charge of the forestry concessions process, the special authorizations will end or be cancelled as soon as there are enough concessions to supply wood to the timber industry. INRENA is responsible for controlling logging—illegal and legal—and the ad hoc commission only works to help implement the process.

This commission member believes that illegal logging could be controlled in one of two ways. For one, INRENA's Commission Against Illegal Logging and second the same concessionary system, which promotes legal logging with opportunities for everyone. He also mentioned that the Forestry Law established an agency called the Supervising Organization of Forestry Concessions (OSINFOR), but that it is not yet in operation. In addition, it is not part of INRENA or the Ministry of Agriculture, but rather part of the Presidential Ministry Council, in order to promote more transparency. OSINFOR is not involved in the concession granting process; it will only supervise and enforce the management plans and other contract stipulations.

INRENA has a Multi-sector Environmental Management and Natural Resources Office responsible for supervising environmental aspects related to concessions granting and management. This office must approve the proposed management plans for the concessions before they are forwarded on to the Forestry Agency for review.[35]

According to one INRENA official, there are actually four legal ways to extract timber: forestry concessions, special permits, harvesting from local forests, and exclusive authorization. He added that these exclusive authorizations, which included old 1000-hectare contracts, expire on June 30, 2004.[36]

Logging in the evaluated area is problematic for many reasons, including: overharvest of precious woods like cedar and mahogany in accessible areas; absence of reforestation efforts to replenish the resource; general lack of knowledge of the norms and use regulations; lack of understanding regarding logging's impact; orientation directed entirely for timber extraction; lack of control and regulation; price fluctuations; complicated extraction and commercialization chains; tense relations that exist because of loggers in the communities; and lack of technical assistance and capacity.

Immigration and population growth

Currently, population in the proposed Yavarí Basin protected area is small. The only communities settled within the proposed area are Carolina, Nueva Esperanza and San Francisco de las Mercedes, with a total population of 200 people. From Preto Lake to Angamos, there are no human settlements on the Peruvian side and only a few families live in Palmeiras on the Brazilian side of the Yavarí.

However, because the area is currently unprotected, there is a serious danger that colonists will settle there, especially considering that many governmental authorities promote colonization in the country's remaining frontiers.

There are several settlements along the lower Yavarí, many of which are made up of members of the Israelite Mission of the New Universal Pact religious sect. Part of their religious beliefs includes advancing the colonization frontier. This sect has national-level presence. They strictly and literally follow the Old Testament and have a very rigid hierarchical structure. Following orders of the religion, these Andean colonists settled this part of the tropical jungle approximately 7 or 8 years ago in an attempt to create religious communities. These communities' increasing populations have already generated negative environmental impacts in the lower Yavarí and further population growth is anticipated, thereby threatening the proposed protected area. Over the next few months, 60 families will immigrate to Parinari to join the five families currently settled in the area.

The religious sect is politically active and they participate in national elections as an organized political party. A few of their candidates have even been elected to Peru's National Congress. A majority of the Yavarí district inhabitants are members of this religion and they have elected their candidate as district mayor: Demóstenes Alarcón. He is trying to attract more people of this religion to the area. The Lieutenant Governor of Nueva Yarina, another Isrealite community, said that the mayor of Yavarí wanted to create local forests and use municipal funds to pay highland people to populate the zone. The Regional Government did not support the idea and instead advised the mayor that he should help those already living in the zone.[37]

Because the members of this religious sect are Andean, they completely lack the knowledge and experience needed to appropriately manage Amazonian tropical forest resources. For the most part, they are farmers arrive in the region they immediately deforest large expanses to plant wheat. Their impact on the jungle is tremendous. Large

deforested areas surround these Isrealite communities. They organize themselves in order to carry out deforestation more efficiently by working in groups of 10 families, each family tending to 2 hectares, they deforest 20 hectares of tropical forest every year. After abandoning these deforested areas, regrowth begins and secondary forests fill in, which they later deforest to plant pasture for cattle.

The Bible guides their work and organizational ways. They are obliged to donate 10 percent of the overall harvest to the church. "Ten percent is for God, Jehovah. For example, if they harvest corn, they must donate part of their first harvest and ten percent of their overall harvest. When they plant their farm and the crop begins to give fruit, they pick the best, the most perfect, and the best bunch to sell. They save the earnings for God and they send them to the church in Lima. Ten percent of the total harvest is also sent to Lima."[38]

Despite their high levels of organization and focus on satisfying its members' needs, these communities seem abandoned and are extremely poor. They do not have access to health or education. Initially, the sect did not even allow agents from the Ministry of Health into their communities, but because of continued malaria outbreaks, they have essentially been forced to accept help from such institutions. They still lack first-aid outposts and medical health centers and do not have any trained teachers from the Ministry of Education; they use teachers from their own congregation to educate the children.

Hardly any of the Israelite communities have titles to the land they occupy. According to them, they cannot get titles because of the large economic interests to extract wood. The district mayor is working to get land titles for these communities. "In a meeting in Islandia, we were informed that the district mayor promised to obtain land titles for all the communities in Yavarí. The mayor would cover the titling costs, which would be around 3,000 Nuevos Soles. He has promised this, and it would be a huge help to the communities since they do not have enough to pay."[39]

The Yavarí District Mayor's Office, headquartered in Islandia, has a 3 million soles annual budget. Eighty percent goes towards investments; the rest is for ordinary expenses and social programs, which, according to the district mayor, is not enough to cover the region's needs. In Yavarí, timber extraction sites have been designated in areas with towns. Because of this, the district mayor says that they have petitioned for the exclusion of these towns from the concessions and have asked for the suspension of the concession process so that they can resolve other problems with these communities. He said that the ad hoc commission and INRENA do not want to comply: "This worries us and we are also worried that the concessions limit the sizes of the towns, which will become a large social problem because it restricts growth. If there are ten families with 90 or 100 hectares, in the future these ten families will become 100 because of natural population growth and they will need more land. But, the concessions will limit their ability to get land."[40] In this sense, the concessions represent a potential obstacle to future migration and population growth in the zone.

The district mayor perceives the forestry concessions as a threat to the interests of the communities in the area. Because of this pressure, and in an effort to neutralize the advancing concessions, the district mayor wants to create municipal reserves in the region. The conservation community views this reserve model with skepticism. Dr. Bodmer explains that there is no way to guarantee that a municipal reserve will be created for conservation purposes.[41] In fact, the conservation community fears that the district mayor may establish municipal reserves in order to ensure that future Israelite immigrants will have land.

However, this is a remote possibility. Natural protected area legislation states that municipal governments can create protected areas to complement biological diversity conservation actions within their territorial land use plans as long as they do not compromise other natural protected areas. There are laws regulating resource use from within municipal reserves. The legislation states that municipal conservation areas should be recorded in the official municipal conservation areas' register as established by INRENA and administered by INRENA's general office. Once registered, the municipal authority is required to determine the necessary precautions, such as the amount of financing needed and uses permitted within the area, in order to properly manage the area and best meet its protection objectives. The local authority must ensure that the municipal conservation area meets its conservation goals for which it was created. They are also responsible for reporting the area's state of conservation to INRENA on an annual basis. To do so, they must create a technical team responsible for administering the area and provide the necessary supervision facilities. They must elaborate, approve, and implement a management plan and show INRENA that they comply with the stipulations. If they do not comply with these stipulations and obligations, the area will lose its status as a municipal conservation area.[42]

A potential immigration threat is the existing circuit between the communities of Libertad along the Tamshiyacu River with 14 families and San Francisco de las Mercedes along the Yavarí-Mirín River, that had 80 inhabitants in 1995, but currently has only 4 families because of disease and the area's extreme isolation. Many people use this trail, particularly outside hunters coming from Tamshiyacu who are financed by people from Iquitos and their meat haulers. This route could possibly facilitate future access for people wanting to settle in the Yavarí-Mirín Valley.

Another possible immigration threat is overhunting. If animals are overhunted, the hunters will have to travel further within the proposed protected area, for example to Negro River. These hunters could settle in San Francisco de Mercedes because this base of operations is closer to the proposed protected area's interior; actually, some hunters have already done this. Under the right conditions, such as increased demand for bush meat and the need to increase supply, more hunters and people collecting forest products could move to San Francisco de las Mercedes.

During our field visit, we encountered a Matsé family (mother, father and child) from San Pedro along the Yavarí River in San Francisco de Mercedes. They said they had walked from Angamos along the Negro River to San Francisco de Mercedes. They had

been a group of eight, but the rest of the family went to Libertad to work in timber or bush meat. This demonstrates that San Francisco de Mercedes is a point of interest and attraction.

The military is considering establishing a base at Carolina, at the mouth of the Yavarí-Mirín River, in order to have an intermediate point for better control and to attract more people to establish live borders. Increasing the population in this region will increase pressure on the natural resources of the Yavarí-Mirín Basin and negatively impact the proposed protected area.

Another potential threat in the medium term is a new highway between Angamos and Genaro Herrera or Requena. This highway would improve and expand existing trails and routes. All of the candidates for the district mayor's office have included this highway project among their campaign promises. The local people support the idea because the area is isolated and flights are infrequent. If this highway is constructed, migration and all of the related problems will increase, including increased land invasions and natural resource extraction.

Natural resources use

Hunting

Because hunting is an important source of meat for ribereño inhabitants and there is a stable market for bush meat, the demand for fauna is high. Not only does hunting put direct pressure on fauna populations, but other human activities and presence in the communities indirectly negatively impact fauna populations. Lack of adequate control, the influence of lenders, and lack of resource management skills complicate the hunting situation in the zone.

According to a chapter in the publication Priorities for the Conservation of Mammalian Diversity: Has the Panda had its Day? on hunting in the Amazon, hunters obtain the majority of meat from the following ungulates: red brocket (*Mazama americana*), grey brocket deer (*Mazama gouazoubira*), collared-peccary (*Tayassu tajacu*), white-lipped peccary (*Tayassu pecari*). and tapir (*Tapirus terrestris*). These ungulates are important components of the Amazonian ecosystem and help maintain forest structure by dispersing seeds.[43]

Increased hunting pressure throughout the Amazon is generating a series of associated effects. Grace Crabb's publication on hunting practices in Northeastern Peru summarizes these effects as detailed below. Increased pressure for bush meat has caused localized species extinctions around many Amazonian settlements. The market value of bush meat is high and selling it has become a highly lucrative business. Increased hunting has also created a dependency between the communities and the buyers, ruining the subsistence-based lifestyle. Studies on game preference show that most people prefer a small number of game species and intensely hunt them. Current levels of bush meat for sale (mostly ungulates) greatly exceed levels needed for community subsistence. Small species, such

as primates, are more commonly consumed for subsistence purposes since preferred game reap higher prices.[44]

Low human population levels in the Yavarí River Basin signify that hunting is not currently a threat to the proposed protected area. According to local hunters, even though populations of certain species like white-lipped peccary, collared peccary and South American tapir have gone down around the communities, it is still fairly easy to find them. This implies that hunting has not surpassed these species' carrying capacity. Crabb notes that animal movement from an area free from hunting into a degraded zone could give the impression that hunting has not actually impacted the populations when in fact it has.[45] This may be what is happening in the study area, where hunting pressure around the neighboring communities is intense and animals are available because of intact habitat in interior forest.

Crabb states that continued reduction of animals generally indicates that hunting is not sustainable and that the harvested species' density declines.[46] Hunting in the region does not show signs of decline. An analysis of hunting effort in Nueva Esperanza (Mirín River) indicates that hunters take less than 40% of total production because animal abundance is not decreasing. This shows that hunting white-lipped peccary and collared peccary is sustainable, even considering human pressure.[47] Despite this analysis, there is an increase in hunting levels. In surrounding communities, there is constant bush meat extraction by heads of family for consumption and sale as well as by outside hunters who come to the zone in search of animal products to sell later.

However current hunting levels of white-lipped and collared peccary are sustainable, although if hunting increases, the animals' ability to reproduce will diminish and hunting will become unsustainable. Hunters and bush meat salesman have a relationship. If commercial contracts and alliances are established, sustainability will quickly decrease.[48] Research is needed to better understand the extent of the relationship between hunters and bush meat salesmen to determine the current levels of dependency and existing alliances.

Middlemen can get away with paying low prices to purchase meat from the hunters because there are not enough bush meat salesmen in the community to buy it directly. The economic value of bush meat is probably the most important contributing factor to overhunting. In a recent publication by Bodmer and Lozano, they note that price is almost always the most important factor driving unsustainable resource exploitation. The economy plays an important role in how rural inhabitants treat their wildlife resources.[49]

Existing demand for bush meat and the Matsés' demand for articles from large populated centers drives them to put pressure on their natural resources. Angamos is the primary market for bush meat from the communities surrounding the proposed protected area in the upper Yavarí. There, a kilo of white-lipped peccary, collared peccary or deer meat can be purchased for 2.5 or 3 soles. In Requena, 80 km away, bush meat costs between 5 and 6 soles per kilo. This increased price is very attractive to local inhabitants who would not think twice to walk to Requena to get it. Many people from Gálvez River, south of

the proposed protected area, make the trip to Requena and Genaro Herrera to sell their meat at a better price and then make their purchases as well. According to locals, people are constantly arriving to sell meat. Generally, the seven or eight people carrying 50 kilos each need two days to reach Requena and three days to reach Genaro Herrera. They pay their hauler one sol per kilo. A lot of people hunt and prepare meat along the way. These groups work on an almost daily basis, and we calculated that about 25 groups go out per month, though we don't know how much or what type of meat they take with them.

Increased bush meat sales near Requena mean increased pressures on the wildlife inhabiting the southern buffer zone of the proposed protected area. During our field evaluation we were unable to verify whether or not people from the Gálvez River communities entered the proposed protected area during their hunting trips, but we anticipate that pressure on wildlife around the communities will increase and eventually force hunters to go further into the proposed protected area in search of game.

Members of the Fray Pedro community, located next to Angamos near the airport, do hunt in a small portion of the proposed protected area's interior. They hunt along Soledad Creek, which forms the southeastern border of the area. When they receive financing, they go all the way to the creek's headwaters. But, when they are hunting for consumption purposes, they hunt near their community. The best hunting is a five-hour walk along the creek to the interior of the proposed protected area. Hunters will only go there when they intend to extract more than 100 kilos of bush meat to sell in Colonia Angamos.

Another very important hunting ground is near San Francisco de Mercedes along the Yavarí-Mirín River. This community, located on Pavaico Creek on the border with the proposed protected area, is connected by a trail to the community of Libertad along Tamshiyacu River. Outside hunters, coming from the Tamshiyacu, Amazonas Rivers, and even from Iquitos, are constantly found in this area. Many of them are financed or work for intermediaries. They use the community of San Francisco de Mercedes as a base of operations for their hunting activities. We assume that these hunters enter the proposed protected area since San Francisco de Mercedes is on its border. Once the hunters have gotten enough meat and prepared it (removed the skins and bones, and have smoked or cured it) they hire meat haulers, and who use the trail along the Tamshyacu River to Libertad, where they have access to collective boats to take them to Iquitos, where they can reap the best prices for their meat.

Trail connecting Libertad with San Francisco de Mercedes

As in the previous case, if the San Francisco de Mercedes' bush meat market increases, wildlife pressures in this part of the proposed protected area will likely increase. And, as that increases, hunters will travel further into the interior of the proposed protected area in search of game.

A comment made by a member of the National Police during a meeting in Nueva Esperanza illustrates the level of bush meat extraction in the area. “We [the police] have to understand the situation and not enforce the law to its full extent because you are hunting and capturing animals to sell in order to help your families, yourselves, and your home. But, the hunting must be manageable; it is well known that hunters pass by the police station with 700 to 800 kilos
of meat. Where is this seen? In what part of Peru? I know that you sell between 700 and 800 kilos, even one ton of meat from animals during the closed season. You bring 50 to 70 packages of meat, impossible!”[50]

In response, an inhabitant from Nueva Esperanza said, “We are approximately 50 to 60 residents. Each family head kills one or two animals. A white-lipped peccary, how much does it weigh? Around 18 kilos, or if it is large, between 20 and 22 kilos. A spider monkey weighs 8 kilos, and a woolly monkey, 6 kilos. Regarding what the police said, that by hunting we are engaging in illegal work, I would like to point out that the police buy the meat or trade their bullets for it. So, we all buy it and we all eat it.”

One inhabitant from Nueva Carolina pointed out that policemen stationed at Carolina purchase the animal skins for 3 Brazilian Reales or 10 Peruvian Nuevos Soles. Or, they trade cartridges for the meat.

This leads us to conclude that not only are the policemen stationed at Carolina failing to exercise proper control over commercialization of wildlife meat, they are benefiting from it. It is evident that the police stationed at Carolina are not safeguarding the wildlife resources in the region. The law stipulates that only the local inhabitants can use wildlife resources for subsistence without permits. However, a ton of meat is much more than subsistence level extraction.

When asked about authorized commercialization of animal skins, one INRENA agent informed us that the region of Loreto had the following quotas: 26,040 collared peccary skins, 16,400 white-lipped peccary skins, 100 red brocket skins, and 100 capaybara skins, for a total of 42, 640 animal skins. INRENA Resolution N° 004-2004 – INRENA on January 26, 2004 established this quota. How does INRENA supervise these quotas? Since last year, they have been working with headquarters; each is responsible for their control posts. Last year Loreto was divided into four headquarters in Yavarí, Requena, Yurimaguas and Iquitos. Every month, these offices send in their statistics to the central clearinghouse in Iquitos in order to keep track of the global total for the region.

When they are nearing quota, which usually happens near the end of the year, the headquarters are informed so that they will not go over. From INRENA’s national office in Lima, they determine the actual number of allowed animal skins for Loreto, Ucayali, San Martín, Junín, Pasco, Amazonas and Madre de Dios. They also determine the price per unit, which is currently 3.5 Nuevos Soles per skin.

INRENA continually inspects warehouses to verify that they are not going over established limits. To obtain a license to sell wildlife products, the person must be affiliated with a warehouse. If INRENA finds skins in an unauthorized location they are confiscated. INRENA suffers from chronic personnel and logistical shortages, but they manage to monitor the most important sites, like airports and river ports. To carry out operatives and confiscations, INRENA coordinates actions with the port authority and the ecological police.[51]

Fishing

Fishing is also an important activity for the ribereño inhabitants in the region. It is a constant source of protein and a complementary part of the family diet. Because of low human population in the zone, fishing is not intense and is done mostly for subsistence. Some native people sell fish in Angamos, but on a small-scale. There are some commercial fishermen present who bring in large iceboxes to keep fish fresh for sale in Tabatinga and Leticia where there is more people and greater demand.

Some Brazilian fishermen enter Peruvian territory to engage in commercial fishing. According to one policeman at the Carolina station, "There are many fishermen from the Brazilian communities, even from Tabatinga and Leticia. They do not respect established fishing seasons, for example they catch paiche and arahuana when it is prohibited. The police cannot conduct patrols to control this because they do not have the logistical support needed. We cannot even patrol known fishing grounds like oxbow lakes."

There are Brazilian and Columbian lenders who work mostly in the Amazon River with Peruvian fishermen who pay them back in product. Some lenders send the fishermen in search of tropical fish, like the dorado and other ornamental fish that are exported via Colombia to the United States. Other lenders are more interested in edible species to satisfy regional demand. There are also large refrigerated boats working the Amazon and other large rivers. Some go collecting fish from the small fishermen, while others fish directly. Both continue collecting fish until their storage tanks are full.

While commercial fishing is not occurring in Yavarí Basin to this extent, there are some cases when financed boats enter the zone. Commercial, small and medium scale fishing is constant in Yavarí River Basin. They too travel with their iceboxes, mostly *teknopor* boxes lined with aluminum sheets conditioned to hold ice and sawdust in order to preserve the fish. Depending on the fisherman's economic abilities (or the loan shark's economic resources) to acquire better refrigeration capacity (i.e., more iceboxes), a small boat can carry between 200 and 400 kilos of refrigerated fish and a medium-sized boat can carry between 1 and 2 tons.

During our field visit, between the mouth of the Yavarí-Mirín River and Angamos, we observed two small boats with iceboxes and three medium-sized boats towing several canoes with iceboxes. This type of transportation is usually autonomously operated; the owner supplies his own fishermen who fish in the mouths of the oxbow lakes or creeks and then the boat owner collects the fish. Commercial fishing in the oxbow lakes found within

the interior of the forest, for both ornamental and edible species, disturbs their natural equilibrium and conservation because these ecosystems are extremely fragile and sensitive.

One fisherman from Nueva Esperanza interviewed during our evaluation told us he fishes for arahuana and their young. He confirmed that he captures males who keep the young fish their mouths until they are big enough to survive on their own. Fishermen use harpoons and shotguns, if they are on the surface to catch the males. Each male carries on average, 100 young fish in his mouth. The males are distinguished from the females by their larger heads. The young are sold in Leticia for 1500 Colombian Pesos or 1.50 Brazilian Reales per fish. When supply exceeds demand, mostly during February, these young fish can be purchased for 0.50 Reales each. Both Brazilian and Peruvian fishermen from Islandia, Tabatinga, and Benjamín Constant engage in this type of fishing. Each fishermen catches between 8,000 and 10,000 young arahuana each season.[52]

We heard it mentioned several times that some fishermen travel from Libertad to Yavarí-Mirín River in search of ornamental fish. After the catch, they are transported in bags to Iquitos. Because these fish are delicate and must arrive alive and well for sale, and because of difficult jungle transportation conditions, this type of operation is not that common.

Low human populations, isolated fishing grounds, and difficult and costly logistics have helped keep fishing in Yavarí Basin low so fishing does not currently represent a threat to the fish populations. Nonetheless, if demand for fish increases, more fishermen and boats will travel to the area.

Collecting

In Yavarí, collecting of non-timber forest products such as fruits, bark, vines, seeds, resins, leaves, and medicinal plants is done mostly for subsistence-level consumption. Large distances and small demand for these products do not provide sufficient incentive for commercial level extraction. Near populated areas, palms are no longer available to collect the fruits or use the fronds. Unsustainable harvesting techniques, where the harvester simply cuts down the palm, have caused this population decrease and harvesters must travel farther to find these trees.

Decreased populations of various palm species used by humans have directly impacted wildlife and their habitat. Palms constitute the preferred food of many animals. The palm fruits eaten by ungulates are also the same fruits that people use. For example, aguaje, el *huasaí*, el ungurahui, la *shapaja*, are all fruits used in juices and ice cream. In addition, the palm fronds are used in home construction, for floors and roofs. In order to harvest the fronds, people cut down the entire palm tree. The inhabitants are taking food supply from the wildlife and when there is a food scarcity, the animals will suffer: reproduction will fall and mortality will increase. This competition for food is putting the wildlife in danger. Then, people place additional pressure on the wildlife by hunting them directly. If the inhabitants want to ensure healthy wildlife populations to hunt, they have to leave their food supplies intact or else their populations will decrease.

According to locals, Amazonian river turtle eggs are also collected for sale in larger towns. During reproduction season, many boats cruise up and down the rivers stopping along the beaches to collect river turtle eggs. They sell them in Angamos, Leticia, Tabatinga and Benjamín Constant. This collection directly affects the turtle populations. During our evaluation, we rarely saw turtles in the river.

Tamshiyacu-Tahuayo Communal Reserve

Background

The Tamshiyacu-Tahuayo Communal Reserve was established at the regional level with support from surrounding communities. After ten years, inhabitants have achieved significant levels of environmental awareness and reserve recognition is high. Organization levels have also increased. All of these achievements, despite remaining challenges, have helped to advance towards natural resource protection in the reserve.

The chapter Community-Based Management in the Peruvian Amazon (Bodmer et. al) summarizes the reserve's history. It says that the first colonists arrived to the Tahuayo River Basin after Iquito's naval base was constructed in 1862. Nonetheless, the rubber boom brought large numbers of colonists to the area. Once the rubber boom ended, there was net emigration from the area. The ribereños communities consolidated during the 1930s recession, which generated a flow of Cocama/Cocamilla people. After 1940, population within the Tahuayo River Basin increased because of the shift towards market-focused agriculture and increased forest resource extraction. This population growth continued through the end of the 1980s.

As the chapter explains, the communities realized that the forests' natural resources had been seriously degraded during the 1980s and they began to take community initiatives to protect them. Residents and small commercial operators from Iquitos had intensely exploited the area by overharvesting timber, excessive hunting, fishing, and extracting of palm fruits.[53]

Another publication, *Collaborative Wildlife Management and Adaptation to Change: The Tamshiyacu-Tahuayo Communal Reserve, Peru* (Newing and Bodmer, 2003) explains that the fishing crisis of the 1980s coincided with an increased number of loggers accessing the area via Blanco Creek. Loggers hunted extensively, which was alarming to both biologists working in the zone and the local residents. The biologists took advantage of the situation created by the fishing crisis and the learned experience of organizational strengthening within the communities to help residents lobby for logging and hunting restrictions. As a result, the regional government created a "reserve under study," and the forestry concessions expiring in 1988 were not renewed. Nonetheless, commercial hunters were not controlled and continued to enter the area in growing numbers. The communities wanted more formal control of the area, but did not want heavy national governmental intervention in the form of a national park or national reserve.[54]

Community-Based Management in the Peruvian Amazon (Bodmer et. al) provides details on the reserve's creation. It says that once Regional Executive Resolution # 080-91-CR-GRA-P officially declared 322,500 hectares as the Tamshiyacu-Tahuayo Communal Reserve (RCTT) on June 9, 1991, the debate began regarding who had access to the reserve and what the extraction limits would be. The communities surrounding the RCTT saw the protected area as an opportunity to gain control over the natural resources, but the reserve's legality and their role as the reserve's protectors were still uncertain. They wanted a strong commitment from the regional government and assurance that they would be responsible for managing resource extraction in the area. In October 1992, the communities of the upper Tahuayo designed, voted and signed a natural resource use agreement. This document defines who has rights to enter the reserve, establishes use regulations and permitted extraction quantities (meat, hearts of palm, palm fruits), and outlines permitted fishing methods. It also defines corresponding sanctions for those breaking the agreement.[55]

In December 2003, in an inter-communal meeting, they signed an act that ratified the established natural resource use agreements. This act unifies the criteria for hunting quotas and extraction of natural resources in RCTT. The act establishes the following points: 1) Each hunter can hunt a maximum of three large and five small animals. One can enter the reserve with intentions to hunt every 60 days. 2) Each hunter may only have 10 cartridges. 3) The maximum fish catch is two tanks every 15 days. 4) Fishing nets must have at least 3-inch holes. 5) Extracting aguaje and chonta from within the RCTT is prohibited. 6) Aguaje collecting from around the communities is permitted between June and August when the fruit is mature. The inhabitants can extract a maximum of 10 sacks per month (equivalent to three full trees) for a total of 30 sacks during their extraction season. Each inhabitant can extract no more than 100 chontas per year. Hirapay leaf extraction from within the reserve is prohibited unless previous permission has been obtained from the assembly. 6) People from other communities that do not surround the reserve do not have any extraction rights. The communities with extraction rights that border the reserve are Buena Vista, El Chino, San Pedro and Diamante/Siete de Julio. 7) Each community will provide economic support until the reserve's director and park guards are selected. Support amounts follow:

White-lipped peccary, collared-peccary, paca, deer	S/. 1.00 per each animal
Fish for sale in Iquitos	S/. 1.00 per tank
Zungaro, paco, and gamitana	S/. 0.50 per each one
Aguaje	S/. 0.50 per sack
Chonta	S/. 0.50 per each one

8) Fish and meat amounts:

Fresh fish (any variety)	S/. 1.50 per kilo
Cured fish	S/. 2.00 per kilo
Fresh meat	S/. 2.00 per kilo
Cured meat	S/. 2.50 per kilo

Two people per community are responsible for controlling resource-level extractions. They conduct home inspections and visits. If a resident extracts more than allowed or does not pay the required fees, they will be sanctioned with a corresponding fine. If they refuse to pay, they are taken to the community jailhouse for 12 hours.

The publication *Natural Connections: Perspective on Community Based Management* (Bodmer et. al 1994) includes a chapter on the reserve. It says that the unofficial legislation developed by the rural communities seemed to be more successful than national legislation in managing wildlife in its natural habitat in the Peruvian Amazon. But community regulations should agree with national legislation. For that, government approval and authority to sanction must be granted, both of which are difficult to acquire for rural inhabitants.[56]

It is very difficult for local inhabitants to keep up vigilance or protection. They do not receive any help from the regional authorities, guaranteeing documents, or logistic support to move boats or conduct patrols. Lieutenant governors are responsible when the fish, bush meat, timber, leaves, and fruit regulations are violated. If there is a good lieutenant governor, then the resources are managed well; if the lieutenant governor is bad, then the resources are poorly managed.

According to the Field Museum's Rapid Biological Inventory (2003), the reserve is still vulnerable to illegal timber extractors, poachers, and other unauthorized harvesters despite the intense work carried out in the zone by scientists and NGOs. Poverty is another factor contributing to ecosystem pressure. The communities receive little help from the government to confront aggressive invasions into the reserve.[57]

According to a tourism businesswoman interviewed, there is significant depredation in Tahuayo; timber is no longer an issue, but there is a great deal of hunting and fishing. Extractors enter the lakes and bottom-trawl them to get to the young fish. People from Iquitos and other places who have family here come to extract resources. She said that the community is well aware of this, but do not have support from the authorities to do anything. The only thing that has diminished is the size of the iceboxes because of excessive depredation; now, people have even started removing trees along the edges to make charcoal.[58]

Logging

Logging also occurs in the western part of the proposed protected area, which corresponds to RCTT and its surrounding areas. A large quantity of timber extracted from within the reserve is floated down the Tamshiyacu River. We verified this during our field evaluation: we saw at least 4 rafts of good-sized trunks of cedar and tornillo floating down the Tamshiyacu River.

Timber extraction via Tamshiyacu River

Libertad is the last community along the Tamshiyacu River and it has been converted into a logging center for those who extract timber from the reserve's interior. Loggers can easily be observed in this location. The loggers are laborers contracted by patrons or lenders from Iquitos. These outsiders enter the area without asking for permission and do not contribute anything to the community. The local inhabitants do not participate or benefit from the jobs created (albeit illegal). In addition, bars have sprung up to serve the loggers, causing uneasiness in the community because the laborers get drunk and cause problems.

According to locals, timber is also transported via the Tahuayo River, although in smaller quantities than via the Tamshiyacu because the communities along the Tahuayo have a certain level of control. A local tourist operator said that everybody knows that timber is being extracted from Diamante/Siete de Julio along the Blanco River. In that area, two families are involved and contribute to the business. There are outside loggers, mostly from Amazonas, who enter to extract wood from in and around Diamante/Siete de Julio and from within the reserve further upriver. There have even been people wanting to open up the reserve to concessions. Supposedly people from El Chino and Buena Vista were pressuring for this in April 2004 so they could start removing timber in August. Buena Vista already has an extraction permit, but it is not have enough wood, so the loggers head into El Chino and harvest wood as if it were from Buena Vista. El Chino's inhabitants are worried because they hope to gain permission to extract their wood in August, but if people from Buena Vista remove it all there won't be anything left.[59]

One logger, who chose to remain anonymous, told us that he has been working for six months next to the Esperanza community along the Tahuayo River and the loggers there are having problems transporting their current load out of the zone (between 70 and 90 cedar trunks). The community is requiring payment and if the loggers don't pay, they will seize the wood. This anonymous loggers said they are waiting to negotiate with the community and the police in order to float their wood downriver. have been floating their wood down the Repartimiento and Flores Creeks and have floated more than seven loads previously. They plan to continue because the concession auctions "are useless." The man also mentioned another logger, Heriberto Cano Cahuas, who works legally in San Carlos sector, behind Esperanza, but uses his permits to extract wood from unauthorized zones.

According to Teresa Quiróz Vásquez, council member of the Fernando Lores District Municipality in Tamshiyacu, the loggers create a myriad of problems. They enter unauthorized zones, kill animals, and occupy land. The local agrarian associations came together to defend their lands and demand that the loggers leave their properties. There are currently several pending lawsuits as a result.

Timber extraction is focused on a few species and has removed the largest individuals of targeted species, especially in the subsistence zone of the RCTT.[60] Now, loggers have to enter further into the reserve producing an ecosystem degradation risk.

Immigration and population growth

After the reserve was created, immigration to the zone continued. People from El Chino and outside communities founded the community of San Pedro; they built a school thereby attracting other families to the community. Later, families from Marañón River founded Diamante/Siete de Julio; they also requested a school and municipal support.

The influx of immigrants has diverse implications for natural resource management. Primarily, newly settled areas slowly move closer and closer to the reserve's border and inhabitants have easier access to more of the reserve for hunting expeditions. Many new settlers came to the area after their homes along the Amazon River and its tributaries were flooded. Others decided to leave their homes in other protected areas because there were more restrictions imposed and they were understandably uncomfortable with any formal protected area.[61]

One person from El Chino said that the community of Diamante/Siete de Julio, up the Blanco River, is encouraging more colonists to immigrate and settle there. The communities of Diamante and Siete de Julio are geographically separated, but legally considered one. The separation was a strategic move trying to avoid the reserve's regulations because most of the people living there are dedicated to intense hunting. They want to regulate the reserve on their terms; they do not follow existing norms or extraction limits imposed by the reserve's management. There is an agronomist helping the communities who is against NGOs. He says NGOs get rich at the communities' expense.

Along Tamshiyacu River, specifically in Libertad, there have been large movements of people. Hunters and loggers enter the zone throughout the year, carry out their activities. For example, loggers cut trees during the dry season and then transport the logs during the rainy season when water levels in the rivers are high. Hunters target different species depending on the season or the demand. There are also many inhabitants, mostly indigenous people from other parts of the Amazon, who travel to and from Iquitos. Some even have homes or children studying in Iquitos.

If more people settle in existing communities, like in the case of Diamante/Siete de Julio where they are trying to attract more people in order to become a large town and have the power to demand land titles and social services, or if people settle and create new communities around the reserve, pressure on the natural resources will increase and the reserve's integrity and natural value will be affected.

Natural resource use

Hunting

A large amount of wildlife meat is transported down the Tamshiyacu River for sale in Iquitos. A group of commercial hunters is based in Libertad from where they set out on

hunting excursions in the area and into Yavarí-Mirín. According to locals, hunters enter and leave the area without permission and do not contribute to the community. Some hunters from other communities also come to the zone with their hunting dogs and impact the fauna by introducing and spreading disease, scaring animals away, and pressuring them.

Agreements established regarding hunting and extraction limits are not completely followed. According to locals, people from El Chino mostly follow the regulations while hunters from San Pedro and even more so from Diamante/Siete de Julio do not, extracting large amounts of meat. The lenders provide incentives to the hunters to extract more and surpass the permitted limits. When hunters extract more then is allowed, a heavy fine is imposed. The funds are managed by a municipal agent and are used to support communal work. If outsiders are caught hunting, their meat is confiscated.

Locals claim that hunters have built a trail from Diamante/Siete de Julio to El Chino Creek that is used to chase and hunt white-lipped peccary. This community's local economy also relies the most on the sale of wildlife meat. Hunters do not respect the limits and take a large number of shotgun cartridges with them. Diamante/Siete de Julio does not impose strict controls on its hunters, while the communities of El Chino and San Pedro do. El Chino does have a trail going towards Limón Creek that is often used for hunting.

There is disagreement between the communities involved in applying the regulations and agreements. People from Diamante/Siete de Julio do not believe that the other communities (El Chino, Buena Vista and San Pedro) should benefit from the reserve without leaving anything for Diamante/Siete de Julio. These communities pay user fees in their respective towns, but inhabitants from Diamante/Siete de Julio want the payments to be made to their communities, alleging that they are the ones caring for the reserve.

The tourism operator mentioned that there have been problems with shots being fired behind her concession. There was an investigation and a lot of arms were confiscated because of excessive hunting, but the confiscation was unsuccessful because the hunters were able to purchase more shotguns with their licenses. Supposedly this is a reserve, but the number of hunters is not regulated; there is no control.[62]

Fishing

Problems related with fishing in the Tahuayo River and its oxbow lakes were one of the main reasons for the reserve's creation. There were a large number of refrigerated boats, many of the largest fished unsustainably thereby harming local people and damaging the aquatic resources in the zone. The article Community-Based Management in the Peruvian Amazon (Bodmer et. al.) states that fishing is the second most important economic activity (agriculture is the first) for the inhabitants of the upper Tahuayo. As the publication explains, during the 1950s operators from Iquitos started sending refrigerated boats to the upper Tahuayo and commercialized fishing. Commercial fishing continued to

increase as the Iquitos population increased. In the 1980s, fish reserves began to decline in the upper Tahuayo because of overfishing.[63]

Things have changed; for the last 15 years fishing is no longer done on such a large scale, but there are still some problems related to overfishing, organizing and regulating the activity.

The tourism operator claims that some families do not agree with the idea of resource conservation or organized resource management. She also confirmed that some families do agree, and have worked with biologists and researchers, while other families are not in agreement do as they wish. They bottom trawl the oxbow lakes and catch entire schools of migrating fish. They enter with their fishing licenses in large boats then head to El Charo oxbow lake. When we go to observe river dolphins, we often find dead ones. Tourists come to see wildlife, yet when we go to the mouth of El Charo we have to carefully maneuver by lifting our motors and rowing in order to avoid their 10 to 15 fishing nets. If we damage the nets, we have to pay for them because if not they won't let us leave."

She said the fishermen from Iquitos in overfish the zone and stay as long as they want, extracting as much as they can, leaving nothing for locals, there are hardly any fish. Before, sport fishing was exciting as soon as you put your pole in the water you would catch something. If there were some form of control, either by a person or an organization, the fauna would recuperate, but because there is nothing, everything is quickly disappearing.

She also informed us that a biologist by the last name of Trigoso worked in the oxbow lakes and had good results. The number of fish increased, but as soon as he retired, everything was ravaged. All of the work the families who supported the project did was lost; those that did not support the project and other outsiders ended up catching all of the fish. The Ministry of Fisheries provides licenses so that fishermen can enter the area, but then they do not regulate them. Even locals complain that they do not receive help from the authorities, not even from the police at the Buena Vista station. They feel like their hands are tied and they have no support.[64]

Collecting

Community-Based Management in the Peruvian Amazon (Bodmer et. al) states that non-timber forest product extraction occurs at unsustainable levels because rural harvesters in Peru's Amazon implement destructive harvesting techniques that include cutting down the entire tree. The ribereños chop down entire palms because they have open access to them and because harvesting the palm fruits is difficult.[65]

The principal non-timber products harvested for both local consumption and sale are aguaje, *el ungurahui*, *la chonta*, *el hirapay*. These species are no longer found near the communities because they have been systematically destroyed. Harvesters have to travel farther distances to gather these products and the more they travel the fewer resources

that will remain. To reverse this tendency, inhabitants, with the help of the Rainforest Conservation Fund (RCF), are planting aguaje palm in sites around their communities.

One person involved explained that the project's objective is aguaje conservation. They have worked uninterrupted since 1990. For the first few years people did not understand the project, but the RCF has taught them. The project has expanded into four communities: Diamante/Siete de Julio where they work with 14 people, El Chino where they also work with 14 people, San Pedro with 10 people, and Buena Vista with two. Fourteen years after starting the project, the aguaje palm trees are productive and the fruits are sold in Iquitos. The project covers approximately 1 square hectare per person involved and they have planted approximately 100 palms per hectare. The palms are planted with wood and native fruit-producing trees. The project also provides inhabitants with an alternative so that they will not rely on the naturally growing aguaje that feed the animals.[66]

Charcoal production is another widespread activity throughout the Tamshiyacu and Tahuayo Rivers that has been occurring for years. The charcoal is sold in Iquitos and is used in poultry factories, barbeque restaurants, and homes; there is a large demand for this product. During our field evaluation along both rivers we observed several charcoal producing fires, the remains of used fire pits, sacks of charcoal in front of homes waiting to be transported, and collective boats transporting large quantities of sacks. The activity negatively affects the availability of target species, the local habitat, and the health of the charcoal producers.

One charcoal producer informed us that he uses wood from the following trees: *machimango*, *pashaca*, *shimbiyo*, and *maquisapañate*. This wood is extracted about 100 meters from the community. First they cut the trees into small logs and then move them to the burn sites. At these sites they build a *casita* made up of straw and burnt soil. They start the fire at the base of the *casita* and let the slow burning flames carbonize the wood over a period of 8 days. He says that, on a monthly basis, he produces 150 sacks 10-kilo each. He sells each sack for three Peruvian Soles, but when water levels are up he raises the price. His buyers come from Iquitos to transport the product on the barges used for public transportation in the rivers. He believes that producing charcoal is a better industry than agriculture, because with agriculture the farmer must wait at least three months to harvest his crops while charcoal can be produced in a matter of days.

Tourism

Tourism is added in this section not because it is a threat, but because it is not reaching its full potential and is only barely promoted. It is included because even though it is a sustainable economic alternative, surrounding unsustainable activities negatively affect future tourism development and its ability to help conserve the region. Natural resource extraction, especially wildlife hunting, directly interferes with ecotourism activities by taking away from the quality of the experience and lessening the site's attractiveness as a destination. Comments from tourism operators in the zone illustrate the situation.

"Hunters know that we cannot be guarding our area 24 hours a day 365 days per year, so they enter the tourism zone. We try to form agreements with the communities to regulate hunting. This benefits them too because we are a source of employment. We talk with our employees and we explain to them that if they work with us they have to help us protect and conserve the area and preserve the flora and fauna because without nature, our tourism operation would flop and they would lose their jobs. If their jobs provide them with the resources to get food and shelter, then they have to support the areas conservation. Everyone seems to be clear on this.

Wildlife can be seen. But, when we bring community members to help us make a small trail to reach the animals for observation, many times they return on their own. When we use the trail at a later date to observe the animals, everything we left is gone. Thirty minutes from here is a canopy trail. We take hikers from there to several oxbow lakes. There are a lot of monkeys there; and once in awhile, it is possible to see a red uakari. Supposedly, there are more red uakaris in this zone than in other places, but lately we have not seen any anywhere. Before, we used to encounter them occasionally, but not now. Edible animals include collared peccary, white-lipped peccary, armadillos and it is hard for us to see these animals now, we have to travel farther to see them. The *paiche* and *la arahuana* have also disappeared; before there were more. The oxbow lakes in the zone like Tapaje, Palmichal, Yarina Nueva, are almost completely deteriorated. Yarina Vieja still has a little bit of wildlife remaining.

The same is happening along the Yarapa River. And, there were too many lodges in that area. Our philosophy is to operate in a unique place, if I am only able to offer the same services and experiences as other lodges, I will look for a new location. Local inhabitants don't understand that they are hurting themselves by over exploiting resources, because if I am gone they will lose their jobs. We have invested a lot in this business, from a marketing and business point of view. We have promoted it as being located within a reserve, but unfortunately its conservation is not being managed.

We also promote selling crafts to the tourists. At first, the locals wanted to bring crafts from the city, but that was not the point. Our lodge could just as easily take our visitors to Iquitos to buy cheap crafts. We wanted to work with renewable products in a way to avoid deforestation and maintain production without destroying the resources. Fibers can be harvested without hurting the tree. We wanted to help them make crafts in this way and our tourists would be the market. We invited every community to participate and whoever produced the highest quality and most creative crafts would sell the most. This way, locals would have income and they could travel to Iquitos to purchase supplies and other basic needs instead of needing to enter the forest to extract everything. This economic support for the community is intended to help conserve and preserve the zone as well. In addition, by providing work to local people, our lodge contributes to the tax base of Fernando Lores District and even Iquitos. If our operation ends, these benefits will be gone as well."[67]

The community of Jerusalén, located along the upper Tahuayo River with access to the Amazon, is made up of native Achuar people who strictly control resource use in their

territory. The community benefits from tourism originating from Yarapa River; they work on crafts and serve as guides, showing animals. The community leader, "Curaca" is a shaman that recognizes the benefits of tourism and is trying to protect the community's resources so they can be a tourist destination. Here they charge 30 Nuevos Soles per animal killed in an attempt to discourage hunting so that it won't negatively impact the tourism potential of the area.

However, the authorities of the regional government have a very different opinion about tourism. The environmental manager questions, "We should ask ourselves how much does the regional government make from tourism? Everything goes to Lima, not even one penny stays here. Those people dedicated to ecotourism do not spend money here. The regional government gets nothing. The taxes are for Lima. Tourists only pay entrance fees in Pacaya Samiria, but that also ends up in Lima."[68] In light of this opinion, it is difficult to promote tourism as an alterative to other harmful activities like the timber industry, which the regional government heavily promotes.

In cases of illegal resource extraction in the area, the lodge requests support from local authorities and even from the Buena Vista police station, without apparent results. They provide gasoline and transportation, but in the end they do nothing.

PROPOSED RESERVED ZONE

The proposal to establish a protected area covering the Yavarí River Valley along with the Tamshiyacu-Tahuayo Communal Reserve is received in different ways by the zone's inhabitants. People do recognize the advantages of protecting the area and providing it solid conservation status. But, they are also nervous that the protected area will restrict their access to, and management of, the natural resources. NGOs and tourism operators support establishing stricter protection for the area.

The legal process for establishing a nationally recognized protected area begins by first declaring the area a reserved zone. As a reserved zone, relevant studies are conducted and the area's final protection category is determined based on the research results. The advantages of establishing a national level protected area is that INRENA will become involved in its protection and administration. This provides greater support and guarantees better protection than a regional protected area, which currently lacks legal backing. National-level protection offers long-term conservation. A regional category is less stable. Nonetheless, the communities have more advantages when an area is regionally protected because if problems arise, they can take it upon themselves to go to Iquitos and resolve them, whereas if it is a nationally protected area, the problems cannot be resolved locally.

An authority with the regional government commented that the law permits regions to have regional conservation areas. The regional reserve exists in name only, there are no regulations. In one moment, the RCTT was recognized as a regional protected area, but given the new regulations it is no longer recognized. The regulations must be updated;

there is a group of people from the regional government currently working to create a proposed regional natural protected areas' law.[69]

Local inhabitants of Tamshiyacu-Tahuayo say that they do not want the area to be declared as a national reserve because they know about the problems in Pacaya Samiria and they do not want the same things to happen to them. They prefer to have a communal reserve with national recognition so that they can have influence regarding its management and decisions.

Collaborative Wildlife Management and Adaptation to Change: The Tamshiyacu-Tahuayo Communal Reserve, Peru (Newing and Bodmer, 2003) says that the concept of communal conservation is based on the premise that there is common interest to limit uncontrolled exploitation by outsiders and to safeguard the natural resource base for the future. The publication says that generally, this requires secure and exclusive land and resource rights for the people.[70] Declaring the sector in Yavarí a communal reserve is not feasible since there are very few inhabitants and communities; for that sector a different category is needed.

Yavarí's district mayor has expressed interest in the regional and municipal reserves. He claims that the district's councilmen have agreed to request the creation of a communal reserve in the Mirín area. He said that they plan on asking INRENA to protect the sector between Carolina and Parinari, which, in some ways, is related to the area that the NGO in Iquitos Pablo Puerta manages. "We coincide in this, and we have already approved it at the council level. To carry it out, we are starting to negotiate with INRENA regarding the issues that need discussion."[71]

An authority with the regional government said, "The State does not have money to administer, finance, or reach the objectives of the natural protected areas, which is conservation. It seems that the conserved areas have been devastated; there is no control capacity and when there is control, it is deficient. We do not have control or vigilance capacity.

Here we have received the NGOs that have come. They say that they have money, that they have investment, but they want to exclude the area that is for forestry concessions, which we cannot do because the region has prioritized this area as a development zone. What has been analyzed is that it is more convenient to prioritize the Sierra del Divisor and an area in the Matsés where there are groups of uncontacted people. In addition, this office does not have any document saying what we have in Yavarí-Mirín and it does not exist here either. Therefore, if we are going to conserve an area, we prefer to conserve an area where uncontacted people live, which has the same biodiversity.

There are also conservation concessions. I have mentioned to the NGOs that if they have money and they want to protect, they should solicit a conservation concession. In this way, they will protect their investment and resources held within. For me, as a regional representative, I prefer that they tell me that they want an area to conserve and not insist on creating a national natural protected area. We all know that these do not function. The

region has to start to support effective development. If they want to conserve, the doors are wide open to conservation concessions. The region of Loreto wants to conserve representative samples of the region, of our people and resources.

The regional government cannot continue to be a simple observer of the resource exploitation. When INRENA is asked why they did not do this or that, they always answer that they do not have a budget. And, this year, the government has further reduced INRENA's budget, 70% of administration—they do not have personnel and the control headquarters have been reduced. This year, the regional government is demanding that this be passed to its competence."[72]

Despite this vision expressed by the regional public authorities, it is necessary to stress that the community carries out communal implementation and vigilance, which it is not a large governmental expense. Under this perspective, creating Yavarí Reserved Zone is compatible with the communities' natural resource management activities. An alternative to assure conservation of the forests in Yavarí is to extend the success experienced by the ribereños communities managing the Tamshiyacu-Tahuayo Communal Reserve, combining local management with rigorous research to benefit the natural and human communities, thereby protecting a critical area important for the future generations of Loreto, Peru, and the Amazon.[73]

RECOMMENDATIONS

Logging

As was mentioned previously, forestry concessions surrounding the proposed protected area will go into effect soon. It is expected that human activities will increase as well as systematic extraction. Effective long-term protection of the proposed protected area's forestry resources depends first on the Forestry and Fauna Technical Control Administration's control and second on the local people's participation in protection and control.

Because INRENA lacks operative and protective control in the area, local communities' control seems to be the best alternative for now. Therefore, the local communities should receive help in organizing and institutional strengthening so that they can form patrol groups and systems to ensure compliance with forestry norms and established extraction plans. Even more important, the regional authorities should empower the communities to carry out this control by backing them with official credentials.

Yavarí, which is farther and more isolated, needs more support from Peru's Marine Corps and National Police for control. These institutions should participate more in the control process by starting patrols and interdictions.

Local communities need training on organizational and in forestry management issues. The loggers should receive information regarding the importance and application of forestry management plans that are required by law to receive forestry permits. Likewise,

the loggers must implement and comply with the terms of the forestry management plans that they have promised to follow in order to receive their permits in the first place.

INRENA's forestry agency must meticulously and strictly evaluate and approve the corresponding management plans. Because INRENA now requires forestry management plans, there is a tendency for loggers to present mass-produced plans, or plans that have been written in an office without any field evaluation or visit, in order to simply meet the management plan requirement instead of creating a useful tool that could support regulated and sustainable extraction. INRENA should not accept these types of plans or plans that lack corresponding fieldwork. It is recommended that INRENA should also evaluate the forestry engineers or environmental consultants carrying out the forestry management plan work to guarantee that they have the appropriate professional level and credentials to do so.

Working with the loggers is essential to assure that their forestry management plans are appropriate and that they are complying with the management plans in a way that contributes to conservation. The plans should include the conservation and protection of fauna and their habitat, as well as compliance with these mandatory rules. The idea behind the concessions is that the loggers will not ruin the forest, but instead them in a sustainable way, helping conservation while at the same time reaping economic benefits. Joint work with the loggers would help ensure proper implementation of the management plans. Contact with the concessionaires should be continual, with information provided to them on a regular basis.

In the buffer zone it is necessary to promote reforestation using commercially valuable species and to promote well-planned forestry management using adequate technologies so that future generations will not have to rely on the proposed protected area for resources, but can use resources in the buffer zone. Existing research recommends increasing the volume of species not well known in the market and species for non-traditional markets like the cosmetic oil, and herbal medicine industries, among other industrial uses. This could be very attractive to concession holders.

It is important to promote coordinated joint work with other institutions in conservation in the region. Points of mutual interest should be promoted, as should information exchanges with organizations working on forestry or environmental issues in the zone. Institutions like the Universidad de la Amazonia Peruana (UNAP), the Instituto de Investigación de la Amazonía Peruana (IIAP), environmental NGOs, and grassroots organizations should get involved with the forestry concessions, their implementation, and control. They should coordinate actions to confront the extractive vision and tendencies promoted by the authorities.

Immigration and population growth

Sustainable development can only be obtained if the demographic levels are in harmony with the ecosystems' productive potentials. Otherwise the people surrounding the proposed protected area will go against the conservation strategies of the area. Therefore, immigration

should be stopped and new settlements in the area discouraged. Coordination with political authorities, like the district mayors, district attorneys' offices, the Ministry of Education, and Ministry of Health among others, should be intensified so that these institutions do not recognize or provide authorizations, property titles, or services to any more new settlements around the proposed protected area.

To this end, an immigration prevention and control program should be formed. Colonists, whether strangers, relatives, or friends of existing community members, should not be allowed to settle in the area. In coordination with corresponding towns, mechanisms and allies should be identified to implement this program. Help should be sought from the regional administration and the public ministry so that they will adopt the initiative and promote it regionally.

Newly settled farmers in the region, especially in the lower Yavarí in the Isrealite communities as well as the communities surrounding the Tamshiyacu-Tahuayo, should be regulated. More sustainable development activities should be promoted to the farmers, including apiculture, ornamental plant farming, tourism, agroforestry, and other activities compatible with the area. This should be complemented with environmental education campaigns that reinforce environmental knowledge and increase environmental awareness.

Natural resource use

Hunting

A new approach is needed when declaring new protected areas that involve the communities and natural resource use. Wildlife should be hunted in a way that is compatible with the animals' biology and the protected areas' needs. A promising solution to overhunting is to rely on populations that are not hunted, so as to enrich the populations in areas that are hunted. The communities could use this source-sink strategy to guarantee long-term wildlife use.[74]

The success of conservation efforts in the Peruvian Amazon depends on the success of work with rural hunters. This includes the sale of wildlife meat in the communities and towns. An effective management strategy that focuses on managing wildlife with rural hunters is communal wildlife management. Community-level wildlife management could influence hunting pressure.[75]

If communities are to implement sustainable wildlife management, information regarding the target species' biology must be integrated with economic implications of sustainable use and the local communities' wishes.[76]

Communities settled around the proposed protected area should be encouraged and incentives provided to establish monitoring and hunting control mechanisms. This would require the help of consultants and professional and institutional training. Hunting management plans should include actions such as species hunting seasons, hunting bans

on animals with young, rotation of hunting grounds, restrictions on firearm usages, raising of wild animals, limits on commercial hunting, among others.

One of today's greatest conservation challenges is to provide useful, adequate information to local communities so that they can better manage their natural resources. The chapter on the Tamshiyacu-Tahuayo Reserve in the publication *Natural Connections: Perspective on Community Based Management* (Bodmer et. al 1994) says that a wildlife extension agent is vital to a wildlife management program. The extension agent would educate the community about the use of wildlife and unite social services and economic alternatives in the permanently settled zone.[77] Sufficient information should be provided to the communities so that they can recognize the value of the proposed protected area as a source for wildlife to hunt.

Communities and even the extension agents often do not know the best management techniques to assure ecological sustainability. Therefore, close ties should be established between scientists, extension agents, and community representatives if a sustainable use system is to be carried out successfully.[78]

These alliances need clear management techniques.[79] Conservation usually requires more than simple grassroots' and community initiatives in order to achieve wildlife management. It functions better if there is co-management with researchers, NGOs, and governmental authorities.[80]

To achieve an efficient fauna-monitoring program, a more rigorous data collection system should be established in order to guarantee high levels of trust in the information. Currently, the communities are not prepared to rigorously collect data as is required. A large amount of wildlife meat is extracted without even minimal levels of control or registration. In order to have true co-management, at least one professional should be permanently stationed in Yavarí and one in Tamshiyacu-Tahuayo to organize an information collection system, and train fauna monitors in each community. Only once the communities have attained a high level of commitment and sufficient data collection knowledge should they carry out this important responsibility.

In order to obtain actual information regarding the quantity of fauna hunted, in the initial phase of data collection in the monitoring program, interference with hunting activities should be avoided; that is, no recommendations should be given regarding which species should or should not be hunted. This helps guarantee that the communities will communicate honestly about their hunting practicies. If they are informed beforehand which species are okay to hunt and which ones are not, they are more likely to hide the fact that they hunt non-recommended species, thereby distorting the quality of the data gathered in the monitoring program.

In the Yavarí sector, communal controls of the sale of bush meat, like the ones in Tamshiyacu-Tahuayo, should be implemented. In Tamshiyacu-Tahuayo, communal control of hunting should be strengthened. The initial orientation and motivation role of

professionals located permanently in the area is crucial to effectively implement such monitoring programs and management plans.

Each community should have a local promoter in charge of collecting data and coordinating communal control. The promoters should be trained in techniques, environmental ideas, and institutional coordination so that he or she could be an efficient link between the community and the promoting institution. This person's influence would contribute to the diffusion and follow-up of monitoring processes while at the same time act as a multiplicative and coordinating element from within the communities. To achieve this, the promoting institution should support and supervise a promoter program.

Fishing

Because fishing is such an important subsistence-level activity for local people, and an important commercial activity for nearby towns and cities, institutions and local governmental organizations working in the region and even the communities themselves should give it more attention. The Ministry of Fisheries, the regional government, aquariums, fishing associations, NGOs, and other related organizations should work together to create a conservation support platform to manage the freshwater fishery resources of the region.

Fishing bans are a viable alternative. They were introduced several years ago in the region, and the local people are aware of the issue. Fishing bans are not completely followed, yet true implementation of fishing bans and respective enforcement is an effective tool for managing fishery resources in the proposed protected area.

According to the Regional Government Environmental Manager, "for the moment, we have declared a temporary fishing ban, from November to April, in the Nanay River zone because that is where zúngaros spawn. Spawning season happens to be the busiest fishing time of year too. We had received many denouncements regarding this issue and we could not just let it keep occurring, and that is why we took this precautionary step. Some sectors are criticizing us because we did not declare a complete ban, but the truth is that we do not have the technical information for all the rest to do it." Implementing fishing bans in the proposed protected area with support from the local communities to comply and participate in enforcement is a management option that should be promoted.

Catch and size limits should be established and complied with, especially at the commercial fishing level. The communities, with support from professionals and institutions, should organize their own control mechanisms, establish zones and fishing seasons, and restrict outsiders' access into the proposed protected area. They should establish restrictions regarding use of nets at the mouths of creeks and rivers to allow migrating fish to pass and not interfere with their reproduction.

To achieve efficient management, information must be disseminated and training provided to the communities in an effort to solidify their commitment. Formation of community enforcement committees would help comply with fishing commitments.

These committees should receive help in institutional and logistical strengthening. They should receive recognition from the Ministry of Fisheries who should maintain close relations and coordination with the committees.

Collecting

To avoid destruction of the palm resources, and subsequent damage to the fauna that rely on the palms for food, palm extraction must be regulated and restricted. Cutting down the palms to harvest the fruit should be prohibited. There are tools and artisan methods for climbing the palms; these should be publicized with all of the harvesters.

The RCTT requires that fruit harvesting management programs maintain or increase the number of palm fruits, which as a consequence will help maintain or increase healthy wildlife for hunting. To convert unsustainable palm use into more sustainable usage, the communities of the RCTT should: 1) stop cutting down palm trees, 2) substantially reduce wild fruit harvest in order to maintain the forest's carrying capacity for important game species, 3) plant palm trees from wild fruits in agroforestry parcels close to populated centers.[81]

Tree nursery to grow palms for reforestation

In Tamshiyacu-Tahuayo, communal-level regulations have been created to limit palm extractions and there are now greater levels of consciousness. There is an aguaje palm reforestation project supported by the Rainforest Conservation Fund that promotes aguaje plantations in order to avoid using wild palms. A similar initiative should be promoted in Yavarí.

Forest management alternatives are needed, including sustainable use and harvest of non-timber forest products. Fibers, resins, medicinal plants, seeds, and other products could be harvested sustainably. Local crafts are a potentially good source of socioeconomic development. Organizations working in the area should work towards finding a market for these types of products.

However, like with other extractive activities, harvest of non-timber forest products should be sustainably managed and harvesters should create and present management plan that would serve as a regulation and supervision mechanism to avoid resource abuse.

Reserved Zone

In light of the regional government's relatively unfavorable belief that the creation of natural protected areas in Loreto is an obstacle to development, a more participative

strategy between institutions and NGOs should be adopted to publicize and demonstrate that protected areas will not be obstacles to development. Demonstrating that other options and sustainable alternatives are more visionary and feasible over the long-term should help to change the public agents' unfavorable position.

An environmental educational and awareness campaign directed at the general public as well as the public authorities in Loreto is urgently needed to promote understanding and comprehension of alternative development options, benefits from natural protected areas, and to explain the significance of creating a reserved zone in this area.

Local inhabitants need to be able to identify environmental problems and to discover which natural resource practices are most harmful over the long run. It is important to increase local inhabitants' knowledge, modify inhabitants' perspectives on their environment, and revise their cosmovision and focus, so that they can identify their environmental problems and then modify their practices contributing to those problems. The environmental education process must also offer feasible sustainable development alternatives that will promote a change in attitude in the people's daily lives.

Because most communities in the areas are far way and isolated, we recommend using existing means of communication, like commercial radio, to publicize messages and provide environmental information. Constant radio campaigns are needed, whether it be through use of advertisement spots or in coordination with the radio program managers so that the environmental education process is constant and complementary to other educational forms, such as seminars, workshops, and onsite trainings.

In addition, more research is needed. Most of the existing data is on Yavarí-Mirín, Lago Preto and Tamshiyacu-Tahuayo Communal Reserve. There is a need to learn more about what happens in Angamos, Yaquerana and other communities along the Oroza and Manití Rivers and how their people interact with the environment.

Control

INRENA's Forestry and Wildlife Control Agency should increase enforcement and patrols in the zone. Due to its logistical problems, the agency should receive help from other institutions working in the zone The institutions could help with transportation and denouncements, and identify areas of illegal extraction.

Another strategy to strengthen control in the region is to get more involvement from the National Police, who already have police stations and personnel in the zone. The stations in Carolina along the Yavarí-Mirín River, Serafín Filomeno along the Tamshiyacu River, and Buena Vista along the Tahuayo River should have more influence in controlling illegal resource extraction. A dialogue between INRENA and the National Police is needed to maintain constant coordination and mutual support.

The National Police say their main obstacle to more efficient control, is their logicstical ineffeciencies and deprviation. The control stations should be provided fuel to overcome

this obstacle, forcing them to conduct patrols and thus have more control over the area. If a cylinder of gas was provided every three months for each police stations, whoever provided the fuel would be in a better position to demand enforcement activities and require reports that justify the use of the fuel in the vigilance and control activities.

Angamos needs a forestry control office, or at least an official representative from INRENA to coordinate enforcement and monitoring activities in the zone. If this is not possible, institutions with presence in the area, like the National Police, the Military, the Regional Government, and organized civil society groups, should be granted certain forestry control authority.

Police station in Nueva Carolina

RCTT park guards should be paid so that they can dedicate themselves to monitoring and control activities. They also need technical consultations, transportation, communication means, and other work materials like rain gear and boots.
The State, grassroots organizations, and other development institutions should work together to carry out efficient control. It is necessary to identify the authorities with responsibilities related to the environment and establish coordination links and exchange information. Fishing permits from the Ministry of Fisheries and logging permits from INRENA should not be granted in the zone.

CONCLUSIONS

The process of forestry concessions underway in Loreto, the expansion of other extractive activities, and increasing migration into the region makes creating a national-level natural protected area an urgent matter. Yavarí Valley covers one of Peru's conservation priority areas. By protecting the area, Peru could advance towards reaching its national conservation goals, establish more efficient regional planning and appropriate land use, as well as select the best opportunities for future development in the area.

Current human population in the area is small, especially in Yavarí where there are only occasional, small communities. In general, the people suffer from high poverty levels and do not receive adequate attention from development institutions. Health and education in the area is insufficient, centers usually lack materials and medicines, malnutrition is extensive, most of the teachers and health technicians do not have degrees, and the infrastructures are deficient. The communities around the proposed protected area have differing levels of organization, though most have only a poorly developed and inadequately organized system, with limited management capacity.

The principal productive and subsistence activities carried out by inhabitants surrounding the proposed protected area are hunting, fishing, gathering of non-timber forest products, and agriculture. General percentages of natural resource usage by those surveyed for this report are summarized in the following table.

Table 43. *Natural Resource Use Activities*

SECTOR	Hunting		Fishing		Collecting		Agriculture	
	Yes	No	Yes	No	Yes	No	Yes	No
Yavarí	71.4	28.6	85.7	14.3	51.8	48.2	87.5	12.5
Tamshiyacu-Tahuayo	31.8	68.2	79.1	20.9	30.9	69.1	91.8	8.2

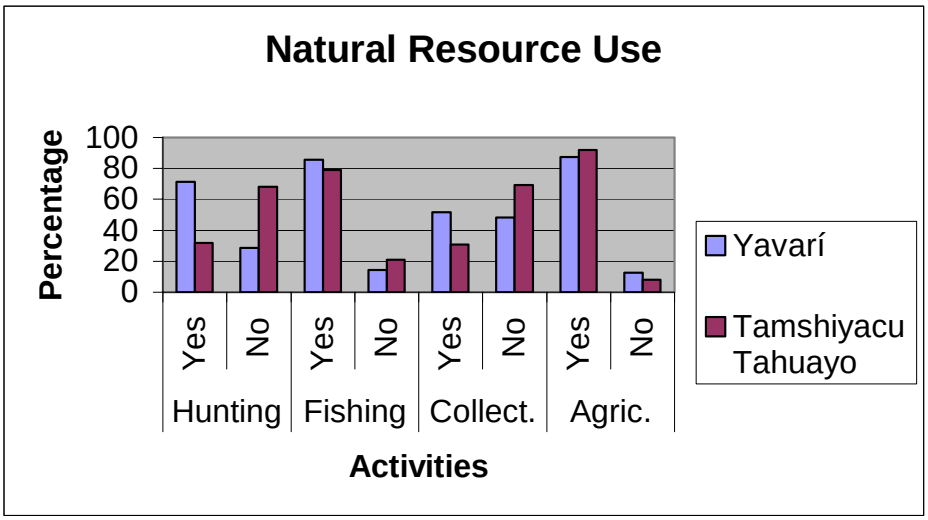


Table 43 and the above graph show that agriculture is the most important productive activity in both sectors; Tamshiyacu-Tahuayo's percentage of inhabitants dedicated to agriculture is slightly higher than in Yavarí. After agriculture is fishing, then hunting, and finally gathering, all of which have higher percentages in Yavarí.

One of the most serious threats to the proposed protected area is timber extraction. Systematic logging is carried out by small and medium-scale loggers, mostly from Iquitos, who either participate directly or contract others to do it. There are illegal loggers operating in the interior of the proposed area and there are legal forestry concessions being created along the left banks of the Yavarí and Yavarí-Mirín rivers.

The problems associated with timber extraction are complex. The timber industry is a significant component of regional industrial development and there is great economic interest. Factors contributing to forestry resource degradation in the zone include the level of extraction, inappropriate extraction methods, lack of regulation, ignorance of the norms and regulations, lack of consciousness of the environmental impact, purely extractive orientation, existence of complex extraction and commercialization chains, tense relations

between loggers and communities, and the lack of technical assistance and training on more appropriate resource management options.

Another significant threat to the proposed protected area is increasing immigration and colonization, mostly in the Yavarí sector, where groups belonging to the religious sect, *Misión Israelita del Nuevo Pacto Universal*, intend to increase their settlements.

Fauna resources are in high demand because hunting provides an important component in the ribereño diet and because there is a stable market. Further impacting fauna availability is permanent human presence around the proposed protected area, impacting fauna populations closest to the settlements. Lack of adequate control, influence of lenders, and lack of knowledge of the resource and its proper management complicate the hunting situation.

Small human presence, difficult access, isolation, and high logistic costs have helped Yavarí remain free of excessive fishing and gathering of non-timber forest products. These activities do not currently pose a threat to the area. However, if demand for these products increases, more fishing boats and harvesters will be attracted to the area to search for the products to supply the market.

Despite the intense work conducted by scientists and NGOs in the sector of Tamshiyacu-Tahuayo regarding control of natural resource use, the zone is still vulnerable to illegal timber extraction, hunting, and other illegal extractions. Poverty is another factor pressuring the ecosystem. The communities receive little help to reconcile their subsistence needs and natural resource conservation.

The inhabitants' general lack of environmental consciousness prohibits them from recognizing the damage they cause because of the way the carry out certain activities. This lack of awareness plus lack of knowledge of sustainable management alternatives makes changing attitudes towards natural resources very difficult.

Lack of sustainable development policies and the lack of state and other institutional presence in the zone make resolving the area's problems difficult. No institutions are presenting alternatives or proposals. There are not many institutions present in the zone, and if they have presence, they are certainly not ubiquitous. The authorities are not trained and thus lack strategies to introduce the topic.

The reality that communal implementation and monitoring of natural resources in the proposed area is mostly assumed by the communities, and the government does not have to invest significant finances should be promoted. Considering this, the creation of Yavarí Reserved Zone is compatible with communities' natural resource management actions and protection. An alternative to assure forest conservation in the zone is to implement the management system currently in place in Tamshiyacu-Tahuayo Communal Reserve in Yavarí.

Effective long-term protection of forestry resources in the proposed protected area depends on both the control provided by the Forestry and Wildlife Technical Control Administration and the local populations' participation in vigilance and control. Joint work with the loggers would help ensure proper implementation of the management plans. Contact with the concessionaires should be continual, and information provided to them on a regular basis.

Increased immigration into the proposed protected area is against the area's conservation strategies and should therefore be stopped and new settlements discouraged. Close coordination is needed between regional and district authorities so that they will support immigration prevention.

Wildlife should be hunted in a way that is compatible with the animals' biology and the protected areas' needs. A promising solution to overhunting is to rely on populations that are not hunted to enrich the populations in areas that are hunted. The communities could use this source-sink strategy to guarantee long-term wildlife use.

If local people do not benefit from the habitat or natural resources held within, they will not have long-term incentives to protect them. Communities settled around the proposed protected area should be encouraged and incentives provided to establish natural resource use monitoring and control mechanisms. To do so, they would need professional advice and training.

While authorities with Loreto's regional government continue to believe that protected areas are obstacles to development and they continue to uphold that forestry concessions are the best development option for the region, it will be very difficult to declare the proposed protected area in Yavarí – Yavarí-Mirín and Tamshiyacu -Tahuayo. This reality urgently requires joint actions by diverse institutions and social sectors to educate, raise awareness, and put pressure on the regional government to adopt more conservation and sustainable development measures.

NOTES

[1] Expediente Técnico para la creación de la Zona Reservada del Yavarí (*Technical File supporting the creation of Yavarí Reserved Zone*). CIMA, DICE, WCS, UNAP, CTAR Loreto. Ministerio de Agricultura, INRENA, IANP. Octubre 2002. Page14.

[2] Expediente Técnico para la creación de la Zona Reservada del Yavarí (*Technical File supporting the creation of Yavarí Reserved Zone*). CIMA, DICE, WCS, UNAP, CTAR Loreto. Ministerio de Agricultura, INRENA, IANP. Octubre 2002. Page 15

[3] Expediente Técnico para la creación de la Zona Reservada del Yavarí (*Technical File supporting the creation of Yavarí Reserved Zone*). CIMA, DICE, WCS, UNAP, CTAR Loreto. Ministerio de Agricultura, INRENA, IANP. Octubre 2002. Page 2.

[4] Linking Conservation and Local People through Sustainable Use of Natural Resources Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Page 316.

[5] Hunting practices of the Ribereños People of Esperanza, Northeast Peru
Grace Christabel Crabb. Durrell Institute of Conservation and Ecology. University of Kent. 2003. Page 12.

[6] Linking Conservation and Local People through Sustainable Use of Natural Resources Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Page 315.

[7] Expediente Técnico para la creación de la Zona Reservada del Yavarí (*Technical File supporting the creation of Yavarí Reserved Zone*). CIMA, DICE, WCS, UNAP, CTAR Loreto. Ministerio de Agricultura, INRENA, IANP. Octubre 2002. Pág. 13.

[8] Rapid Biological Inventories:11. Perú: Yavarí. Pitman, N., Vriesendorp, C., Moskovits, D. (eds.). The Field Museum, CIMA, WCS, DICE, RCF, Museo-UNMSM. Noviembre 2003.

[9] Linking Conservation and Local People through Sustainable Use of Natural Resources Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Pág. 320.

[10] Why the Tahuayo? James Penn and Greg Neise.

[11] Interview with Richard Bodmer. March 14, 2004.

[12] Interview with the Director of the Yaquerana Subregion of the Loreto Regional Government, headquartered in Angamos, José Lozano Marín. March 23, 2004.

[13] Using the weight/age ratio to measure malnutrition is the method used by Peru's Ministry of Heath in their groth and development cards, which are manufactured based on the US National Center of Health table, valid for all countries. The table differs between boys and girls and considers +/- 2 standard deviations error normal.

[14] Linking Conservation and Local People through Sustainable Use of Natural Resources Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Pág. 331-332.

[15] Hunting practices of the Ribereños People of Esperanza, Northeast Peru
Grace Christabel Crabb. Durrell Institute of Conservation and Ecology. University of Kent. 2003. Pág. 36.

[16] Interview with Richard Bodmer, March 14, 2004.

[17] Interview with the Director of the Yaquerana Subregion of the Loreto Regional Government, headquartered in Angamos, José Lozano Marín. March 23, 2004.

[18] Linking Conservation and Local People through Sustainable Use of Natural Resources. Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Page 344.

[19] Rapid Biological Inventories:11. Perú: Yavarí. Pitman, N., Vriesendorp, C., Moskovits, D. (eds.). The Field Museum, CIMA, WCS, DICE, RCF, Museo-UNMSM. Noviembre 2003. Pág. 39.

[20] Regulations of Forestry Law # 27308: Supreme Decree No. 014-2001-AG, Supreme Decree No. 006-2002-AG, Supreme Decree No. 006-2003-AG, Supreme Decree No. 012-2003-AG. In addition, Articles 66, 67, 68, 69 and 71 of Peru's 1993 Political Constitution apply as does the Organic Law for Sustainable Natural Resource Use # 26821.

[21] Interview with Pablo Puertas Meléndez, Director of WCS-Perú. March 11, 2004.

[22] Interview with Pablo Puertas Meléndez, Director of WCS-Perú. March 11, 2004.

[23] Interview with Pablo Puertas Meléndez, Director of WCS-Perú. March 11, 2004.

[24] Interview with Regional Governmental Environmental Manager, Nélida Barbagelata Ramírez, April 7, 2004.

[25] Seventh complementary transitory disposition of the Forestry and Wildlife Law #27308 of July 2000.

[26] Interview with the primary sub-official technician with the National Police, Misael Bocanegra Ruiz, at the Nueva Carolina border police station. March 19, 2004.

[27] The 27 forestry use units being questioned are: 522, 482, 481, 479, 478, 293, 480, 286, 477, 476, 457, 456, 474, 268, 253, 473, 254, 455, 454, 249, 248, 471, 240, 472, 467, 466 and 464.

[28] Interview with Yavarí District Mayor, Sr. Demóstenes Alarcón, March 28, 2004.

[29] Interview with Environmental Manager with the regional government, Nélida Barbagelata Ramírez, April 7 2004.

[30] Interview with Nueva Esperanza community president, Mr. Eugenio Alvarado Vela, March 16, 2004.

[31] El acta al pie de la letra dice lo siguiente:
Siendo las 11:10 horas del 17 de marzo del 2004, el intervenido Hulker Sanda Ríos de Requena, sin documentos personales a la vista, domiciliado en Comandancia Río Orosa sin DNI o documento alguno. Se pudo verificar de la existencia de 200 trozas de madera rolliza de la especie cedro, la misma que no cuenta con la numeración del contrato forestal en ninguna de las trozas.
Firma: Pedro Navarro Chung (Sub Oficial Técnico de Segunda, jefe del Puesto de Vigilancia Fronterizo de Carolina).

[32] Interview with INRENA administration director in Iquitos, Walter Meléndez Torres, March 30, 2004.

[33] Interview with INRENA administration director in Iquitos, Walter Meléndez Torres, March 30, 2004.

[34] Diario La República. Lima, Perú. April 18, 2004. Society Section, Page. 45.

[35] Interview with Engineer Antonio Morizaki, member of the Ad hoc Commission regarding the forestry concessions process. March 30, 2004.

[36] Interview with INRENA administration director in Iquitos, Walter Meléndez Torres, March 30, 2004.

[37] Interview with Luitenant Governor of Nueva Yarina, an Israelita community settled on the Yavarí River, March 25, 2004.

[38] Interview with Luitenant Governor of Nueva Yarina, an Israelita community settled on the Yavarí River, March 25, 2004.

[39] Interview with Luitenant Governor of Nueva Yarina, an Israelita community settled on the Yavarí River, March 25, 2004.

[40] Interview with Yavarí District Mayor, Mr. Demóstenes Alarcón, March 28, 2004.

[41] Interview with Richard Bodmer of WCS, March 14, 2004.

[42] Chapter X, Articles 78 to 81 of the regulations of the Natural Protected Areas Law, Supreme Decree Number 038-2001-AG.

[43] Integrando Caza y Áreas Protegidas en la Amazonía
Richard E. Bodmer. Integrating hunting and protected areas in the Amazon. En N. Dunstone y A. Entwhistle (eds.). Future Priorities for the Conservation of Mammals: Has the Panda had its day. Cambridge University Press, UK. 2000. Page 2.

[44] Hunting practices of the Ribereños People of Esperanza, Northeast Peru
Grace Christabel Crabb. Durrell Institute of Conservation and Ecology. University of Kent. 2003. Págs. 2 – 6.

[45] Hunting practices of the Ribereños People of Esperanza, Northeast Peru
Grace Christabel Crabb. Durrell Institute of Conservation and Ecology. University of Kent. 2003. Pág. 8.

[46] Hunting practices of the Ribereños People of Esperanza, Northeast Peru
Grace Christabel Crabb. Durrell Institute of Conservation and Ecology. University of Kent. 2003. Pág. 11.

[47] Hunting practices of the Ribereños People of Esperanza, Northeast Peru
Grace Christabel Crabb. Durrell Institute of Conservation and Ecology. University of Kent. 2003. Pág. 54.

[48] Hunting practices of the Ribereños People of Esperanza, Northeast Peru
Grace Christabel Crabb. Durrell Institute of Conservation and Ecology. University of Kent. 2003. Pág. 60.

[49] Rural Development and Sustainable Wildlife Use in the Tropics
Richard Bodmer, Etersit Pezo Lozano. Research paper 2003. Page 7.

[50] Address to the Nueva Esperanza community members by National Police Technician Carlos Ruíz during a meeting on March 18, 2004.

[51] Interview with the director of INRENA's Forestry and Wildlife Control Department in Iquitos, Biologist Ronald Rodríguez Viena on March 30, 2004.

[52] Interview with Mr. Ariel Carihuasari Aricari, fishermen from Nueva Esperanza on March 18, 2004.

[53] Linking Conservation and Local People through Sustainable Use of Natural Resources Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Pages 320 – 321.

[54] Collaborative Wildlife Management and Adaptation to Change: The Tamshiyacu Tahuayo Communal Reserve, Peru. Helen Newing and Richard Bodmer. Nomadic Peoples NS 2003 Volume 7 Issue 1. Page 113.

[55] Linking Conservation and Local People through Sustainable Use of Natural Resources Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Págs. 324 – 325.

[56] Managing Wildlife with Local Communities in the Peruvian Amazon: The Case of the Reserva Comunal Tamshiyacu Tahuayo. Richard E. Bodmer. In D. Western, M. Wright and S. Sturm (eds.) Natural Connections: Perspective on Community Based Management. Island Press, Washington D.C. 1994. Page 119.

[57] Rapid Biological Inventories:11. Perú: Yavarí. Pitman, N., Vriesendorp, C., Moskovits, D. (eds.). November 2003. Page 98.

[58] Interview with Operations Manager of the Amazon Rainforest Camp, Dolly Beaver. April 6, 2004.

[59] Interview with Operations Manager of the Amazon Rainforest Camp, Dolly Beaver. April 6, 2004.

[60] Linking Conservation and Local People through Sustainable Use of Natural Resources Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Page 339.

[61] Collaborative Wildlife Management and Adaptation to Change: The Tamshiyacu Tahuayo Communal Reserve, Peru. Helen Newing and Richard Bodmer. Nomadic Peoples NS 2003 Volume 7 Issue 1. Pág. 119.

[62] Interview with Operations Manager of the Amazon Rainforest Camp, Dolly Beaver. April 6, 2004.

[63] Linking Conservation and Local People through Sustainable Use of Natural Resources Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Pages 332 – 334.

[64] Interview with Operations Manager of the Amazon Rainforest Camp, Dolly Beaver. April 6, 2004.

[65] Linking Conservation and Local People through Sustainable Use of Natural Resources Community-Based Management in the Peruvian Amazon. Richard E. Bodmer, James W. Penn, Pablo Puertas, Luis Moya and Tula Fang. Page 335.

[66] Interview with an aguaje project agent, Exiles Guerra on April 5, 2004.

[67] Interview with Operations Manager of the Amazon Rainforest Camp, Dolly Beaver. April 6, 2004.

[68] Interview with environmental manager of the Regional Government, Nélida Barbagelata Ramírez, April 7, 2004.

[69] Interview with environmental manager of the Regional Government, Nélida Barbagelata Ramírez, April 7, 2004.

[70] Collaborative Wildlife Management and Adaptation to Change: The Tamshiyacu Tahuayo Communal Reserve, Peru. Helen Newing and Richard Bodmer. Nomadic Peoples NS 2003 Volume 7 Issue 1. Pág. 110.

[71] Interview with Yavarí District mayor, Sr. Demóstenes Alarcón, March 28, 2004.

[72] Interview with environmental manager of the regional government, Nélida Barbagelata Ramírez, April 7, 2004.

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