

The Tres Chimbadas Otter Project

Wildlife Ecology, Tourism, and Conservation in the Peruvian Amazon

Hey! Thanks a lot for your interest in helping out one of the most appealing and amazing animals in the Amazon. The first thing for you to do to help these water-loving giants is to learn a little about their ecology—basically who they are and what they do in their environment.

The Giant River Otter and his Family around the World

Lineage

The Giant Otter, *Pteronura brasiliensis*, is one of thirteen species of otters in the world, which together make up the Otter Sub-Family Lutrinae. Otters are mammalian carnivores belonging to the Family Mustelidae, which includes minks, badgers, porcupines, skunks, weasels, ferrets, and tayras, the Giant Otter's terrestrial cousin here in Peru. Otters are widely distributed all over the world except Australia and Antarctica, where placental mammals have been absent or limited, at least until the last couple hundred years. As a group, Lutrinae are highly adapted to life in the water, they usually occupy the top trophic position in ecosystem food webs, and they are highly endangered all over the world.

Morphology and Appearance

Like other members of the weasel family, otters have long, sleek curving bodies and short limbs. A testament to their adaption to aquatic environments, the head and torso of Giant Otters have been described as torpedo-shaped. In the water, their main power is provided by a large and muscular tail shaped like a paddle, about half a meter long; their short arms and legs mainly just help steer when in the water. Body length of Giant Otters including the tail is close to that of humans, usually from 1.5 to 1.8 meters in males, and 1.5 to 1.7 meters in females. (Carter and Rosas, 1997; Duplaix, 1980). Lengths of over 2 meters are also commonly reported, and even up to 2.4 meters (about 7.5 feet!) are recorded historically (Carter and Rosas, 1997). Body weight is about the same as a large dog, generally ranging from 26 to 32 kilograms in males and 22 to 26 kg. in females; the heaviest individual recorded weighed 34 kg. (75 pounds). Giant Otters are light brown when dry—but more often appear shiny black, when wet—except for their necks, which are splotched blond. These irregular blond “throat markings” are the Giant Otter's fingerprint; they are different and unique for each individual, and can thus be used to identify and tell individuals apart. (Duplaix, 1980; Carter and Rosas, 1997)

Geographic Range and Habitat

Giant Otters are endemic¹ to the South American tropics. Highly adapted to aquatic environments, they were historically inhabited over half of South America, from the Caribbean coast to northern Argentina, and from the Andes to the Atlantic. They were abundant throughout the freshwater streams, rivers, and lakes of the Amazon, Orinoco, and La Plata river basins, as well as Surinam and the Guyanas. Giant Otters prefer black-water habitats with slow moving, shallow, and relatively clear water. In Peru, Giant Otters concentrate their habitats in oxbow lakes—former sections of river separated when the river changed course. Even so, rivers are still used, especially to travel from one lake to another.

Giant Otters have possibly the smallest home ranges of any top predator in the world, with a family group of up to 12 individuals able to live indefinitely in an area just over a square kilometer. These are regularly marked with communal latrines on the banks of the body of water, and are not shared with other groups. (Duplaix, 1980; Schenck and Staib, 1994) Giant Otter latrines are conspicuous, circular or rectangular areas several meters squared, which are cleared of vegetation and leaf litter, littered with fish scales, and if freshly used have a pungent odor that can be smelled many meters away (Duplaix, 1980).

Ecology

Known locally in Spanish as “Lobos de Rio,” or “River Wolves,” much of the Giant Otter’s behavioral ecology does resemble that of wolves or dogs. Giant Otters live in family groups, typically totaling anywhere from 3 to 10 individuals, which are made up of one reproductive pair and their offspring from up to the last four years. The entire family group spends most of their time as a cohesive unit, swimming, hunting, marking territory, resting, and playing together. Even though they hunt as a team, only in rare cases will an individual share the fish s/he catches, other than with young cubs.² While the majority of each day is typically spent in the water fishing, Giant Otters also emerge out of the water on to the shore or partially submerged logs, and exhibit “extracurricular” social behavior such as grooming, play-wrestling and play-chasing, with the whole family including parents participating in play.

Giant Otters are extremely active and strictly diurnal, spending as much as 8 hours hunting for fish each day, consuming about 20% of their body weight each day, about 10 pounds of fish per otter. They den at night in one of several burrows kept along the banks within their territory. These dens may have several openings, each usually just big enough for an adult to pass through. Inside they open up to be able to fit a whole family of 6 foot long otters, about 10 individuals in the case of Tres Chimbadas. In Peru, over 99% of *Pteronura*’s diet is fish, but they have also been observed to occasionally prey on caiman (South American crocodilians), aquatic birds, frogs, and anaconda (Brecht-Munn and Munn, 1988), as well as crustaceans in Surinam and other more coastal environments (Duplaix, 1980). They are prey specialists: In southeastern Peru over 3/4 of their diet was found to be comprised of only two different species of fish (Schenck, 1999). Scat analysis has shown that 55% of the Giant Otter’s diet in Tambopata consists of one species *Prochilodus caudifasciatus*, known locally as “Boquichico”. And nearly 22% consists of another, *Satanoperca jurupari*, locally called “Bujurki.” Giant Otters hunt primarily by sight, although their sense of hearing and smell are also acute. They also have extremely long whiskers called vibrissae, which can sense vibrations and movements of fish underneath the water. (Duplaix, 1980)

¹ Endemic: native to a certain place and not present elsewhere

² Previous field studies report absolutely no sharing of food in wild *Pteronura* (Rosas 1997; Duplaix 1980; Brecht-Munn and Munn, 1988; Schenck and Staib 1994, and Schenk 1999). On three occasions in 1999, and once in 2000, I observed the whole group sharing captured *latin name not known yet*, a 3 foot long catfish known locally as “Doncella.” On another occasion in 2000 I observed one otter make a mouth to mouth pass of a normal sized “Boquichico,” to another, who may have been a cub, although it had already grown enough to be indistinguishable from the other group members by size.

Giant Otters normally produce a litter of 2 to 4 cubs in beginning of the dry season once a year, with each pregnancy lasting about 65 to 72 days.³ Pteronura cubs spend their first 2 months of life in the den, and all members of the family group help rear them. An older brother or sister will baby-sit the cub in or near the den while the rest of the group hunts. The mother cannot actually afford to spend too much time with her young during the day, because she must go out to catch plenty of fish in order to produce enough milk for them. At two to three months of age, the little giants are already half the size of adults, and they begin to accompany their family on the hunt. The cubs are given fish from the other group members, who also help teach them to hunt during play sessions. At first they simply play or chew on the fish, often lounging on logs near the bank. Within a few weeks, they develop a strong liking for fish, but they may continue to suckle somewhat for up to five months of age. Even though the cubs are almost full-grown by just 4 months of age, they won't become sexually mature until they're about 3 years old. At about 3 or 4, both male and female otters will leave their family group in search of a new territory and a mate. Both of these are scarce, and solitary young otters have been documented to travel up to 80 km in their search. (Schenck and Staib, 1994)

Statement of Research Problem: (the reasons for doing this field work)

Otter species around the world have proven especially vulnerable to the exponential rise in human development over the last few hundred years. The waterways that are otter habitat are also often the first areas inhabited and heavily populated by humans. Also like humans, otters are top predators, occupying the highest trophic levels in ecosystems. So over the last few hundred years they have suffered considerably all over the world by virtue of being in direct competition with us, for both habitat and food, namely fish and seafood. For example, the European River Otter, *Lutra lutra*, is locally extinct in most of its former range in Europe, because it was actively exterminated as a pest by fishermen in the 1700's and 1800's, and is further restricted by pollution in major navigable rivers. Making life even harder for otters the world over, not only have people competed with them, but we have outright hunted them intensively. Like the North American Sea Otter, the North American River Otter, and others, excessive hunting of Giant Otters for their fur has decimated their populations, leading to their current endangered status.

Giant Otters are now one of the 23 most endangered mammals in the world, and the most endangered mammal in the Amazon, according to the IUCN⁴ (Carter and Rosas, 1997). Historically common throughout the South American rainforests, Giant Otters were decimated by the hundreds of thousands between 1940 and 1970 to satisfy foreign demand for their pelts. After almost driving Pteronura to extinction, the sale of their furs was internationally banned in 1973. Unfortunately, the loss, degradation, and disturbance of their habitats, and to a lesser extent direct competition and extermination by fishermen and poachers, keep Pteronura populations from recovering. As human populations and economic pressures increase, pushing into the last, until recently isolated pockets upper Amazon where Giant Otters still thrive, their survival is seriously at risk.

In 1985, it was estimated that as little as 1,000 to 3,000 giant otters remained in the world (Brecht-Munn, 1988). Southeastern Peru is currently considered one of three principle regions—along with Surinam and Brazil's Pantanal—where concentrated Pteronura populations still exist. The very real possibility of extinction in the near future gives Pteronura implicit importance for Conservation and ecology field studies. Moreover, at the top of the food chain, giant otters are an “umbrella species:” their existence depends on and is proof of extensive biodiversity and environmental quality, as they require an intact forest for clean and clear water to hunt, fish and the insects and fruit trees that feed these fish, and so on down to the lowest trophic levels, in order to live. Pteronura is also a “flagship species:” an animal that

³ For this reason it was very surprising to observe, on February 18th, 2001—the middle of the rainy season—a roughly 2 month old cub with the Tres Chimbas study group. Monitoring the cubs' growth and the timing of the next litter is a long-term goal of TCHOP data collection, shedding light on their reproductive success.

⁴ International Union for the Conservation of Nature

engenders empathy and interest from people, and thus fosters public interest and concern for rainforest conservation at large (Schenck, 1999). If the mainstream public can be made aware of and compelled to protect this species, they will unavoidably also protect the Amazon rainforest as a whole.

Wildlife Ecology and Wildlife Tourism: Conservation or Exploitation?

The inherent appeal of Giant River Otters also fosters a direct “**conservation-development mechanism:**” a way to generate income for people that depends on—and thus fosters—protection of the rainforest. Wildlife tourism, benefitting from and to some extent based on Giant Otters, creates a long-term economic incentive to protect not only the otters themselves but the entire ecosystems that tourists pay to experience. Despite being virtually unheard of in the outside world, Giant Otters are very important for the tourism industry in Southeastern Peru. But there is considerable evidence that tourism can also endanger them. Determining and quantifying the effects of tourism and other human activities on *Pteronura* ecology in the wild is the main focus of this field study.

Wildlife Tourism in the World and in Madre de Dios, Peru

The development potentials of Tourism are well-merited. Tourism is now reportedly the largest industry in the world—surpassing the petroleum industry with nearly \$3 trillion in annual world expenditures—employing one out of 15 workers world-wide, and growing over 60% in the last twenty years. It accounts for 5.5% of the world’s gross national product (GNP), and is growing faster than both world and service sector GNP, at nearly 9% annually (World Tourism and Travel Council, 1992, Oelrichs 1992). In terms of the industry’s importance to national economies, Peru is ranked 32nd out of 170 countries worldwide, with nearly 20% of Total Export Revenue coming from tourism (Ceballos, 1995). “Ecotourism,” as defined by the World Tourism Organization, is the fastest growing sector within the Tourism industry (Ceballos, 1995).

One of the most biologically diverse regions in the world, and only a \$35 flight from Cuzco and Machu Pichu—among the most visited tourism destinations in the world—the Peruvian province of Madre de Dios is prime to those who want to experience the almost mythological reputation and overwhelming diversity of wildlife of the Amazon rainforests.

Along with biodiversity, Madre de Dios also has one of the fastest growing human populations in the country, as Peruvians evading a longstanding nationwide recession immigrate to the area by road, river, and jet into a recently improved airport. The rainforest here is cut and burned to make plots for agriculture and cattle, which after a few years must be abandoned and replaced with more rainforest because of the soil’s poor fertility. The creation of parks—which in Peru exclude human habitation and severely restrict human activity—can simply concentrate human development—and accompanying environmental degradation and deforestation—in a region as a whole. Unless human development and conservation can somehow coexist, a fragment of rainforest may be preserved, but the majority—along with untold biological diversity—will disappear before we ever get the chance to know what we have lost.

As the number of people paying to visit natural areas has increased considerably in the last few years, the phenomenon “ecotourism” has been identified as a possible means for putting economic value on these areas in their natural state. The Ecotourism Society, a U.S. based non-profit organization, lists three requirements for true ecotourism. These are: (1) environmental and social education of tourists (2) conservation of nature, and (3) local economic benefit (URL: www.theecotourismsociety.org). This last criterion is in practice the most questionable aspect of most nature tourism operations, especially internationally. Around the world, the local inhabitants of rural areas that are ecotourism destinations tend to be less educated and less internationally experienced than their urban (or foreign) counterparts. As a result, they lack experience and connections with international Travel and Tourism Agencies, and the training to fill higher-level management positions in this business, as well as the language and cultural skills to fill guiding positions. The local benefits of low paying, menial employment in nature tourism operations are often outweighed by the loss of access to natural resources, as ecotourism operations promote reserves that are “off-limits” to local use. Without even considering values of social justice and rural development, this phenomenon has negative impacts on biodiversity and nature conservation. When local inhabitants are not employed in ecotourism, they often have no choice but to convert

local forests into fields or pastures or work in other environmentally degrading activities to make a living. On the other hand, the more people in a region benefit from a business based on nature and biodiversity, the stronger their incentive to protect it.

Case Study

In 1996, the Infierno Native Community (INC)⁵ entered into a partnership with Rainforest Expeditions (RFE), a Lima-based ecotourism company. As suggested by the organizations Cultural Survival Quarterly and Conservation International, if this partnership lives up to its potential, protecting biodiversity by generating local and national income from it, it could be a model that will give hope to Conservation around the world.

Under the terms of the legally binding contract, 60% of profits from their INC-RFE “Posada Amazonas” lodge go to an INC community fund, and 40% go to RFE. Decision-making is split 50/50 between RFE and a committee of 10 INC members. According to the contract, members of the Infierno community—now the majority of the staff—are to train to integrate themselves into higher level positions, to guide foreign tourists in English and manage the lodge completely in 2016, when they will gain full ownership. Only time will tell the true sustainability of this project, showing us whether biodiversity is conserved, local people benefit, and the resource that brings tourists to this place is still here when the community gains full ownership. If it works it will be a significant step against the status quo of the ecotourism industry in Madre de Dios, which is dominated by and mostly benefits non-local companies.

The Giant River Otter—Little Known Superstar

Conditioned by the Discovery channel and other nature documentaries, many tourists come to the Amazon hoping—even expecting—to see “charismatic megafauna,” such as jaguars, crocodiles, tapirs, and harpy eagles. In reality however, most of the Amazon’s top predators are very elusive, occupying immense home ranges, and most mammals here are nocturnal. Even when they are spotted, most animals offer only a glimpse before they are lost, in the dense rainforest that allows visibility of only a 10 or 20 feet. This fact weakens Amazonian ecotourism as far as competition within the industry, as wildlife-seeking customers are attracted to other places, such as the “big-game” reserves in the African savannas.

Giant Otters are completely unique among large predators and mammals in the rainforest, because they can reliably be seen by tourists. The lakes where *Pteronura* are obligated to spend hours every day fishing represent the only natural open spaces in a dense sea of primary rainforest, so the strictly diurnal otters are observable from up to a kilometer away, and they are obligated to spend hours on end hunting in these open areas. Moreover, ecotourism is a seasonal industry, peaking significantly in the northern hemisphere’s summer months, between June and October. This corresponds to the dry season in most of the Amazon, when *Pteronura* habitats effectively dry up and home ranges—already extremely small for top predators—become several times smaller, further increasing encounters with tourists. Giant Otters have been seen on roughly 75% of Posada Amazona’s (PA’s) daily visits to Lake Tres Chimbas.

Moreover, personal observation confirms that Giant Otters are appealing in their own right, and not only as a “default” substitute for better-known mammals and predators. Not historically hunted by native groups, they exhibit an impressive and easily-provoked territory defending display, wherein they approach the tourist boat or other intruder to within 5 meters, surround it, rise up to show their size, and give a chorus of “alarm snorts” before retreating. Even more unique, Giant Otters allow tourists not only to spot a top predator, but also a good chance of seeing one in action in the wild. With each individual needing about 10 pounds of fish each day, an otter family group typically catches at least 1 fish every ten minutes. These hunting bouts and captures are extremely conspicuous, with the whole group chasing, diving, and rising out of the water, and the successful hunter spending minutes chomping down the fish, bones and all, while treading water at the surface. They are very expressive, communicating frequently within the group with loud, almost human like squeals and whistles, as well as endearing in their social play, which usually occurs in plain view on top of lakeside logs.

⁵ Located just 10 kilometers downriver from Bahuaja lodge on the Tambopata River, and a ½ hour drive from Puerto Maldonado

Before coming to Madre de Dios, most tourists have never heard of Giant Otters, but a majority rate them as a principal highlight of their experience at the end of their stay. The increased customer satisfaction from seeing a large, charismatic predator translates into higher economic returns directly through tips and indirectly through “word of mouth” advertising upon the tourist’s return home. The prevalence of the Giant Otter’s sleek body and soulful mug in local tourism brochures is testament to this importance. (Schenck, 1999). For Posada Amazona’s, our study group of Giant Otters is a particularly important ecotourism resource, a prime highlight of their most popular tourism activity, the boat tour of Lake Tres Chimbas.

As a prime attraction, ecotourism creates a long-term economic incentive to protect Giant Otters, which are otherwise locally vulnerable to human disturbance, deforestation, overfishing (Schenck, 1999), extermination by fishermen, (Silverio Duri-Valdivia—personal communication), poaching⁶, and mercury contamination of water and fish, resulting from alluvial gold-mining, currently Madre de Dios’s largest industry (Schenck, 1999). But the same conspicuousness that makes giant otters so important to tourism actually makes them vulnerable to it. As Pteronura family groups are required to fish for hours in small, open lakes in order to survive, they are susceptible to human activity and disturbance in these highly accessible and confined spaces.

Tourism as a Threat

Potentially the most severe effect of tourism activities on Pteronura stems from the high sensitivity of the reproductive female. In response to mere human presence, the mother can become stressed and stop lactating, resulting in the death of the entire litter.

This phenomenon has been observed repeatedly in captive giant otters in zoos in South America and abroad (Duplaix 1980) (Hagenbeck 1992) (Schenck 1999). The most detailed record published comes from the Carl Hagenbeck Tierpark Zoo in Hamburg. Here, 3 pairs of Pteronura were formed between 1975 and 1990, producing twelve litters of 2-5 cubs each. All of these litters died due to early starvation from lack of maternal nutrition. Lactation of the reproductive female was determined to cease entirely. In reaction to human presence, the Pteronura mother lay flat on her belly, looking around all sides of her with her neck pressed to the ground, a position that also physically prevented the young from nursing. In 1990, after the female Pteronura at Carl Hagenbeck Tierpark once again became pregnant, this time she was isolated from human presence, not only from zoo tourists but also from staff, aside from one caretaker who left food and occasionally cleaned her zoo habitat, avoiding the nesting box entirely. This strict isolation began two weeks before birth and continued for several weeks after, and led to the first successful rearing of Pteronura cubs outside of South America (Hagenbeck, 1992).

In the wild, Schenck and Staib (1994) monitored three Pteronura groups living in three lakes heavily visited by tourists in Manu National Park. The groups successfully reared only three of nine litters over three years, with six litters dying of early malnutrition. While the sample size of this data may not be enough to draw an generally applicable rate of cub mortality, the findings suggest potentially severe impacts of tourist disturbance in the wild. This is 1/3 the expected success rate; undisturbed otters normally successfully rear each litter. The fact that the peak tourist season (June-October) is also Pteronura’s cubbing season and the dry season, when aquatic habitats shrink, increasing interactions with humans.

Aside from altering lactation, it has been suggested—though not systematically confirmed—that tourism can cause entire Pteronura groups to catch less fish, alter normal denning activities, reproduce out of the naturally optimal season, and abandon a habitat altogether (Charles Munn, personal communication) (Schenck, 1999)(Patty Herrera, personal communication).

As a lack of suitable living space is the main factor currently limiting Pteronura recovery, ecotourism potentially represents both the most promising solution for Giant Otter conservation and their most dangerous threat, leading a wave of development into their last isolated habitats. Despite significant implications both for economic development and conservation, no study to date has yet examined Pteronura-tourist interactions in any depth. Such a study is listed as a top priority by the world’s current leading Pteronura researchers. (Schenck, 1999).

⁶ One case was even reported, though unconfirmed, from our own Tres Chimbas Lake, in Schenck, 1999.