

Challenges to the Conservation of River Turtles (spp. *Podocnemis*) in the Peruvian Amazon

Francisco Laso

fjl2102@columbia.edu

Francisco received his B.A. in Environmental Biology from Columbia University in 2008. He melds science and art in his attempt to broaden the scientific community's sphere of influence. He is currently working for the Network of Conservation Educators and Practitioners (NCEP) at the American Museum of Natural History (AMNH).

Abstract

These images were captured during the summer of 2007 as part of an ongoing study that addresses habitat and community dynamics from broad to narrow ecological vantage points. Amazonian river turtles are ecologically important as they play an essential role in the seed dispersal of several fruit tree species in the flooded plain. These turtles also have religious, cultural, and economic significance for indigenous river communities. The endangered Amazonian river turtles *Podocnemis expansa*, *P. unifilis*, and *P. sextuberculata* are a local delicacy in Iquitos, Peru. Despite their importance and familiarity to people, we know very little about these species and commercial exploitation has decimated turtle populations outside natural reserves. Conservation of these species is aimed at the sustained wellbeing of the flooded forest ecosystem and its inhabitants. The hope is that future generations will inherit the success of our good stewardship rather than the failings of our negligence.

Author's Note

The following is a selection from a group of pictures that was taken for a visual manual to be used by researchers, park officials, and river communities. The photo-manual is meant to serve researchers and conservationists in recognizing the basic physiology and biology of the three turtle species, learning basic blood sampling techniques, qualifying threats for extinction, and proposing strategies for conservation.

Keywords: Testudines, Podocnemididae, Podocnemis, Turtle, Amazon, Iquitos.

Challenges to the Conservation of River Turtles (spp. *Podocnemis*) in the Peruvian Amazon

June-August 2007, Iquitos, Peru. Created with the support of the Kluge Fellows Summer Research Program.

The Amazonian river turtles, *Podocnemis expansa*, *P. unifilis*, and *P. sextuberculata*, have long been of great ecological, economic, and cultural importance for the Amazon rainforest and its inhabitants. All three species were once known for their astonishingly large population sizes all over the Amazon River basin. Today, they are a rare sight and are listed as species of conservation concern on several international endangered species listings. Most inhabitants of river communities in the Peruvian Amazon, who have hunted turtles for their meat and eggs for centuries, are aware of the severe drop in turtle populations during the past few decades. River community members identified the cause of the turtles' disappearance to be the unsustainable commercial exploitation of this resource to meet the growing demands of large urban areas such as Iquitos, Peru.

Tourism is one of Iquitos' main economic strengths, and much of the increasing demand for wildlife meat comes from tourists with adventurous palates. After having extirpated turtle populations for miles around Iquitos, turtles, especially rare specimens such as giant river turtles (*P. expansa*), are likely to be brought from within Peru's largest protected area, the Pacaya-Samiria National Reserve (RNPS). Unfortunately, current regulations and conservation efforts are insufficient. An anonymous RNPS park ranger explained that his organization is often unable to handle illegal activities like poaching and logging on its own because of fuel scarcity and conflict with armed offenders is dangerous. As a result, authorities rarely intercept turtles that are smuggled into Iquitos in the cargo of transportation barge passengers.

The genus *Podocnemis* is a primitive one, and it has evolved through millions of years to become intricately integrated with the flooded forest ecosystem. Since the turtles are important seed dispersers, scavengers, and sources of food for other predators, their disappearance has profound ecological implications. Historically, fresh water turtles can reach very high biomasses and densities, which can give us an idea about their significant contribution to nutrient cycling and to energy flow patterns in both lakes and rivers (Moll). In tropical forests, most plants produce fruit during the flooding season, and 70-90% of plant species are vertebrate-dispersed (Ganesh and Davidar); *Podocnemis* turtles have the potential to be high-quality seed dispersers

because their diet is predominantly comprised of fruits, which are swallowed whole and generally pass unharmed (Moll and Moll). Seeds that have been ingested by turtles actually fare better than non-ingested seeds as turtles carry them away from the parent tree and are fertilized by the nutrients in turtle droppings (Moll and Jansen). The most important factor to determine the extent to which *Podocnemis* turtles fulfill their role as one of the flooded forest's key seed dispersers is the density of turtle populations. It is probable that the consequences of the sudden disappearance of this genus from the Amazon Basin ecosystems are not yet fully perceptible because the cycles that are being disrupted by the unfulfilled niches of these turtles occur at larger time scales than humans can effectively perceive. The sheer longevity of fruit trees that depend on turtles to disperse their seeds is enough to camouflage their disrupted life cycles.

The ramifications of these turtle species' extinctions goes well beyond bottom lines of fishermen and market vendors. Their survival or demise might influence the existence of the flooded forest itself and of all the life, resources, and ecological services it provides. The crucial role that these turtles play in the life cycles of Amazon plant species binds their destiny to both local and global processes. It ranges from a single tree providing food and a habitat to the entire flooded forest acting as a carbon sink, regulating global climate and producing the oxygen we breathe. After just a couple centuries of rapid anthropogenic growth in the area, these species are likely to face extinction if their situation is ignored. This resource urgently needs to be managed with improved information and organization.



The Amazonian giant river turtle (*P. expansa*). Its hidden aquatic lifestyle, vast seasonal migration areas, and the lack of baseline quantitative demographic data leave us with very little knowledge about this species.



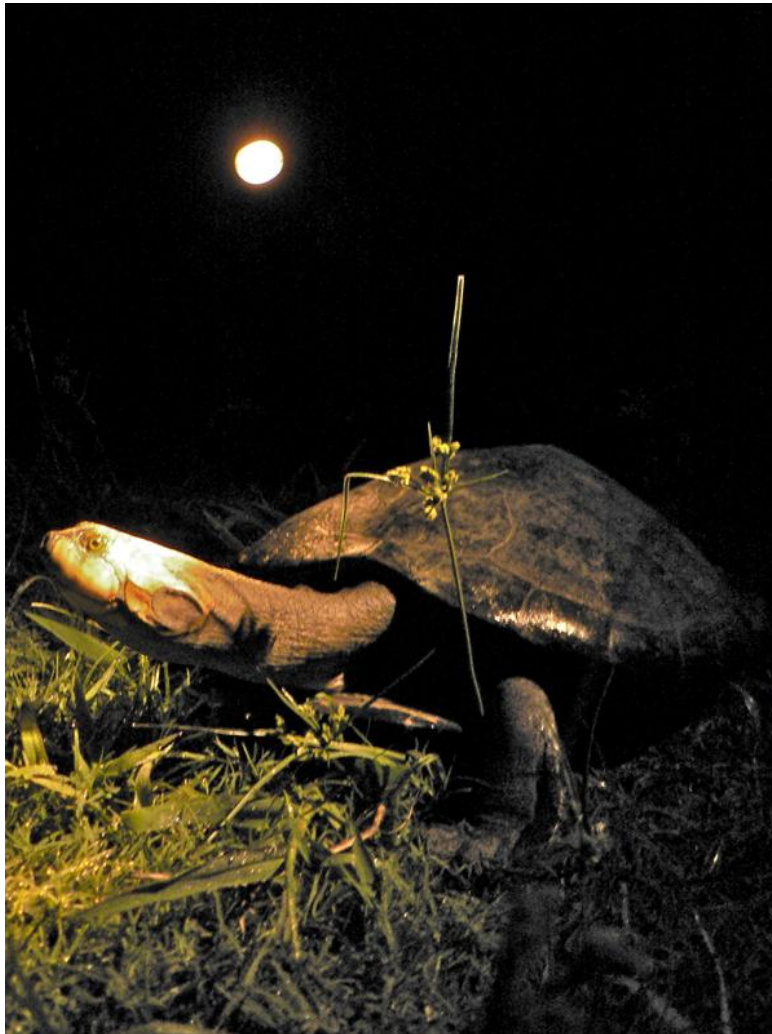
Close-up of a female *P. unifilis*, the medium-sized species. More is known about female turtles than male turtles for all three species since only females come out to nest in the sandy beaches while males remain out of sight. Nesting is the most vulnerable time for an adult turtle.



Sandy banks on the Peruvian Amazon during dry season (June to September) are the preferred nesting ground for *Podocnemis* turtles. The land left by the receding river is also prized agricultural ground for the people of the Amazon.



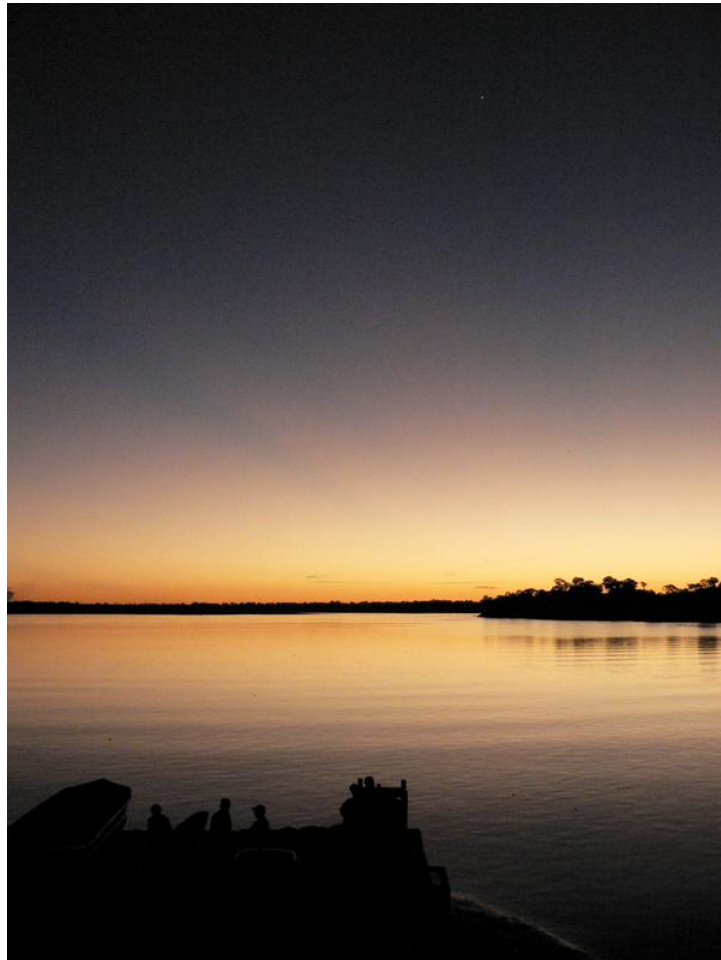
P. unifilis basking in the sun. The yellow markings on their heads are characteristic of male turtles. Since female turtles are more vulnerable to poachers, the species' gender ratios are likely strongly male-biased.



These turtles leave the safety of the water at night and sometimes come out to nest in great numbers. This event is known as a turtle “derrame” or “spillover.” In spite of the turtle’s concealment efforts, many people await the spillover with great anticipation; annual feasts with turtle soup and eggs usually follow.



Town elders recall such an abundance of giant river turtles (*P. expansa*) that "they could be easily caught every day." Younger people reported never having met anyone who had caught a *P. expansa*.



Passerby traders buy turtles from fishermen for a fraction of their price in Iquitos markets. Turtles are brought to Iquitos on large cargo barges, which stop along river communities transporting everything from people and animals to construction materials and fuel, all at once.



Boats travel for weeks before they reach their final destination, and all passengers come prepared with hammocks. We were able to spot over 50 *P. unifilis* hidden in the personal belongings and cargo of passengers from a single transportation boat heading to Iquitos from Bretaña, a small town at the entrance of the Pacaya-Samiria Natural Reserve.



Over 400 tortoises (Motelo) which were confiscated at airports, cannot be returned to the wild due to possible diseases they might have contracted, so they are kept indefinitely by park officials under poor living conditions. There is no available room to house confiscated river turtles.



With 402,481 reported inhabitants (INEI), Iquitos' remote location is not immediately apparent. Tourists and settlers have quickly turned Iquitos into a modern and global city.



As more people from the outskirts move to Iquitos to work in tourism, urbanization spreads, and its pressure on the environment rapidly increases. Because the city lacks land access, many basic products must be imported by boat or plane to Iquitos, increasing Iquitos' ecological footprint.



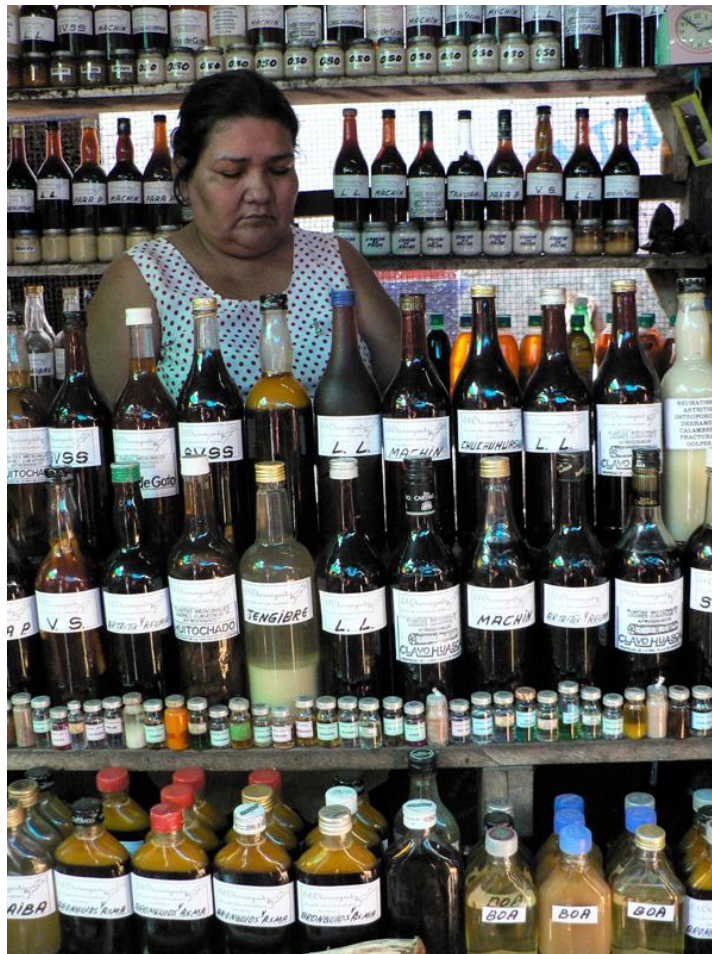
Since no turtles are found for miles around Iquitos, turtle product availability is not constant. Belén market vendors stock up on live turtles as soon as traders in transportation barges arrive.



Belén Market, representing 71.3% of the entire city's wildlife trade, is the most commercially active market for wildlife products in Iquitos. Here, *Podocnemis* turtles are sold as bushmeat and pets (Bendayan, 1991).



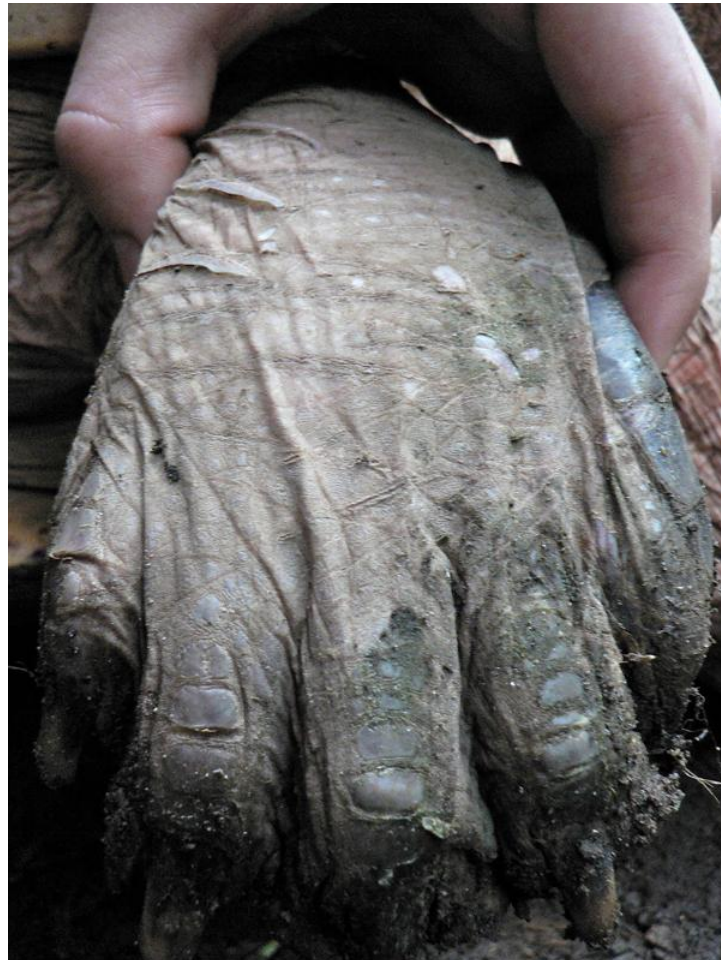
Despite its rarity in the wild, during its nesting season *P. expansa* is an alarmingly common sight in markets, particularly in Mercado de Belén. Here, turtle meat is more expensive than imported beef.



A saleswoman at the Belén market sells potions for ailments. Turtle products are common in traditional medicine and have religious value for many people since the turtles are known for their longevity and fertility. With the unsustainable harvest of this resource, few turtles reach sexual maturity.



Early morning preparations for a day at the market. This vendor alone prepared five *P. unifilis* that she expected to sell that same day. As populations of giant river turtles have dwindled, the medium-sized turtle (*P. unifilis*) has become the most commercialized species.



Front hand of a massive adult female *P. expansa*. Targeting larger specimens has not only reduced the average size of the population, but it has also targeted the most important portion of the population for its conservation, the breeding individuals.



Three different traditional turtle dishes: from left to right, Estofado, Zarapatera, and Picadillo.



Lacking refrigeration, vendors who cannot sell all their fresh eggs must quickly boil them so that they will last a few more days. Focusing on the integral cultural, economic, and ecologic support provided by river turtles to the Amazon region is a powerful approach for localized conservation efforts aiming to have larger-region impacts.



A community member helps park officials find and transfer nests to artificial beaches for protection against poachers and predators. Most conservation efforts in Peru seem to be aimed at the reproduction of Podocnemis turtles.



Every artificial beach may contain hundreds of nests each nesting season. Thousands of hatchlings are then released at their original nest site.



A boy helps build the roof of his classroom. In collaboration with park officials, a number of rural schools have built artificial beaches and looked after a small number of *P. unifilis* nests that park officials have collected. School programs have been very effective in promoting community involvement, showing that, while securing the survival of these turtle species is not child's play, everyone can have a significant role in it.

Works Cited

- Badayan, Acosta. *Influencia Socioeconomica de la Fauna Silvestre como Recurso Alimentario – Iquitos*. Universidad nacional de la Amazonia Peruana, Facultad de Ciencias Biologicas. 1991.
- INEI. *Peru: Proyecciones de Poblacion por años calendario segun Departamentos, Provincias y Distritos*. Lima, Instituto Nacional de Estadistica e Informatica. 2002.
- Moll, D. and K. P. Jansen. "Evidence for a Role in Seed Dispersal by 2 Tropical Herbivorous Turtles." *Biotropica*. 2002, 27(1): 121-127.
- Moll, D. "Population Sizes and Foraging Ecology in a Tropical Fresh-Water Stream Turtle Community." *Journal of Herpetology*. 1990, 24(1): 48-53.
- Moll, Don and Moll, Edward. "River Turtles" New York: Oxford University Press, 2004.