



Protected Area Profile – Peru Tumbes Reserved Zone

Last onsite field visit: October 2003

Date of publication: November 2003

Location: Provinces of Tumbes and Zarumilla, Department of Tumbes

Year created: 1994

Area: 75,102 hectares

Ecoregion: Dry forests of Tumbes/Piura – Peru, Ecuador

Habitat: Very dry tropical forest, dry premontane tropical forest, and dry tropical forest.



Summary

Description

The forests of Tumbes are atypical, different from the rest of Peru's coastal deserts, making it an important biodiversity center and wildlife refuge. Here, nature has continually evolved producing unique species that have adapted to the hot and humid tropical conditions surrounded by desert. Tumbes Reserved Zone is protected and recognized internationally as part of the Noroeste Biosphere Reserve (UNESCO's Man and the Biosphere Program, 1977).

Biodiversity

Some of the reserved zone's species include mantled howler monkey (*Alouatta palliata*), American crocodile (*Crocodylus acutus*), pale browed tinamou (*Crypturellus transfasciatus*), bronzed-winged parrot (*Pionus chalcopterus*), rufous-headed chachalaca (*Ortalis erythroptera*), among many others. There is a great diversity of flora species, including the endemic kapok tree (*Ceiba trichistandra*), and several mesquite species (*Prosopis* spp.), the "angolo" (*Pithecellobium multiflorum*) and the "pretino" (*Cavanillesia platanifolia*). Economically important floral species that are also threatened by overharvesting include trumpet trees (*Tabebuia* sp.), mesquite (*Prosopis pallida*), and palo santo (*Bursera graveolens*).

Threats

Principal threats to Tumbes Reserved Zone include timber extraction, gravel extraction, overharvest of non-timber forest products, grazing animals, contamination, and forest fires. These problems are intensified by lack of security and lack of interinstitutional coordination.



Panorama of the dry forest in Tumbes Reserved Zone (photo © Diego Shoobridge)

Description

Geography

The area's characteristics are different from the rest of Peru's coast because oceanic and continental atmospheric components interact here. The climate is transitional, between Peru's coastal desert and Ecuador's subhumid tropical climate (INRENA 2001).

The area has hilly topography, flat in some areas and hilly in the part closest to the coast; on the opposite side, where the area borders the foothills of Amotape's mountainous range, the topography is hillier with pronounced slopes (INRENA 2001).

Its climate is subtropical with varying precipitation throughout the year and some extreme climatic events such as the El Niño phenomenon. Average annual precipitation is 1350 mm, ranging from 100 to 2000 mm. The area with the most precipitation (up to 1537 mm per year) is along the reserved zone's extreme eastern border, in El Caucho – Campo Verde. The area's tropical climate has corresponding temperatures varying from 35°C during summer (February to April), and 15°C in winter (July and August). Average relative humidity varies between 70 and 80% (INRENA 2001, pg 4). The soils are clayey and muddy with low phosphorus and potassium content and very high calcium content (Wust 1998, p. 46).

Access

There are several unpaved secondary roads crossing through Tumbes Reserved Zone. In the northern part of the protected area, there is a road that begins in the town of Tumbes, passes the town of San Juan de la Virgen, then onto Miraflores, continuing to El Tutumo and reaches Matapalo. Matapalo, in the northeastern part of the protected area, is also accessible by the road running along the Ecuadorian border from the town of Zarumillo. From Tutumo and Matapalo there are additional access roads going towards the sectors El Caucho, El Limón, Cerro Bombas, that eventually lead to the border control posts operated by the Civil Guard and the Army along the border between Peru and Ecuador.

From the locality of Pampas de Hospital there is an access route to the Angostura Creek, along the northwestern border of the reserved zone. Along Tumbes River there is another route that reaches Rica Playa on the western side of the reserved zone. From there, one can travel via river or on foot further into the protected area. All around the protected area there are roads and routes connecting any number of towns and settlements in the zone.

The eastern and southern part of the reserved zone borders Ecuador, from which there are also many access routes that reach the protected area.

Biodiversity

Despite being only a few kilometers from the city of Tumbes, next to the Peruvian coast, and the many access routes, the forests of Tumbes Reserved Zone have remained unaltered for centuries and have become a wildlife refuge. Here, nature has continually evolved producing unique species that have adapted to the hot and humid tropical conditions surrounded by desert and that have been separated from related Amazonian species by the Andes Mountains.

There are two distinct forest types within the reserved zone, each with different landscape characteristics that make the entire area very special: dry tropical forest and tropical forest. Among the species inhabiting these habitats are: mantled howler monkey (*Alouatta palliata*), American crocodile (*Crocodylus acutus*), pale browed tinamou (*Crypturellus transfasciatus*) bronzed-winged parrot (*Pionus chalcopterus*), rufous-headed chachalaca (*Ortalis erythroptera*), and more (Wust 2003, pp. 88-90).



Tumbes dry forest (photo © Diego Shoobridge)

Regional residents, especially hunters and nomadic herders, used this mysterious and relatively unknown place for years. It wasn't until later that its national importance was recognized, and in 1957 the state declared 75,102 hectares as a National Forest to rationally use its valuable wood species. Of course, the forest was much more than precious woods and firewood to make charcoal. This small corner of the country ended up becoming the last refuge for a number of

North American flora and fauna species whose southern distribution extended to the Tumbes' forests. Unfortunately, these forests in neighboring countries have been decimated and this is the last, relatively unaltered, remaining portion. The area is home to a number of endemic species—species only found in this area—and endangered species such as the Tumbes crocodile and the Noroeste river otter (Wust 2003 pg. 92).

Flora

The vegetation present between 0 and 500 m is not very dense and is mostly small trees or bushes dispersed over slightly hilly terrain with an herbaceous layer and an occasional cactus. In the northernmost sector, the bushes are denser. Between 500 and 1200 m, there are small trees mixed with an herbaceous layer and bushes. The deciduous trees are always covered by epiphytes. In moister areas, the forest grows higher and denser and there are even some evergreen species. In the north, above 400 meters above sea level, there is a complex forest harboring species uncommon to the rest of the area. It is possible to identify a dominant tree layer at 20 meters, with many epiphytes, and another co-dominant layer of short trees with skinny trunks and bushes. Deciduous species dominate the lower altitudes and are usually replaced by evergreen trees as the altitude increases (INRENA 2001, pg 8).

There are 84 forestry species in Tumbes Reserved Zone, including spruce hualtaco tree (*Loxopterygium huasango*), oreja de león, amarillo, cedar, laurel, polo polo, kapok among others



Photo © Diego Shoobridge

(Wust). There is a great diversity of species representing the flora, including the endemic kapok tree (*Ceiba trichistandra*), several mesquite species (*Prosopis* spp.), “angolo” (*Pithecellobium multiflorum*) and the “pretino” (*Cavanillesia platanifolia*). Economically important species threatened by overharvesting for firewood use or to construct parquet floors include trumpet trees (*Tabebuia* sp.), mesquite (*Prosopis pallida*) and palo santo (*Bursera graveolens*).¹

In the interior forest, dozens of orchid varieties compete in beauty with bromeliads, malvaceae and begonias. Ferns and tillandsias grow along the streams along with precious woods, from the hualtaco and trumpet tree, which have practically disappeared from other areas (Wust 2003, pg. 92).

Fauna

There are 230 vertebrate species in the reserved zone, including 175 bird species, 4 amphibian species, 36 mammal species, and six reptile species. There are typical, restricted distribution species in the zone. Among the reptiles are the viper (*Botriechis schlegelii*) and various lizards (*Dicrodon* sp.). A notable amphibian species is (*Trachycephalus jordani*). Notable bird species include yellow-faced parrotlets (*Forpus xanthops*), grey-cheeked parakeet (*Brotogeris*

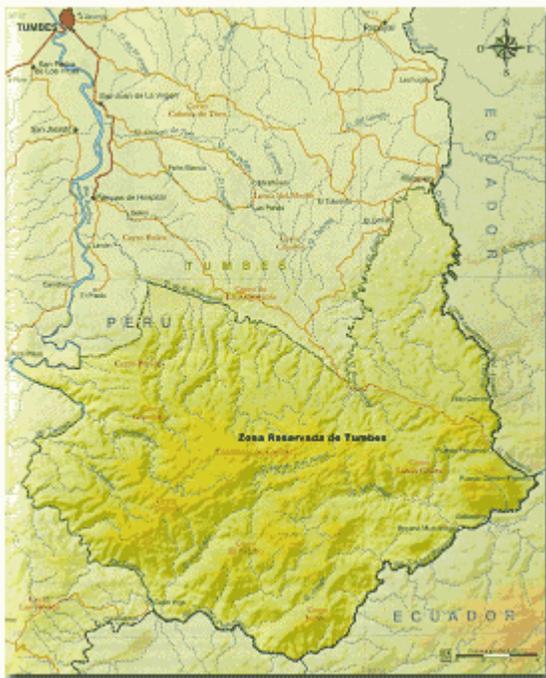
pyrrhopterus), Peruvian antpitta (*Grallaricula peruviana*), grey-backed hawk (*Leucopternis occidentalis*), white-tailed jay (*Cyanocorax mystacalis*), and the pale-legged hornero (*Furnarius leucopus*). Mammals include white-tailed deer (*Odocoileus virginianus*) and the Guayaquil squirrel (*Sciurus stramineus*). Threatened species in the zone include bronzed-winged parrot (*Pionus chalcopterus*), neotropical river otter (*Lontra longicaudis*), mantled howler monkey (*Alouatta palliata*), the jaguar (*Panthera onca*) and the margay (*Leopardus weidii*).²

Additional species include American crocodile (*Crocodylus acutus*), tyra (*Eira barbara*), magnificent frigate bird (*Fregata magnificens*), common black hawk (*Buteogallus anthracinus*), yellow warbler (*Dendroica petechia*) and great-tailed grackle (*Quiscalus mexicanus*) (Wust).

Management

History

In 1957, the Peruvian government declared the Tumbes National Forest in what is today Tumbes Reserved Zone. According to Peruvian law, timber can be permanently harvested from an area declared as national forest. It should be noted that the timber industry was seriously exploiting the forest in the 1940s, before it actually became a natural forest. In 1965, to promote



Mapa: Santuarios Naturales del Perú W.W.F.

regeneration, a minimum diameter was established for harvestable trees. In 1970, to further promote forest regeneration, a 10-year ban was put into place prohibiting timbering and creation of charcoal in portions of the departments of Piura and Lambayeque. This ban was expanded indefinitely in all of Tumbes, Piura and Lambayeque in 1974 and only domestic use of over mature trees was permitted (RS No. 0144-74-AG). This measure mandated the closing of all sawmills dedicated to production of wood flooring in Tumbes; as a result, some of the mills moved into the forest while others actually closed and sold their equipment. In Sullana, some wood flooring factories ignored the ban and continued production using the wood from the dry forests of Piura and Tumbes.³

Ministerial Resolution No. 0594-94-AG created Tumbes Reserved Zone, following the third complementary ordinance of the Directive describing the measures of Law No. 26258

promulgated on December 9, 1993 that referred to the logging ban of natural forests in Tumbes and Piura. The ordinance states, “Tumbes National Forest Reserved Zone was originally created by Supreme Decree Number 007-57 on July 8, 1957. It covers 75,102 hectares in Tumbes and Zarumilla provinces, Department of Tumbes.⁴ The protected area is created to conserve and protect a representative sample of Pacific tropical forest, and to especially protect threatened and endangered flora and fauna species.” Resolution No. 318-2001-INRENA established Tumbes Reserved Zone’s buffer zone, which was approved on December 13, 2001.

Noroeste Biosphere Reserve

Tumbes Reserved Zone and its two neighboring protected areas, Cerros de Amotape National Park and El Angolo Game Preserve, together make up the Noroeste Biosphere Reserve. Peru proposed to incorporate these three areas into UNESCO's Man and the Biosphere Program. On March 1st, 1977 UNESCO declared the Noroeste Biosphere Reserve along with two other Peruvian reserves: Huascarán and Manu Biosphere Reserve. Peru's proposal, as well as UNESCO's recognition, designated Cerros de Amotape National Park as the core zone and El Angola Game Preserve and Tumbes National Forest as the biosphere reserve's buffer zone. Neither the transition zones' extensions nor the level of cooperation between these areas' management were defined.

The idea to include terrestrial, coastal and marine ecosystems into an internationally recognized program was conceived in 1974 when the Man and the Biosphere Program began. Biosphere Reserves accepted into the program should incorporate three complementary functions: a conservation function, to protect genetic resources, species, ecosystems, and landscapes; a development function, to promote sustainable human and economic development; and a logistic function, to support and encourage research, education, training, and permanent monitoring of activities of local, national, and world interest relating to conservation and sustainable development.

The areas' planning and administration began many years after their actual creation. Nonetheless, what used to be Peru's Forestry Police (of the Civil Guard) played in an important security and vigilance role in the protected areas enforcing the forestry bans. The Forestry Police was created in 1976, and in 1977 it began working in the area with headquarters at the 56th District in Piura. The police force in Tumbes was large with three control posts: one in Pampas de Hospital, one in La Bocana – Casitas and the last one in Máncora. The General Forestry and Wildlife Office of the Ministry of Agriculture implemented the control posts and provided vehicles and some field equipment.

In 1988, planning for Cerros de Amotape National Park began—13 years after the park was created, and 11 years the Noroeste Biosphere Reserve was recognized. In 1989, World Wildlife Fund (WWF) provided funding to the General Forestry and Wildlife Office and the Peruvian Foundation for Nature Conservation (today ProNaturaleza) to jointly implement security and vigilance in the park, with directors and park guards.

In 1993 it became necessary to implement the reserve and the 1994-1998 Sustainable Development Plan for the Noroeste Biosphere Reserve and Adjoining Areas was completed.



Map: Conservation and Sustainable Development Strategy of the Noroeste Biosphere Reserve

This plan divided the reserve into three zones: Core Zone, Buffer Zone, and Transition Zone. At this time, the suggested Core Zone included Cerros de Amotape National Park, Tumbes National Sanctuary (officially not part of the Noroeste Biosphere Reserve), and part of Tumbes Reserved Zone (the sectors of El Caucho and Campo Verde). The Buffer Zone included the remainder of Tumbes Reserved Zone and El Angolo Game Preserve. The Transition Zone was made up of the adjoining areas.

Finally, in 1996—twenty years after Cerros de Amotape became a National Park—the state agency INRENA assumed direct administrative and management control of all the protected areas within the Noroeste Biosphere Reserve.⁵

Important NGO contribution in the region

The non-governmental organization (NGO) ProNaturaleza has worked in the area since 1988. Below is a copy of an e-mail describing their work:

ProNaturaleza has played an important initial role implementing, developing, and managing the protected areas in Tumbes. In agreement with the Peruvian Government, who supervised the work, the organization was actively carrying out a series of projects.

ProNaturaleza's Noroeste Program started in 1988. The goal was to guarantee proper natural resource management in the region by promoting local participation and by forming agreements with national and international organizations. Initially, they worked to support the administration of Cerros de Amotape National Park and gradually they increased their program to include the other protected areas, buffer zones, and areas of influence in Tumbes. Through this Regional Program, the organization channeled its best efforts to conserve the region's natural diversity and assure sustainable resource management.

Since expansion, ProNaturaleza has worked to restore mangrove ecosystems, regulate extractive activities—especially those harvesting marine or aquatic resources—to implement an environmental education program in rural communities, and to elaborate planning and management documents for the Noroeste Biosphere Reserve. Recently they have begun a binational program to replicate Ecuador's positive experiences in mangrove management.

They have actively helped manage the region's protected areas as well as develop strategies and management policies. During 2002, they have worked with private entities and public agencies (such as INRENA) to elaborate and publish the following four planning documents:

Noroeste Biosphere Reserve Conservation and Sustainable Development Strategy.
Strategy for Tumbes Mangroves Ecosystem Conservation.
Cerros de Amotape National Park Master Plan.
Manglares de Tumbes National Sanctuary Master Plan.

They have also helped strengthen local harvester organizations and mangrove fisherman, training them in marine resource management and in new, alternative fishing methods, as well as improving the commercialization of their harvests in order to increase benefits to the communities and the mangrove ecosystem. During 2002, they supported the development of crab farming and concha negra farming in order to reduce pressure on the wild populations.

Through their *Education and Conservation of Dry Forests Program*, ProNaturaleza holds workshops for rural community members and gives class to 13 educational centers (7 elementary schools and 5 technical schools), reaching 500 students and approximately 50 educators, in order to create environmental awareness.⁶

Administration

The Natural Protected Areas Agency of the National Institute of Natural Resources (INRENA) within the Ministry of Agriculture is responsible for Peru's natural protected areas. Law Number 26834, Natural Protected Areas Law passed June 30, 1997, and its corresponding Supreme Decree Number 038-2001-AG regulate their administration.

The Noroeste Biosphere Reserve, of which Tumbes Reserved Zone is part, has approximately 21 park guards, four professionals, one administrative assistant, and a director. There are four control posts in Tumbes Reserved Zone: Isla Noblecilla, El Caucho, La Angostura and Zapallal. These posts are basic; they lack radio communication, bathrooms, showers, and space for educational or interpretive materials. There are two park guards per control post. The guards rotate between the protected areas of the biosphere reserve every three months: those stationed in Tumbes Reserved Zone may be moved to other posts within the same reserved zone or to posts in Cerros de Amotape National Park or Manglares de Tumbes National Sanctuary.



Sign in the protected area



*INRENA's control post on Isla Noblecilla
(photos © Diego Shoobridge)*

There is also a volunteer park guard system, made up of local community members who participate in security and maintenance work on a part-time basis. Usually, there are one or two volunteers per control post. Ismael Lobeñas Aguirre, an ex-volunteer park guard, confirmed that his role was to help the rotating personnel teams. He would work every Tuesday and Thursday from INRENA's control post at Isla Noblecilla. Lobeñas passed an exam and then worked for four months as a volunteer.

Twenty-one park guards for all the protected areas is not enough and as a result many infractions occur in remote areas of the reserve without the protected areas' administration even knowing.

During our visit to the area, we noted the absence of park guards in some of the control posts. According to the director, there was a training and coordination workshop for the area's personnel in the city of Tumbes. According to the park guards, they never abandon the control posts. When the paid park guards are needed somewhere else, the volunteer park guards maintain watch. However, we were unable to confirm this fact during our visit.

Budget

The reserved zone's budget comes from the shared budget that covers the entire Noroeste Biosphere Reserve plus Manglares de Tumbes National Sanctuary. The total approximate budget is \$200,000 per year and it covers personnel salaries, uniforms, fuel, security costs, and administrative expenses.

Human influence

The protected area's environment is very complex. Despite its small size, the area has a wide variety of ecological zones and microclimates that determine the distribution of many flora and fauna species. These natural characteristics in turn affect human development; different groups specialize in distinct activities depending on the particular available resources (such as water or species) and conditions (such as the climate, physiology, among others). Population and economic activities in areas with year-round water availability are greater, while in areas without year-round water the opposite is true. Production is greater during the rainy season than the dry season. Other natural elements, such as soil type, vegetative communities, water sources, and general landscape form—and their variations—also affect human activities (agriculture, timber extraction, grazing, fishing, tourism) (INRENA 2001, pg. 12).

Several communities surrounding the protected area exert influence on it: Becerra Belén, Pueblo Nuevo, Cabuyal, Peña Blanca, Chacritas, Matapalo, Tutumo, Totorá, Miraflores, Leandro Campo, Nuevo Progreso, Pampas de Hospital. Principal economic activities include agriculture and animal grazing, although these activities depend on the rains and they are severely impacted by droughts.

There are communities within the reserved zone; some arrived before it was created, others after, and some continue to arrive. During years with excellent rainfall, more people move to the area to raise cattle and to grow crops. Currently there are two communities in the reserved zone. The first community has 20 families (80 people), is located on La Angostura Creek and carries the same name. The other community, Isla Noblecilla, is in the northeast and it has 30 families (approximately 150 inhabitants). In Isla Noblecilla, there are approximately 35 hectares of permanent agriculture land and an additional 60 hectares of temporary agriculture land. In La Angostura, there are 30 hectares of permanent agriculture and 20 hectares of temporary agriculture land.

The suggested final protection for Tumbes Reserved Zone is to incorporate it into Cerros de Amotape National Park. In the event that this occurs, La Angostura and Isla Noblecilla would not be included within the borders of this new park. It appears that the inhabitants have learned of this upcoming change in protected area status and have begun land speculation, invading additional areas in the reserved zone. This is occurring most in Isla Noblecilla; once this community is excluded from the protected area, the inhabitants will have secure land tenure and can sell the lands that they are currently and illegally invading.

Land invasions are common in the area. Many people from Ayabaca and Huancabamba (from Piura's poor highlands) are immigrating to Tutumo, Pueblo Nuevo, Isla Noblecilla and Quebrada Seca to farm; to do so, they first deforest and settle a parcel. Many of these immigrants are opening up protected lands, mostly because they are unaware of the boundaries and because the local communities are not coordinated to stop it. These invasions are also affecting lands included in the binational Puyango-Tumbes development project, which was conceived years ago and has been recently reactivated with Peru and Ecuador's peace agreement. The Special Land Titling Program (PETT) of the Ministry of Agriculture is titling territories in order to clarify and demarcate the lands once and for all.



*Homes in La Angostura
(photo © Diego Shoobridge)*

According to one PETT technician, INRENA has not shown or explained the protected area's boundaries. When settled agriculturalists have occupied an area for three or four years, and they have crops in production, they begin to solicit their land titles—this is when the problem appears. According to the technician, this is most common in El Tutumo and Quebrada Fernández, in the zone called “Casitas” where there is more participation caring for the area. This same technician informed us that he has been visiting the area regularly and he has not seen INRENA personnel in their control posts.⁷

The Mayor of the Matapalo district predicts that the regulation elevating the reserved zone to national park status will be passed and then INRENA will show up to assume control. However, there are people living within the reserved zone that do not want to abandon the area, rather they want to retain their lands. The Mayor advises that INRENA must consult with the community before elevating the status to national park because the community members are the ones that should be most involved since they will be most affected.⁸

Park guards from La Angostura control post indicate that most people support the existence of the protected area, although they also made it clear that some people do not want the reserved zone to be elevated to a formal category, like a national park, so that they can continue with their extraction and grazing activities.

Tourism

Tourism in the region, made up of national and international tourists, is increasing. Many tourists are arriving from Ecuador to visit the department of Tumbes and the surrounding areas. Many beaches along Tumbes' coast are popular with tourists; particularly Punta Sal, Zorritos in Tumbes and Máncora in Piura (which is very close to Tumbes). Tourists interested in this type of tourism want beautiful beaches, good weather, and in the case of Máncora, waves for surfing. There is not much tourism further inland in the protected areas; mostly just locals interested in short weekend trips to picnic and swim in the river.

Tumbes Reserved Zone receives approximately 500 tourists per year. This number includes school visits to La Angostura, where students swim in the river's pools and waterfalls. There is also some scientific tourism—researchers who visit El Caucho to learn about the most tropical portion of the reserve, and Faical Sector and Bombas Hill to study the mantled howler monkey.

One ex-park guard interviewed during our field visit to the area informed us that many Ecuadorian hunters frequent the sector of El Caucho. The ex-park guard also criticized the “Playa Hermosa” tourism project that the Peruvian government and the private sector are developing along the Tumbes Coast, close to the southern sector's mangroves. He said, “How are they going to develop the Playa Hermosa mega-project? They have not even considered the Rica Playa, which is closer.”⁹

Conservation and research

Between 1996 and 2000, PROFONANPE conducted the *Tumbes Reserved Zone Biodiversity Conservation Project* (with support from the John D. and Catherine T. MacArthur Foundation). This project helped change the old categorization from Tumbes National Forest to Tumbes Reserved Zone and thereby began the planning process for its conservation and management. This also led to the elaboration of an important document: Biodiversity and Socioeconomic Diagnostic of Tumbes Reserved Zone (webpage: <http://www.profonanpe.org.pe/data-proyectos-pro.htm>).

Between 1997 and 1998, using participative processes, INRENA, ProNaturaleza and CTAR Tumbes (with financing from Germany and the Royal Government of the Netherlands), elaborated the Noroeste Biosphere Reserve's conservation and sustainable development strategies. During the same time period, the National Environmental Council (CONAM, the national environmental policy's main organization) created Tumbes Regional Environmental Council (CAR-Tumbes) in order to promote departmental planning and environmental management (April 23, 1999, by Board of Director's Decree Number 003-99-CD/CONAM).

In 2000, PROFONANPE started the “Natural Areas Protection” Program with financing from Kreditanstalt für Wiederaufbau of Germany. This program ends during 2004. They are improving infrastructure and acquiring equipment for the protected areas (including Tumbes Reserved Zone) and also working to establish sustainable financial resources for the areas and helping the communities to reduce their dependence on natural resource exploitation.

Other studies and related publications include:

BEST, BJ Y KESSLER, M. 1995. Biodiversity and Conservation in Tumbesian Ecuador and Perú, Cambridge University: Bird Life International.

CENTRO DE DATOS PARA LA CONSERVACIÓN –Universidad Nacional Agraria La Molina. 1992. Estado de conservación de la diversidad natural de la región noroeste del Perú. La Molina.

COMISIÓN AMBIENTAL REGIONAL DE TUMBES, GRUPO TÉCNICO BINACIONAL. 2002. Plan Binacional para la gestión de recursos naturales fronterizos Tumbes (Perú), El Oro y Loja (Ecuador). Tumbes, Perú.

MINISTERIO DE AGRICULTURA, DIRECCIÓN GENERAL DE FORESTAL Y FAUNA.
Diagnóstico del Uso del Bosque Nacional de Tumbes: Propuestas para su conservación. Tumbes,
Perú.

Threats

Threats to Tumbes Reserved Zone include:

- Timber extraction
- Gravel extraction
- Harvesting of non-timber forest products
- Grazing animals within the protected area
- Contamination

Regional inhabitants have continually predated the forests of Tumbes, despite their ecological importance. Because of lack of control, hunters, loggers, and cattle ranchers were able to destroy larger and larger percentages of the forest, reducing the area for species survival (Wust 2003, pg. 92).

Timber extraction

Illegal timber extraction is the most serious and prevalent threat to the reserved zone. Hardwood species, such as hualtaco, trumpet tree, oreja de león Amarillo are most sought after. There are several sawmills, known as “parqueteras,” that are dedicated to producing hardwood floors. The parqueteras in Tumbes and Zarumilla demand mostly the trumpet tree and hualtaco.

Forest extraction in the zone has a long history. Since the 1940s these forests have been intensely harvested. In 1957, Tumbes National Forest was created in an attempt to regulate timber extraction. There have been a series of bans overtime. Finally in 1974, RS No. 0144-74-AG declared a permanent logging ban. This ban was further strengthened in 1993 by Law No. 26258, which prohibited timbering of natural forests and production, transporting, and commercialization of firewood or carbon in the departments of Tumbes, Piura, Lambayeque, and La Libertad for a period of 15 years. Strangely enough, despite this law a new parquetera (hardwood floor factory) was built in Zarumilla province. Authorities insisted that the factory used wood imported from Ecuador, but evidence indicated that the wood was illegally harvested from the prohibited areas in Peru for wood flooring and also for construction.¹⁰

One of the key informants interviewed for this report confirmed that the hardwood flooring factories have been cutting timber with permission from INRENA's forestry department. The hardwood flooring producers indiscriminately harvest wood, without abiding by the cut regulations set forth in the management plans; for example, they cut young, skinny trees that have not yet reached the minimum diameter, they haphazardly use chainsaws, they harvest the *Alseis peruviana*—an endangered tree according to INRENA's publication "Flora of the Noroeste Biosphere Reserve," they are overharvesting, and they are harvesting from high biodiversity areas such as Bombas Hill in the El Cuacho sector.¹¹



Cut timber and a logging trail (photo © Diego Shoobridge)

Much of Tumbes' wood is illegally harvested to satisfy the demand coming from Ecuador. The harvest is called "ant extraction" since it is done on a small but continual and systematic scale, covering a large geographic area. There are various foot trails throughout the reserved zone going towards Ecuador where donkeys take the wood to market. Some of the extracted wood is also sold locally in Tumbes, mostly for home construction. Ever since the peace accord between Peru and Ecuador was signed, many Ecuadorian cross the border to enter Peru. Traditional trade along the border has been reduced since Ecuador uses American dollars instead of its own national money, and now many primary materials (like wood or other natural resources) are sold to Ecuador.

In the last two years, Ecuadorians from the town of Manabí del Oro have been extracting more and more wood for use as hardwood floors and furniture from the sectors of Balsamal and Cotrina (near Lajas Identification Marker), many times using the chainsaw improperly. Peruvians have also been entering Isla Noblecilla and extracting wood from the border with Faical Creek then they cross the border at Matapalo and Quebrada Seco to transport the wood to the Ecuadorian towns of Cacabón (sometimes using Ecuadorian trucks). Once the wood is in Cacabón it is transported to Huaquillas and then resold to Peru as imported wood.¹²

Before cutting and extracting a particular tree, the loggers clear the surrounding area to facilitate the extraction. This damages the forest and prohibits natural regeneration. Likewise, when the trees fall, they also damage surrounding vegetation.

The forest portions more or less conserved were stands of palo santo (*Bursera graveolens*) located close to Lechugal, La Coja, Quebrada Seca, Matapalo and El Mono/Miraflores. During 2002, these stands were intensely harvested and the wood used to construct wood cargo boxes. The forests of El Tutumo, Pitón Hill and Faical Creek were also the best-conserved samples of dry forest in all of the buffer zone. However, they too have been overharvested and since the forest management plans have been implemented, they no longer have the same condition.¹³

The Forestry Management Plans granted by the Technical Administration of Forestry and Fauna of INRENA in Tumbes are causing difficulties. Three forestry concessions of 500 hectares each have been granted outside of, but next to, the reserved zone. These concessions are supposed to follow the management plans presented at the time the concession was granted. Locals state that the concessionaires are not just extracting from their designated locations (at El Tutumo and Chacritas), but that they are extracting wood from the protected area and then claim that it is from their concession. These management plans have turned into licenses for unlimited wood harvesting. Loggers pass the control posts freely (both INRENA's and the police) by simply showing a copy of their permit and transportation authorizations acquired after winning the contracts because their management plans were approved. According to several inhabitants interviewed, now that the management plans exist, the timber harvesters extract even more wood than before.

It seems that these management plans are also technically deficient. For example, they recommend leaving only one tree per species to serve as a seed bank for the entire 500 hectares, or they do not clearly identify which are the selected trees with appropriate diameter sizes. The Natural Protected Areas Agency in Lima has been inconsistently enforcing the requirements for granting and maintaining concessions. Nonetheless, pressure from Tumbes Regional Office, local conservation organizations and even the local Natural Protected Areas Agency resulted in the cancellation of these concessions. Yet, systematic timber extraction in the zone continues. The extractors keep showing local inhabitants and authorities their supposedly "approved" management plans, as if they were still valid to harvest wood.

Local inhabitants confirm that many people come to the area from the city of Tumbes, Cerro Blanco and Zarumilla to harvest wood. Most of the trucks pass by El Tutumo because INRENA forestry officials are not usually present in their control posts, and the illegal extractors take advantage of their absence. One publication explains the ongoing situation: Full loads of hardwood—hualtaco and trumpet tree— were confiscated by Eulogio (forestry technician), who's only weapon was his presence, and turned over to the police for the legal follow-up. Nonetheless, the perpetrators "took care" of the situation with the authorities, and obtained the confiscated wood. Eulogio was disgusted and declared, "Nothing worked, so I quit."¹⁴

The Lieutenant Governor of El Tutumo told us that to better regulate timber extraction in the region, they had a meeting at Isla Noblecilla where the police, INRENA, the army, farmer groups, and the local government agreed that the inhabitants needed to have a more active role in security and in denouncing illegal logging. As a result, there is now a local security and control committee made up of farmer groups. The committee is responsible for notifying the authorities in case of a violation. This key informant also mentioned that control posts were manned one month ago, but now they are not because of lack of personnel.

In addition, this informant expressed his dissatisfaction with the concessions system. He commented that the management plans are approved for outsiders but not for local community members—he gave several examples: Orlando Gutiérrez is from Tumbes, Griselda Campaña is from Zarumilla, and Antonio and Manuel Jiménez. He notes that the community is against indiscriminate logging because they don't benefit, and the forests will disappear and there will be nothing left for the future. The outsider timber concessionaires do not pay the laborer well. There are six local community members working in the concessions of El Tutumo. This same

informant commented that if the forests are to be logged, the local people should be the ones doing it. He even proposed opening a hardwood-flooring factory with the Mayor in El Tutumo. His rationalization was that there is unemployment in the region and that agriculture is not enough to meet the community's needs. He added that the protected area does not inconvenience anyone in the Tutumo community, rather they benefit from it.



*Illegal logging in the Isla Noblecilla sector
(photo © Diego Shoobridge)*

The informant believes that the management plans actually facilitate illegal timber extraction. He emphasized that there was less logging before the management plans were implemented, the forest was better cared for. But, now, with the “famous” management plans, there is less regulation and it is totally out of control. Every day, at least two trucks full of wood leave the area. These trucks have authorizations for the concessions. In the informant's opinion, the management plans facilitate document falsification and create confusion. He added that there should be alternatives to eradicate the problem, like agriculture and cattle raising promotion, building dams to store water during the dry season, etc.¹⁵

We learned during informal conversations with park guards at the Angostura control post that the logging problem is a legal issue. They commented that the management plans have only been in place for two years, and it appears as though these plans have legalized all timber extraction.

One ex-volunteer park guard informed us that the illegal loggers work in “yuntas”: one person cuts the trees while the other keeps watch to avoid being discovered. This informant also commented that the park guards with INRENA's Technical Administration of Forestry and Fauna Control are never present at El Tutumo's control station. He said, “they don't control anything and who knows where they are.” He did confirm that the park guards within the reserved zone at Isla Noblecilla maintain presence at their posts. According to this informant, Ecuadorian loggers extract trumpet trees from the sectors of Peñas, Pozo Ñato, Pozo Redondo and Quebrada Pato. The wood is sent to Ecuador to make wood flooring.¹⁶ Within the protected area, there are only three or four people to regulate forestry activities and they do not have any logistical support. Even in the El Tigre sector, in the heart of the protected area, there is illegal logging.

The district governor of La Totorá commented that the forestry sector approves management plans and INRENA does not care. He feels that the biggest problem is that INRENA is granting the concessions to rich people and not to the local inhabitants. He asks, “What person is going to reforest if they aren't paid even one penny? What's worse is that they give management plans to people we don't even know, they should be giving them to the local people.”¹⁷ One community member of El Tutumo commented that before the concessions, the police were in more control and now with the concessions, INRENA has more control and the police can no longer take direct action. The management plans are only an excuse to receive forestry authorizations and

extract all kinds of wood. With one single authorization, the loggers make two to three trips. The lieutenant governors cannot control it, because these authorizations “close their mouths!” This same informant told us that a number of inhabitants think that the reserved zone does not benefit the community. They do not support recategorizing it to national park because they won’t be able to plant pasture for their cattle there. He thinks that if the local inhabitants’ preferences were taken into consideration, they would probably support it more.¹⁸

The Mayor of Matapalo District blames Ecuador, he says that the Ecuadorians come to the area to buy the timber and then they take it to the border zones. On horses, they travel 5 to 8 km or in the case of Isla Noblecilla, 3 km.¹⁹ One ex-INRENA park guard confirms that trucks leave the protected area with timber. He said that before, there were no trucks, but now they are heading towards Ecuador. There are logging roads in the protected area that did not exist before. The same informant said that the protected area’s director blames the ex-director of the Technical Administration of Forestry Control, who said that the wood was from the buffer zone. He says that is not true, the extracted species are no longer found in the buffer zone so it has to be coming from the interior of the protected area.²⁰

The Matapalo District Governor does not agree with the concessions and management plan system. She sees the reserved zone as a conservation area, and the management plans bring about serious problems. She said that most of the time, the wood is cut from the reserved zone, but when the loggers pass a control post, they show their authorization and say that the wood is from the concession. They drive back and forth freely. She exclaimed, “Come see how they are logging these forests right here in Isla Noblecilla! You will see!” She explained that there are five concessions with management plans, but that no one ever goes to verify if they are complying with the plans, or to see what they are doing, if they are cutting the proper trees or not. She thinks that instead of providing financing to INRENA, the money should go to locals organized for self-defense. She thinks that they would work better and she prefers giving the work to locals so that they will take care of their forests. Tumbes Reserved Zone has always been protected by the State. Before, the army was present for national security reasons, and no one logged. It seems like now that it is a reserved zone, there is logging; both the Peruvians and Ecuadorians are responsible because there is no border control. This is the problem. The governor added, “I am sick and tired of telling the biologist (the protected area’s superintendent) to please, with his nice vehicle, go make a surprise supervision of the control posts and the staff.”²¹

Gravel extraction

Construction materials (sand, rocks, gravel) are regularly extracted from the sector of La Angostura Creek, part of the buffer zone that is very close to the reserved zone. There are many gravel pits along this area, most are non-mechanized, traditional extractions, but there is also heavy machinery, which causes greater impact.



Mechanized gravel extraction (photo © Miguel Moran)



Non-mechanized gravel extraction (photo © Diego Shooobridge)

Many people are concerned with rock extraction from Las Anonas Creek, within the protected area. Extraction permission was given to a Korean company even though no environmental impact study was completed because supposedly rock and gravel materials were needed to strengthen the riparian areas and prevent flooding during a possible El Niño event. The company used heavy machinery to extract the materials.²² Las Anonas has always been a tourist attraction, mostly for people from Tumbes, who would go there to swim and enjoy the waterfalls. But, after heavy machinery worked in the area, the swimming holes and waterfalls are gone and there is nothing special about the area anymore.

The local organization Asociación de Conservación, Educación, Cultura y Turismo Tumpis has suffered damages directly by this rock extraction and the subsequent mess. The organization owns land at the Las Anonas' outlet. They have even solicited permission from the Ministry of Agriculture to acquire additional land (for a total of 20 hectares) in the form of a concession to promote tourism, recreation, and conservation. However, these plans have changed because the swimming pools and waterfalls have been destroyed, and the organization can no longer promote its sustainable development activities in the area.²³

A local conservationist and tourism operator interviewed for this report confirmed that when he enters the protected area with tourists (mostly foreign tourists), they have noticed the changing landscape due to heavy machinery and rock and gravel extraction. Currently, there is a huge pile of rock in a fragile zone. His organization has been reporting this to INRENA for about one year, but they have yet to respond. He said, "This is arrangement was made in Lima, so we are going to go public on a national level with this." He adds, "They are impacting aquatic species like

shrimp and fish, birds and hawks that live in this sector (Pozo Azul) of Angostura. In areas where rocks and boulders are extracted, the creeks are beginning to dry up. In the Las Anonas sector, there was a waterfall. However, the company brought in a Caterpillar, and now there is nothing. They did not respect the waterfalls or anything; the machinery has ruined this popular swimming hole and has altered the landscape. The informant added that he denounced this pillaging and landscape alteration to Tumbes Prosecutor's Office, and Prosecutor Juana Pacaya Mallqui is carrying out the investigation.²⁴

Harvest of non-timber forest products



Honey extraction (photo © Miguel Moran)

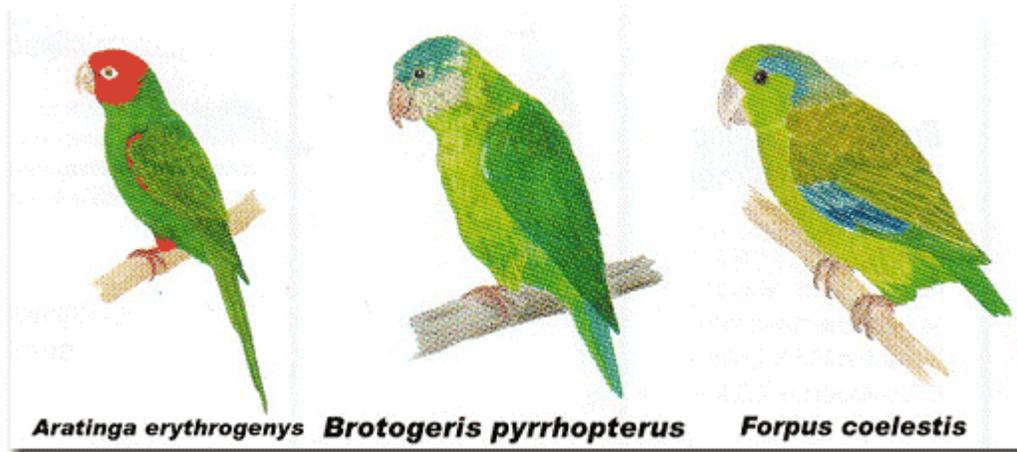
The demand for wild honey is increasingly. It is found either in tree hollows and is known locally as “tree honey,” or in ground hives and is known as “ground honey.” To extract tree honey, the harvester chops down the tree in order to get to the bees in the interior cavity of the tree. To collect ground honey, the harvester digs a large hole in the soil, which contributes to erosion. In the process of collecting honey, the harvester usually destroys the beehive and in some cases, the entire colony dies or disperses after the intrusion. Honey overharvesting has driven most of the wild honeybees out of the most human-influenced areas into the interior of the protected area. The animal herders are now the ones who find beehives within the remote areas of the reserved zone and who extract honey.

According to locals, this honey is very popular. Ecuador is paying higher prices than in Peru, so it is very hard to find honey for sale in the local communities. Also, because the wild honeybees are relatively tame, they are being out competed by more aggressive (non-native) bee swarms escaping from cultivated bees. Wild honeybees can also be raised in smaller hives; this would be preferred since the honey is better quality and has a higher market price.²⁵ Ecuadorians are knocking down trees of 25 to 30 meters in height from within the protected area to harvest honey. They come prepared with weapons, dogs, and axes to carry out their illegal work.

Apiculture has become a popular moneymaking activity in the zone. Beehives can be seen around the communities and in agricultural plots. The bees most often used are Italian (*Apis mellifera*) that have been Africanized, meaning they are mean and attack people and animals. This introduction of non-native bees is creating an imbalance because the native bee species now have to compete for food, habitat, and they could contract the non-natives diseases. Both wild honey extraction and increased domestic apiculture could threaten the native honeybee species within the reserved zone.

Newly hatched parrots are also commonly collected to be sold as pets. Usually, the poacher cuts the tree to reach the parrots—thereby impacting both the individuals and the entire species since he is destroying valuable habitat. Poachers also use nets to capture parakeets. The most sought after species include bronzed-winged parrot (*Pionus chalcopterus*), cherry-headed conure (*Aratinga erythronys*), red-fronted conure (*Aratinga wagleri*), Pacific parrotlet (*Forpus coelestis*), and the grey-cheeked parakeet (*Brotogeris pyrrhopterus*), which is a threatened species.²⁶ Poaching takes place mostly from August to October, with smaller scale poaching in

other months of the year. Each parakeet is sold on the Peruvian border for five soles. Those sold on the international market reap higher prices. Within the reserved zone, most parrots are poached from the Zapallal sector.



*Images from Manual de Identificación de Especies, Tomo I, INRENA * 27*

According to locals, there is less parrot poaching today than in the past because of better regulations, and therefore it is harder to buy them. The fact that poaching is more under control these days does not mean that it is no longer a threat to the wild parrot populations. It is well known that of ten poached parrots only one survives to market. That means that many parrots are still poached from the wild even though they are not for sale. If the demand for parrots on the border does not diminish, poachers will continue to supply them. There is a potential danger that poaching will increase if the price gets better (i.e. demand goes up), poverty increases and people look for alternative income sources, if middlemen get involved, or if other resources decrease.

Timber extraction for charcoal production is another common activity nearby the reserved zone, although it is not as prevalent here as it is in neighboring Cerros de Amotape National Park. The charcoal production process begins by cutting trees to collect firewood, which is the input material, and collecting the top layer of duff from the forest floor—which includes organic materials like leaves, twigs, and dried flowers. This duff is used as fuel to keep the fire burning during charcoal production. By removing the duff, the charcoal producers reduce the amount of organic material available to provide nutrients to the soil, thereby taking away the forest's natural fertilizer. The locals state that firewood and duff collection for charcoal is legal, that there are corresponding permits and plans in places like Peña Blanca or La Angostura, but that there is also illegal extraction in places like Miraflores and close to Pampas de Hospital.

The forestry management plans mentioned previously are also used to produce charcoal. There are approximately 40 forestry management plans and some of those are then used to justify charcoal production even though they were not approved for such uses. Buyers pay locals 8 soles for charcoal and then they travel to Lima to sell it for 100 soles; this poor pay represents an abuse of local people. There are management plans for charcoal production in portions of the following sectors: El Tutumo, Matapalo, Casitas, Vaquería, La Peña, San Jacinto, Peña Blanca, and Miraflores. But, near El Chaylo, Los Encuentros, and Fernández charcoal is produced illegally.²⁸

Locals also engage in subsistence hunting. They kill deer, wild pigs and birds like tinamous and doves. The exact situation regarding fauna hunting is unknown, but according to locals, the hunted species are harder and harder to find. With increased immigration to the zone, especially agriculturalists coming from Piura's highlands, pressure on the native fauna has increased. Another problem are the Ecuadorian hunters. In Ecuador, the natural resources have been severely degraded, and it is hard to find any wildlife there so the hunters cross the border in search of prey. According to an ex-park guard interviewed for this report, there are a lot of Ecuadorian hunters in the sector known as "El Cuacho."

Grazing animals within the protected area

The presence of grazing animals within the protected area has created a tense situation between the area's administration and the herders. Cattle and goat raising are important economic activities in the region. These animals are free-range and feed on pastures and grasses. There are two problems: first, the animals enter and graze within the protected area; and second, some ranchers deforest within the protected area to plant pasturelands so that their cattle and goats have more to graze.



Cattle within the protected area (photo © Diego Shoobridge)

There are at least four pasture areas within Tumbes Reserved Zone. The first is located in the southern part of the reserved zone and it is made up of the following places: Figueroa, Cónдор Flores, Linda Chara, Pan de Azucar and Zapallal. The pasture grass *Panicum maximum* was introduced in this zone and it has expanded due to additional deforestation and burns. This area is distinct since it is semi-managed and the ranchers are somewhat organized. Nonetheless, more pastures are systematically incorporated to the detriment of the forest and there is a

conflict because there are at least 500 heads of Ecuadorian cattle in Bocana Murciélago, where the illegal landholders are putting up fences and they intend to evict the Peruvian ranchers. The second pasture area is found in the forests of Anonas, Quebrada El Tigre, Brunos, Cochass range, Alambique, and Quebrada Angostura. The third is Isla Noblecilla – Balsamal. And, the fourth pasture is in El Caucho and in the following creeks: Faical, las Pavas and los Limones.²⁹

An ex-park guard interviewed for this report added that the "cajamarquinos" (people originating from the region of Cajamarca, Peru) occupy more than 1000 hectares with their cattle and that there are at least 15 families settled within the reserved zone.³⁰ In the sector of Isla Noblecilla, a rancher by the last name of Carrillo, grandson of one of the pioneer ranchers in the region, that belongs to the Rancher Committee "Carmelo Carrillo," confirmed that there are more ranchers in the area and that ranchers from Cajamarca began settling the reserved zone and now compete with the previously settled cattle raisers. The informant blames INRENA, he said, "They bring the cattle from Pampas de Hospital and they scatter them throughout the reserve." He added that

further within the reserve, Mr. Brito has at least 400 heads of cattle, as do Mr. Faría Lavalle, Nimio Zocola and several others.

Guanábano Creek, where clear waters are still seen, is a tributary of Tumbes River in the sector of Rica Playa. During our visit, signs of the existence of cattle were evident all along the trail next to the creek. Vegetation is low enough that people can ride their mules without any obstruction. We only observed one cow present in the creek, there were no goats. According to our guide, during the dry season when pastures are scarce, the ranchers feed them by hay or they enter further into the reserved zone looking for food. During the rainy season when the grasses are green, the cattle are present.

Governor of La Tatora District says that he agrees that people who had land and cattle before the area was declared reserved zone should be allowed to work the land. In the sector of La Cebolla, Balsamar, and Los Palos there are pastures. He told us that INRENA and ProNaturaleza were surprised to learn that there were cattle in those areas.³¹

According to an informant, recently most degradation is occurring in Isla Noblecilla, sector Matapalo. They clear the kapoks and other vegetation and then burn the area so that pasture for cattle will grow. Large expanses of reserved zone forest in Isla Noblecilla are being deforested. Peruvian ranchers from Matapalo and Ecuadorians from the other side of Lajas River are also involved in selective logging to harvest wood.³²



*Introduced pasture grasses for cattle
(photo © Diego Shoobridge)*

Wust describes the scene in his 2003 publication. He said that during a binational expedition in canoe along the Puyango – Tumbes Rivers, deterioration of the dry forests in Ecuador was extremely worrisome. The forests were invaded and burned, extensive pastures for cattle grazing were replacing the grand kapoks and pretinos. Large wounds were opened waiting for the erosive action of the rains. Garbage and pollution was everywhere close to the cities (Wust 2003, pg. 98).

Between Faical and Campo Verde, which is the heart of the reserved zone with high levels of biodiversity and of great scientific interest, there are also a large number of cattle. There were no cattle there before. The cattle are ruining the forest's understory. The cattle demolish everything and enter virgin areas. The ranchers enter the protected area with dogs; if the dog sees a wild pig it chases it and runs around, and finally scares it out of the area. Then, when tourists or scientists enter the area to observe fauna, they don't see anything...INRENA requires that visitors solicit permission to visit the area 48 hours ahead of time. Tourists arrive and they want to visit the area the next day, but it is not enough time to get the permissions. Tourists do not want to wait two full days to receive permission to visit the reserved zone; yet ranchers enter the area without permission. The point is, ranchers can easily enter the reserved zone and they do not contribute anything, rather they harm the area while the tourists have to jump through hoops to enter.³³

Allegedly, the cattle ranchers and to some extent the honey extractors are the ones causing the wildfires in the protected area. The park guards claim that fires occur less frequently, yet this does not mean that fires are not a serious threat to the reserved zone's ecosystems. During the dry season, the air has practically no humidity, which could easily spread destructive fires.



Deforestation within the protected area is carried out to open up new grazing areas in the Isla Noblecilla sector (photos © Diego Shoobridge)

Contamination

There are two main sources of contamination in the zone. First, there is solid waste and garbage produced in human settlements that are not properly treated and are tossed into the open air and second, there is water contamination from gold mining upriver in Ecuador. There is also garbage from Ecuadorian towns that floats downriver into the reserved zone. According to people interviewed for this report, some fragile fish species have disappeared from the river and the endemic crocodile is increasingly hard to find—evidence that contamination is negatively impacting the reserved zone. World Bank and Prodeminca (Environmental Control of



Garbage, solid waste, within the protected area (photo © Diego Shoobridge)

Projects)elaborated an environmental management plan to set up guidelines for environmentally responsible mining in the zone. This document cites research conducted between 1996 and 1998 indicating that the Ecuadorian towns of Portovelo and Zaruma were seriously degrading the aquatic environment and that the water quality of Puyango River (which also borders Peru) was an environmental and political problem to confront.

Among the impacts generated by extractive activities, gravel extraction and mineral processing include deforestation, incessant erosion, noise pollution, excessive dust from heavy machinery, destabilization of the land, accumulation of gravel materials and mineral additives. The primary impacts are related to effluent discharges from mining activity in the Amarillo and Calera Rivers. The ecological effects are severe and drastic. Amarillo River has some fauna, although much less than before when it was clean; Calera River is a dead river, there are no fish or invertebrates.

Of course, contamination extends further than just those rivers. For at least 20 km where these rivers converge, there is no life. A few kilometers more, some of the river's vital signs return: a few invertebrates. Only after reaching 160 km downriver into Peruvian territory does the river's water quality improve. The contamination is from heavy metals like mercury and there are alarming levels of cyanide.

River contamination means that the water is inadequate for agricultural irrigation or recreation. This in turn makes the binational Puyango-Tumbes irrigation project between Ecuador and Peru infeasible.³⁴

Another type of contamination particularly worrisome to local inhabitants is fresh-water shrimp harvesting using chemical poisons. This method kills the shrimp (that are then harvested), and also destroys the ecosystem and kills off other species like the *Chaetostoma micropf* that is no longer found in the rivers or creeks. The chemical poison does not just disappear after its application; it settles in the sediments and contributes to bioaccumulation. The rivers and creeks on their own cannot recuperate. The shrimp harvesters are well aware of the damage they are causing; after all, they carry out this illegal activity at night.

Future threats

Future threats to the zone include:

- Worsening of current threats
- Protected area reduction

Worsening of current threats

In the short term, if timber extraction, unregulated grazing animals, commercial extraction of non-timber forest products, gravel extraction, and river contamination continue, the reserved zone will be seriously threatened and impacted. It appears as though the activities are continuing and in some cases expanding; if they are not stopped and managed immediately, the protected area is at risk of losing its biological richness and ecological integrity.

Protected area reduction

The current categorization proposal for the reserved zone is to include it as part of Cerros de Amotape National Park. This would provide stricter protection, restricting activities that are currently threatening the area and permitting only ecotourism and research.³⁵ Knowing that these restrictions would be put into place, the proposal also recommends removing the communities of Isla Noblequilla and La Angostura from the new national park thereby reducing the protected area's size. This is proposed so that the inhabitants will be outside of the national park and can continue to use the natural resources of the area since those won't be protected. It seems as though the price Tumbes Reserved Zone will pay for stricter protection is less actual area protected.

Before this territory reduction occurs, several inhabitants and land speculators seek to benefit by gaining land parcels. They are deforesting and opening up agricultural areas so that once the protected area is reduced and the lands they are claiming are outside of the protected area, they can sell the land. This deforestation and opening up of agricultural parcels within the protected area could result in even less territory for the new protected area limits since the locals might claim that their land includes everything that has been deforested. Since there is deforestation deep within the protected area, the new protected area boundaries could be reduced even further than the current proposal suggests.

The process to recategorize the reserved zone should be conducted in consultation and coordination with involved stakeholders so that the new protected area limits are decided by consensus and the new natural resource use restrictions are clearly understood. As of right now and during the entire categorization process, deforestation, new human settlements, and grazing animals within the reserved zone must be stopped. In addition, illegal resource extractors need to be identified and retained.

Recommended solutions

Timber extraction

The hardwood flooring sawmills need to be controlled and regulated. Their documentation should be in order and the mill needs to operate according to established norms. Wood destined for each mill needs to be verified; authorities need to check wood origin, if it is coming from properly managed concessions, verify the species, and volumes, and transport permits.

The threatened, vulnerable or endangered species need to be respected. This is the case for the species *Alseis peruviana*. Harvesting of this species should be strictly prohibited; to ensure this, management plans and regulation systems need to be established. Police and local authorities need training to be able to differentiate between species and therefore exercise more effective control.

Concessions and management plans should be cancelled. Even though it seems like these concessions were granted formally, in practice, they are not functioning and harvesters continue to extract from outside of the managed area. The general public and local authorities (including the police and army) need to be informed of the cancellations so that they no longer serve as an excuse to log indiscriminately. Future management plans should only be approved for areas outside of the protected area and they must be strictly regulated and monitored.³⁶

Priority should be given to local inhabitants when it comes to assigning timber concessions. An urgent training program is needed for locals involved in timber harvesting and a general environmental education program is needed for the population at large that emphasizes the importance and value of the forests and resources and the importance of management and conservation.

Competent professionals, such as forestry engineers with professional certification, should design the management plans and they should cover all the requirements mandated by law. INRENA's forestry sector responsible for approving and supervising the management plans should better analyze the proposals and consult with INRENA's Natural Protected Areas Agency before approving them. The forestry sector should also carry out corresponding monitoring of the application of the management plans to verify that they are following the guidelines set forth in the plan. The Natural Protected Areas Agency should do its part by ensuring that timber from the interior of the reserved zone is not harvested; they need to better monitor the concessions closest to the protected area.

Efficient control of forest resources is urgently needed. Informative campaigns should be carried out in the local community to discourage outsiders from entering the protected area to harvest wood. The message of such a campaign should be clear: timber harvesting is a restricted activity. It should also emphasize that subsistence level use of timber is not the major problem, it is the overexploitation for commercial purposes that needs to be limited.

The borders need to be urgently controlled in order to block Ecuadorian harvesters. Specific instructions should be given to the border army and police troops. Covert timber trucks should be destroyed and abandoned so that the illegal harvesters cannot continue to use them to transport illegally acquired wood.

Sustainable resource use must be promoted and destructive timber harvesting techniques need to be stopped. Small tree removal should be avoided to allow natural forest regeneration. Chainsaw use should be limited; while cutting a tree with a chainsaw is appropriate, cutting the boards should not be done with chainsaw since it generates too much waste.

The Technical Administration of Forestry and Fauna Control in Tumbes needs more logistical support so that they can have capacity to carry out their field duties and maintain constant presence at the control posts. INRENA's Forestry Office should maintain close coordination with the Natural Protected Areas Agency to better control and utilize logistic resources.

INRENA needs to carry out an information campaign explaining its different agencies—specifically, they need to describe the roles and tasks of the Natural Protected Areas Agency and the Forestry Office and what responsibilities the citizens have to each.

Locals should have a more active role when it comes to security and denouncing illegal wood trafficking. Local control and security committees formed by the communities should receive support and training. We suggest promoting these grass-roots committees in places where they do not exist. These committees should coordinate directly with INRENA's Natural Protected Areas Agency and its Forestry Office. These committees should be backed by corresponding legislation and should receive control and monitoring support. Local governments should be informed and coordinate with the committees regarding management plans and local control.



The Mayor of Matapalo expressed disagreement with the way INRENA operates. He said that the organization comes and makes decisions and then works in isolation, and that is not right. He believes that INRENA from the start should create awareness within the community, and begin to help the situation with projects and alternatives because as he says, many people have lived off of timbering for many years but INRENA has never tried to create awareness of the problem. They have also mistrusted INRENA because one agency lets them harvest and other doesn't. He said that his community wants to do projects; for example, there is a lot of kapok in the zone and they could do a project using the cotton-like fiber from the kapok seeds to produce mattresses and pillows. Or, another suggestion he had was to fence-in the cattle and establish intensive-cattle raising, as opposed to the current extensive method that is destroying the zone.³⁷

The Regional Director of Tumbes Regional Government's Natural Resources and Environmental Management Office emphasizes that it is important to remember to include all the communities, because if one town, such as Casitas, develops an alternative project, another town, such as Chailo, is left out. And, that is where hardwood extractors—who have never had any other opportunity—operate. He adds that they are extremely worried about forestry activities in the zone, and that is why the regional government is going to regulate it within a regional planning context. He informed us that the regional government is going to ensure that the traditional timber harvesters will be the ones to get the concessions, to use the wood and the non-timber forest products. He said it is a priority for the Regional Government. He adds that they will work with all the institutions, like INRENA, in order to achieve this goal. He believes that they need to change the focus, change the treatment of the management plans as instructed by INRENA in Lima since thus far, it has only benefited outsiders and not local people from Tutumo. He said that the regional government will try to regulate the situation so that the local population benefits. He said, "I am sure we will come to an agreement with INRENA and we are going to incorporate all the positive energy coming from local organizations and local people to make decisions that will benefit them and the area's biodiversity. I strongly believe that we will see positive, tangible results in the near future. In the short term, we will have to stop the advance of destructive activities like migratory agriculture and indiscriminate deforestation in the natural protected areas. I believe that we will reverse the situation in time, there are serious problems and dangers, but I think we still have time to reverse this. Of course, it also depends greatly on the predisposition and political will of the national authorities."³⁸

Gravel extraction

Currently, gravel extraction occurs in the buffer zone and not in the interior of the reserved zone. The extractors in the buffer zone are rather strong. In the La Angostura Creek we confirmed the presence of five or six non-mechanized extraction mines and preparation areas. There is also one large-scale extraction mine that uses heavy machinery and has an operations center.

The gravel extraction occurs in the buffer zone because of legal uncertainty that leaves questions regarding which institution has jurisdiction and responsibility to manage and control the buffer zones. In many cases, when there are illegal extractions or other violations, the Forestry Office claims that the Natural Protected Areas Agency is responsible and vice versa. Since this buffer zone issue has not been clarified at the national level, at least INRENA of Tumbes should internally coordinate efforts to minimize uncertainties, avoid confusion, and more efficiently enforce prohibited activities. The fact that any intervention must be carried out with the help of the Prosecutor's Office and the National Police reemphasizes the need for detailed, interinstitutional coordination.³⁹

Authorities need to verify whether or not the gravel extractors comply with legal requirements and if they have corresponding permits to extract the material. In addition, environmental impact studies should be conducted for each mine and then subsequent compliance with environmental management plans. INRENA should coordinate closely with the Ministry of Energy and Mines to follow-up on the environmental impact studies and to be on top of the Ministry's monitoring activities.

In the case of small-scale, low-impact traditional mining, a full environmental impact study is not justified. Instead, these gravel mines should present to the Ministry of Energy and Mines an "Environmental Impact Declaration" as is required by law. The declaration should specify the following issues: volume of material to be extracted, volume and location of waste pilings, information on the concession, and details of the foreseen impacts of the activity. INRENA should check these Environmental Impact Declarations before they are approved (when the proposed mining activity is in a buffer zone). In addition, strict control and enforcement of the laws and regulations are needed, as well as enforcement of the obligations detailed in the Environmental Impact Declarations.⁴⁰

Harvest of non-timber forest products

All illegal harvesting of non-timber forest products should be controlled and eventually stopped entirely. Allowed extractive activities within the protected area should be limited and follow established regulations. Article 107 of the Natural Protected Areas Law 26834 specifies that harvest of non-timber forest products, for auto consumption or commercialization, should follow guidelines set forth in the master plan, must abide by corresponding management plans, and priority should be given to local people. The impact on wild flora and fauna must be considered when harvesting non-timber forest products, such as in the case of honey. A harvesting contract should be drafted according to the guidelines established in the master plan.

Article 111 of the Forestry and Wildlife Law establishes that forest products, unlike timber, can be collected and permission granted as long as the collection does not cause deforestation or destruction to standing trees, does not provoke alteration of the forest cover, and does not negatively impact the wildlife. Thus far, the honey extraction methods have not followed these established requirements. An extensive educational campaign is needed to raise awareness among the local inhabitants that they should carry out a controlled harvest and follow the guidelines. INRENA should clarify and publicize the necessary requirements and procedures for harvesters to legalize their activity. At the same time, there should be an interdiction program to stop commercialization of wild honey. The police and border security should be informed and trained to carry out continual control operatives.

Apiculture is an alternative to produce honey and reduce pressure on the native, wild honeybees. Nonetheless, the apiculturists must demonstrate that they have sufficient knowledge to manage the bee panels. Untrained apiculturists cause the most damage to their cultivated hives as well as to wild honeybees. They should demonstrate that they have sufficient knowledge to maintain sanitary hives and avoid disease propagation. They should also be able to guarantee that they can keep their bees contained so that swarms will not escape and displace native bees.

The legislation also addresses wildlife use, both commercial and non-commercial uses. First of all, we do not recommend parrot collecting for the pet trade; however, for those people already involved, they should follow the norms. They should be registered, present their plans, obtain corresponding permits and they should be strictly monitored by a competent INRENA agency. They should also carry out evaluations of target wildlife species as part of the required environmental impact study.

Article 108 of the Natural Protected Areas Law establishes that wildlife use from within protected areas is permitted as long as the populations are healthy and the use is compatible with the protected areas' category, master plan, zoning, and specific management plan. Wildlife farming is an interesting alternative to diminish pressure on the wild populations and it could be promoted in the region for certain species following established legislation.

Firewood extraction for charcoal production should be strictly regulated. This activity should be limited to the guidelines set forth in the required management plans. Volume limits and permitted species should be followed. Tree selection should be done carefully. Charcoal producers should be encouraged to reforest certain zones and to care for the forest. In addition, from a public health standpoint, the producers themselves should receive nasal protection masks to prevent lung damage from inhaled smoke. Mutually beneficial actions like these could help both the producers and INRENA make concessions to better meet their respective goals.

Hunting should be done sustainably. To do so, research is needed regarding the current state of target species and the populations' general ecological characteristics. Subsistence hunting is permitted but it should be conducted according to the master plan and according to traditional methods as long as they are not explicitly prohibited or target endangered species. Commercial hunting needs to be stopped. There should be an intense environmental education campaign directed at the hunters (suppliers) and the buyers (the demand side).

Grazing animals within the reserved zone

Because the reserved zone is a transition category, permitted and prohibited uses are not entirely defined. In this case, Tumbes Reserved Zone took a precautionary approach to allow pre-existing traditional use (before the area was declared as a protected area) and restrict all other uses until the final categorization was determined and the final permitted resource uses could be determined according to the new category. Because the proposal for Tumbes Reserved Zone is to incorporate it into Cerros de Amotape National Park, all direct uses would be prohibited—including grazing. The situation is more complicated however, since some of the grazing animals were present within the interior of the area before it was declared a reserved zone and therefore, the ranchers have certain grandfather rights that protect them from direct eviction. And, there are

new ranchers from Ecuador and the highlands of Cajamarca and Piura putting their animals in the protected area to graze.

New ranchers must be prohibited from entering the protected area with their cattle and goats. Any rancher who entered the protected area after it was declared should be removed and evicted. Those present before the protected area was created should carry out sustainable management, complete with management plan, corrals, grazing rotations, and formal registration of number of animals, at least until the new protected area category is determined. If the ranchers do not follow

through with the obligations established in the management plans, they should be evicted from the area. As soon as the reserved zone's final category is determined, the master plan must regulate the activity and establish new guidelines and requirements.



*Goats inside the protected area
(photo © Diego Shoobridge)*

The ranchers' use of dogs needs to be monitored. We recommend restricting the number of dogs permitted in the reserved zone. We also recommend that the owners assure that their dogs are disease-free in order to avoid wildlife contamination. Ranches should not be allowed to carry any tool unrelated to grazing, such as axes, and chainsaws, among others.

Ecuadorian ranchers should be prohibited. The national police and the army responsible for border control should be instructed and trained to stop Ecuadorian cattle-raisers from crossing the border. INRENA should coordinate with both institutions and provide institutional and political support to implement this measure.

Actually, the protected area's administration has already ruined relations with the National Ranchers Society (SONAGAN). There is no dialogue between the two groups and actually there is no communication at all. INRENA needs to change this negative and inefficient policy and reestablish communication with this group. It is a fact that there are ranchers in the protected area and INRENA needs to learn how to deal with this reality and take the lead to improve the situation. Essential components include keeping communication channels open and continued dialogue.

Good relations and open dialogue will help the reserved zone's administration coordinate directly with cattle owners and the people using the protected area to avoid indiscriminate use and negative impacts on the resources. Regulations and a concrete management plan for grazing animals are needed. We suggest coming to agreement on temporary use of the land, with rotating schedules. The system needs to be evaluated and adapted if need be.

Once agreements are reached with ranchers, the area's administration needs to enforce the stipulations of the agreements. They should round up stray cattle, capture cattle in unapproved areas, and fine the rancher for each captured cow or goat. To do this, an organized system of fines and fees needs to be established and legitimized by a resolution (at the Ministerial,

Directorial, or Departmental level), which would allow park guards to implement the system. The system would need to include a specific list of violations and the amount of fines. It should be promulgated as soon as possible. The area's administration should strictly implement the regulations and prohibit the ranchers from transgressing.

The protected area is the entire country's natural heritage. Those people using the protected area for their personal benefit are doing so at a great societal and environmental cost. Therefore, a compensation and auto-financing system is needed. We recommend implementing fees for pasture use within the protected area. Regulations should be established and user fees per head of cattle determined. The costs do not have to be so high that they are prohibitive; rather they should reflect the economic situation of the area and be relative to the ranchers' earnings.

Eventually, if the reserved zone is recategorized as a national park, the grazing animals should be removed from the protected area and alternatives should be proposed to facilitate their departure. For example, water holes could be constructed in the lower altitudes (outside of the protected area) to provide irrigation for year-round pasture and thereby eliminate the need for ranchers to go to the protected area for green grass during the drier months.

Contamination

The corresponding municipalities should deal with the garbage and solid waste from their territories. The municipalities and rural authorities would need training and consultants to help them confront their jurisdictions' garbage problems. The training should include topics that would help them select alternatives, such as collection, final disposal, separation of garbage, and sanitary dumps.

Tumbes River contamination is more complicated since the problem involves Ecuador and therefore the solution depends on more than just the Peruvian authorities. Any attempt to resolve the issue should be coordinated by the Ministry of Foreign Affairs and should be considered within a bilateral development program.

The environmental management plan elaborated by World Bank and Prodeminca in Ecuador suggested relocating the mining processing plants. The municipalities of Zaruma and Portovelo have made certain attempts to relocate their mineral processing plants to other areas. Nonetheless, these relocations have actually created greater problems because they have been moved too close to streams and the residuals continue to flow into the basin. This has created the need for new storage areas, which has generated new deforestation in previously intact areas.

Therefore, new processing plants are urgently needed in properly selected areas and the operations located in isolated areas need to be relocated so that their waste can be properly managed. Concentrating these activities in one area would increase the capacity to recover heavy metals, treat the water, collect the waste more efficiently, and better administer and regulate the chemical processes used.

Cyanide is a hard-to-recycle contaminant for the treatment plants. But, as described in the management plan, the processing plants could reuse the cyanide by installing activated carbon cells, thereby creating less waste and contamination.

This same document cites Portovelo-Zaruma as an example of the environmental problems associated with small-scale mining where individual miners cannot manage the measures to implement treatment plants because they are too small and do not have the financial resources. This is a serious problem for the authorities and the environment.⁴¹

The chemical poisons used to harvest fresh water shrimp have contaminated the area's wells, creeks, and rivers thereby breaking the law.⁴² The authorities should adopt a firm policy and sanction anyone found poisoning the waterways. Interinstitutional coordination is essential in order to implement the existing legislation and stop this type of contamination. Institutions such as the protected area's administration, political and judicial authorities in the region, the National Police, the Sub prefect, Justice of the Peace, etc. should be included. The authorities should publicize that anyone caught poisoning the waters will be put in jail. INRENA and the police should try to set a precedent and capture someone as soon as possible so that the local community will know that they are serious. Hopefully this will discourage other potential violators from continuing to poison the creeks and harming wildlife.

Many locals recognize that the chemical poisons have practically eliminated shrimp from the rivers. They comment that they can no longer find shrimp in the creeks or fresh water pools. This is also true for other fish species. An exhaustive study is needed of the fresh-water shrimp (called "Chicama" locally) to determine the number of remaining individuals and understand its ecological aspects (such as fecundity, longevity, mating rituals, feeding habits, natural enemies, mortality, diseases) for its management. The creeks also need to be evaluated; specifically a sediment analysis and benthic study is needed to evaluate the amount of chemical residuals. Other species such as the *Chaetostoma micropf*, should be evaluated as well.



View of Tumbes River, upriver of the Rica Playa sector within the reserved zone (photo © Diego Shoobridge)

Conclusions

The zone, with its characteristic landscape scenery, is a very special place of great conservation importance. The forests harbor important biological diversity and it is a unique ecosystem in Peru.

The most serious and prevalent threat to the reserved zone is illegal logging. Hardwood flooring producers and the Ecuadorian market demand large quantities of timber. Extractors load their wood onto donkeys and use the many trails throughout the zone to get to Ecuador to sell the wood. The forestry management plans are technically deficient and they have caused a number of problems regarding place of harvest; much timber is even harvested from within the protected area as if it came from a managed concession. Other threats to the area include systematic extraction of gravel and building materials, overharvest of non-timber forest products such as honey and parrot poaching, charcoal production, and hunting.

The presence of grazing animals within the protected area has created a tense situation between the cattle ranchers and the protected area administration. Cattle is an important economic activity in the region, yet the people with cattle let them graze protected area pastures and grasses, thereby impacting the reserved zone. The biggest problem now is that additional ranchers continue to immigrate to the region and they are deforesting large expanses of forest to plant pasture for cattle.

There are two main sources of contamination in the zone. First, there is solid waste and garbage produced in human settlements that are not properly treated and are tossed into the open air. Second, there is water contamination from gold mining upriver in Ecuador. There is also garbage from Ecuadorian towns that floats downriver into the reserved zone.

Urgent attention is needed to reduce these threats to the protected area. Forestry activities should be better regulated. The hardwood flooring producers and sawmills must be regulated. Any future forestry management plans approved should be regulated and closely monitored. INRENA's Forestry Office should monitor the application of the management plans in practice and verify that the concessionaires are complying with the stipulations set forth in the plans. In addition, concession priority should be given to local people. A training program is urgently needed for those people already in timber harvesting, and an environmental education campaign is needed to raise awareness with the rest of the community. Better border control is needed to prevent Ecuadorian loggers from entering the protected area. Sustainable resource use should be promoted and destructive logging techniques prohibited. The local people should have a more active role when it comes to security and denouncing illegal timber trafficking.

Authorities need to verify whether or not the gravel extractors are following legal requirements and if they possess the corresponding permits to extract the material. They should also have to comply with the requirement of completing environmental impact studies for each mine/gravel pit and the respective management plans.

All illegal harvesting of non-timber forest products should be controlled and eventually stopped entirely. Allowed extractive activities within the protected area should be limited and follow established regulations. At the same time, there should be an interdiction program to stop commercialization of illegally extracted forest products. The police and border security should be informed and trained to carry out continual control operatives. More detailed studies should be completed on the resources harvested from the zone.

Animals, both cattle and goats, must be prohibited from grazing in the protected area. The ranchers who arrived in the zone after the protected area was declared should be removed and

evicted. The ranchers who arrived before the zone became protected should sustainably manage their cattle and pastureland at least until the protected area is recategorized and final regulations put into place. An organized, regulated sanctions program is needed, legitimized by an INRENA resolution, which allows park guards to fine ranchers who let their cattle graze in off-limit zones. Ecuadorian ranchers should be prohibited.

The municipalities should treat the garbage and solid waste produced in their jurisdictions. Since using chemical poisons to harvest fresh-water shrimp is against the law, the authorities should punish violators to the full extent, jailing them and making an example of them. Tumbes River contamination is more complicated since the problem involves Ecuador and therefore the solution depends on more than just the Peruvian authorities. Any attempt to resolve the issue should be coordinated by the Ministry of Foreign Affairs and should be considered within a bilateral development program.

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Acknowledgements

Miguel Morán Morán: ParksWatch – Peru field assistant, assistant photographer, and helped collect information for this report.

Norma Alzamora Remicio helped systematize the bibliographical information.

Notes

¹ <http://peru.gotolatin.com/spa/Guide/PeruNationalParks/Tumbes/Tumbes-1.asp>

² <http://peru.gotolatin.com/spa/Guide/PeruNationalParks/Tumbes/Tumbes-1.asp>

³ Diagnóstico del estado de conservación de los recursos naturales renovables en la región Tumbes: Teoría y realidad. Un aporte al proceso de posicionamiento de competencias y funciones ambientales del Gobierno Regional de Tumbes. Manuel Leiva Castillo. Documento interno. Diciembre 2002. Pág. 7.

⁴ Tumbes Reserved Zone is different from other reserved zones that have been created via Supreme Decree because it was created by a Ministerial Resolution and as a complementary action to the anti-deforestation regulations.

⁵ Diagnóstico del estado de conservación de los recursos naturales renovables en la región Tumbes: Teoría y realidad. Un aporte al proceso de posicionamiento de competencias y funciones ambientales del Gobierno Regional de Tumbes. Manuel Leiva Castillo. Documento interno. Diciembre 2002. Págs. 7 – 9.

⁶ ProNaturaleza provided the information via e-mail on November 21, 2003. For more information, contact: Kjeld Nielsen Communications Coordinator with Pro Naturaleza knielsen@pronaturaleza.org

⁷ Informal conversation with Field Technician from the Special Land Titling Project (Proyecto Especial de Titulación de Tierras PETT), Sr. Coveñas, on October 4, 2003 at El Tutumo.

⁸ Interview with the Mayor of Matapalo, Mr. Juan Miguel Feijoó Navarrete, on October 3, 2003 in Matapalo Municipality.

⁹ Interview with ex-parkguard Santos Peña.

¹⁰ Diagnóstico del estado de conservación de los recursos naturales renovables en la región Tumbes: Teoría y realidad. Un aporte al proceso de posicionamiento de competencias y funciones ambientales del Gobierno Regional de Tumbes. Manuel Leiva Castillo. Documento interno. Diciembre 2002. Pág. 9.

¹¹ Interview with Mr. Alan Feijoo, President of the Cultural Association, Asociación Cultural, de Turismo Científico y Conservación Cardos Azules de Pampas de Hospital, on October 3, 2003.

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¹³ Diagnóstico del estado de conservación de los recursos naturales renovables en la región Tumbes: Teoría y realidad. Un aporte al proceso de posicionamiento de competencias y funciones ambientales del Gobierno Regional de Tumbes. Manuel Leiva Castillo. Documento interno. Diciembre 2002. Pág. 15.

¹⁴ From the Book: Santuarios Naturales del Perú. Paracas y las áreas protegidas de la costa. Walter Wust. La República, Ediciones Peisa, 2003. Pág. 95. Eulogio Peña, was a forestry technician with the Agrarian Office in Tumbes, before INRENA maintained presence.

¹⁵ Interview with the lieutenant governor of El Tutumo, Mr. Desiderio Mendoza, on October 2, 2003.

¹⁶ Ex volunteer park guard Ismael Lobeñas, October 3, 2003.

¹⁷ Interview with district governor of La Tatora Mr. Jesús Domínguez, on October 2, 2003.

¹⁸ Interview with ex-lieutenant governor of El Tutumo, Mr. Ramón Serna Vilela, on October 3, 2003.

¹⁹ Interview with mayor of Matapalo District, Mr. Juan Miguel Feijoó Navarrete, on October 3, 2003.

²⁰ Interview with ex-parkguard (INRENA) Mr. Santos Peña; on October 6, 2003.

²¹ Interview with Matapalo District Governor, Marina Velásquez Carrillo, on October 3, 2003.

²² The ex-park guard Santos Peña confirms that the area's director, biologist Fernando Cuadros authorized the rock extraction and then he cleared his name by blaming the El Niño phenomenon. He said that they have witnessed other phenomenons and they have never had to remove gravel or rock. Cuadros made a deal with Merino, the business man wanting to extract the material. Cuadros was told and he responded that he would give him three more days.

²³ Asociación de Conservación, Educación, Cultura y Turismo Tumpis. Contact: Johnny Saldarriaga Boyer email: acectum@hotmail.com

²⁴ Interview with Mr. Alan Feijoo, President of Asociación Cultural, de Turismo Científico y Conservación Cardos Azules de Pampas de Hospital, on October 3, 2003.

²⁵ Interview with Mr. Estudillo, goat herder in El Ciénago, on October 25, 2003.

²⁶ *Brotogeris pyrrhopterus* is a species listed as threatened in Supreme Decree Number 013-99-AG. For more information, refer to the Species Identification Manual (Manual de Identificación de Especies Tomo I, vertebrados del calendario de caza comercial.) INRENA, Lima, 2003.

²⁷ Images are from Manual de Identificación de Especies Tomo I. Vertebrados del calendario de caza comercial. Intendencia Forestal y de Fauna Silvestre, INRENA. Lima 2003. Pages. 16, 19 and 20.

²⁸ Interview with Mr. Antenor Vilela Morán of the Centro Eco-Paleonto Arqueológico Tumbes, on October 7, 2003.

²⁹ Diagnóstico del estado de conservación de los recursos naturales renovables en la región Tumbes: Teoría y realidad. Un aporte al proceso de posicionamiento de competencias y funciones ambientales del Gobierno Regional de Tumbes. Manuel Leiva Castillo. Documento interno. Diciembre 2002. Pág. 25.

³⁰ Interview with Ex-park guard Fernando Cedillo, on October 5, 2003. Cajamarquinos: those coming from the Andean Department of Cajamarca in Northern Peru.

³¹ Interview with District Governor of La Tatora Mr. Jesús Domínguez, on October 2, 2003.

³² Interview with Mr. Alan Feijoo, October 3, 2003.

³³ Interview with Mr. Alan Feijoo, October 3, 2003.

³⁴ Plan Ambiental para Minería Aurífera Artesanal en Ecuador. Rehabilitación de Cuencas. Autores: Hakan Tarras-Wahlberg, Bo Lundberg, Ricky Collins and Carlos Páez. Study conducted between 1996 and 1998 in the basin of Puyango River (Ecuador) and its tributaries Amarillo and Calera.

³⁵ Article No. 50 of the regulations of the Natural Protected Areas Law (Reglamento de la Ley de Áreas Naturales Protegidas), Supreme Decree No. 038-2001-AG of June 22, 2001 establishes that national parks protect the ecological integrity of one or more ecosystems, flora and fauna associations, and evolutionary processes, as well as associated aesthetic, landscape and cultural characteristics. In these areas, new human settlements and natural resource use are prohibited. Permitted activities include scientific study, educational activities, tourism—all under INRENA regulations of course. Scientific use is given priority to all other public uses.

³⁶ Article No. 63 of the regulations of the Natural Protected Areas Law (Reglamento de la Ley de Áreas Naturales Protegidas), Supreme Decree No. 038-2001-AG of June 22, 2001 refers to forestry activities in the buffer zones of protected areas. It establishes that management plans for forestry activities need to consider the activities within the buffer zone. Forestry activities should take into account the special conditions of the protected area and its buffer zone in order to be compatible.

³⁷ Interview with District Mayor of Matapalo, Mr. Juan Miguel Feijoó Navarrete, on October 3, 2003.

³⁸ Interview with Manuel Leiva Castillo, Regional director of Tumbes' Regional Government's Office of Natural Resources and Environmental Management in Tumbes, October 6, 2003.

³⁹ Article No. 25 of Law No. 26834, Natural Protected Areas Law of June 17, 1997 establishes that buffer zones are the areas next to the natural protected areas within the protected areas system, that, for their nature and location require specie treatment in order to guarantee the protected area's conservation. Each protected area's master plan will define the extension of the buffer zone. Activities conducted in the buffer zone should not threaten the protected area. Additional articles refer to the buffer zones: No. 61 of No. 64 Regulations of the Natural Areas Protected Law, Supreme Decree No. 038-2001-AG of June 22, 2001.

⁴⁰ For more information, refer to the following laws: Law No. 27446, passed April 23, 2001, which is the Environmental Impact Evaluation Law. Law No. 27651, passed January 24, 2002, Small Mining Promotion Law and its regulations Supreme Decree 013-2002-EM created April 21, 2002. General Mining Law, Supreme Decree 014-2002-EM. Title 15 of General Mining Law's regulations regarding the environment, Supreme Decree 016-93-EM. Article No. 64 of Natural Protected Areas Law, Supreme Decree No. 038-2001-AG of June 22, 2001 refers to environmental impact studies for buffer zone activities and INRENA's technical approval.

⁴¹ Plan Ambiental para Minería Aurífera Artesanal en Ecuador. Rehabilitación de Cuencas. Autores: Hakan Tarras-Wahlberg, Bo Lundberg, Ricky Collins and Carlos Páez. Study conducted between 1996-1998, in the Puyango River basin Ecuador, tributaries Amarillo and Calera.

⁴² Fishing with toxic substances is an illegal act. See Penal Code, Article 309 regarding illegal extraction of aquatic species, which says, "Anyone who extracts aquatic flora and fauna species during prohibited seasons, in prohibited quantities, or from prohibited zones, or who extracts prohibited species will be jailed for 3 years." Agreements: Law No. 8002 (February 23, 1935) Prohibits use of explosives or toxic substances for fishing in the sea, rivers, lakes, modified by Law No. 8543 (June 4, 1937) and No. 10932 (December 17, 1948). Supreme Decree 004-99-PE (March 28, 1999) General Regulation for environmental protection for fishing and aquatic activities, Article 6, Supreme Decree No. 008-2002-PE (June 27, 2002) Inspection regulations and procedures for sanctions with fishing and aquatic activities, Law No. 25977 (December 21, 1992) General Fishing Law.

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Date published: May 2005