

Does local knowledge change after a species long term absence? The case of giant river otters *Pteronura brasiliensis* Gmelin, 1788 (Carnivora Mustelidae)

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ABSTRACT

Public participation could be useful to determine species presence and ecological aspects, however it is possible that local knowledge of species whose populations had suffered a decrease could have changed. To determine current knowledge of giant river otter, *Pteronura brasiliensis* Gmelin, 1788 (Carnivora Mustelidae), we undertook a preliminary assessment based on 35 interviews performed between June and August 2014 with natural resources users in the Pacaya-Samiria Reserve (Peru) aimed to determine the presence, feeding habits, reproduction periods, and threats. It was possible to determine that current knowledge correspond with available information in literature thus, I consider that it is possible to use public participation in cases of little known species that are recovering.

KEY WORDS

Public monitoring; *Pteronura*; Pacaya-Samiria Reserve; endangered species.

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Habitat loss, fragmentation, and degradation, along with other human-related causes have put most ecosystems and the species that inhabit them at risk (Myers, 1988). Therefore, conservation strategies rely on the prioritization of areas that are key for the long term survival of many species. Such prioritization becomes more important in areas with high biodiversity; and even more so when these areas are related with high human densities, where actions are needed sooner rather than later (Sanderson et al., 2002). However, information on both ecosystems and species at regional level is often missing making it necessary to generate a strategy that could help to increase knowledge at this level. It has been proposed that this kind of information can be obtained from the general public as a first step for management; as scientific research

is usually limited in space and time (i.e. short term studies in a specific site) making some changes to go either unperceived or identified after a huge gap of time (Scholte, 2011). Just to mention, in Madagascar local knowledge has been used to shape distribution of carnivore species (Kotschwar et al., 2015) and in Zimbabwe to determine population trends of different carnivore and game species (Gandiwa, 2012).

However, there is not enough information on how local knowledge and perception changes after a charismatic species disappears from a region such as in the case of the giant river otter, *Pteronura brasiliensis* Gmelin, 1788 (Carnivora Mustelidae). This species was once distributed in most freshwater streams of South America, from Venezuela to Argentina (Eisenberg, 1989). Its numbers have

decreased significantly up to the extent that some populations have disappeared from its former range due hunting and habitat loss (Carter & Rosas, 1997; Recharte & Bodmer, 2010). The species is currently listed as endangered by the red list (IUCN, 2016) with a projected population decrease of about 50% within the next twenty years (Shostell & Ruiz-Garcia, 2013). Fortunately, due a ban on hunting and a decrease on its commercial demand in Peru, giant river otter populations have increased in certain areas such as in the Yavari River (Recharte & Bodmer, 2010) and in the Pacaya-Samiria National Reserve in Perú (Groenendijk et al., 2001). The species is important at local level as it is considered a top predator and due its potential as a bio indicator as it is especially sensitive to disturbance and resource availability, preferring conserved areas with good fish stocks (Carter & Rosas, 1997; Groenendijk et al., 2001; Recharte & Bodmer, 2010). Unfortunately, scientific information of the species along its range is scarce except for a few areas (e.g. Madre de Dios: Hajek & Groenendijk, 2006) and Pacaya-Samiria National Reserve (Groenendijk et al., 2001). However, there is not enough information on how local knowledge and perception changed after the long term absence of the species in the region. Thus, it is important to determine if users of natural resources are aware of the giant

river otter presence and ecology in order to include their knowledge in management plans.

I undertook semi structured interviews with the natural resource users of the Pacaya-Samiria National Reserve in northeastern Peru to assess their actual knowledge on giant river otters (Fig. 1). The Pacaya-Samiria National Reserve is located in the Amazon Basin and is considered the largest protected area of flooded forest in the Amazon with 20,800 km² (Bodmer et al., 2011). Its average annual rainfall is 2000–3000 mm and a mean temperature between 20 and 33°C (Bodmer et al., 2011). The reserve and its buffer zone have 203 rural settlements; most of them (89%) are small villages with less than 500 inhabitants located on the borders of the Marañon and Ucayali/Puinahua rivers (González, 2003). The households in the area include people of mixed origins (mestizos), natives from the ethnic groups Cocama-Cocamilla and Shipibo-Conibo, whose major economic activities include fishing, agriculture, game hunting, and extraction of forest products (González, 2003). Some communities have been actively involved in groups of natural resources management in the Reserve (Puertas et al., 2000; Piana et al., 2003). I concentrated my efforts in the Samiria River, a black water river preferred by giant river otters (Carter & Rosas, 1997). I used the vigilance point 2 known as “Tacshacocha” as interviewing place, since visitors and members of the community management groups have to register when travelling upriver.

I made a total of 35 interviews between June and August 2014. The survey consisted in a set of 22 questions aimed to determine the presence of the species, habitat preferences, reproduction patterns and potential threats to giant river otters. Interviewed persons belong to five different communities: Leoncio Pradro (47%), San Martín de Tipishca (29%), San Carlos (12%), Santa Rita (3%) and Victoria (9%). On average, the interviewees were 41 years old. Half of them (50%) belong to one of the local community-based conservation groups which were formed aiming for the sustainable use of natural resources as well as turtle management and conservation; they also serve as guides for scientific groups (19%). Sixty-nine percent of the interviewees typically use the reserve throughout the year, another 22% use it only during the dry season. Therefore, I considered that responses were based on field experience.

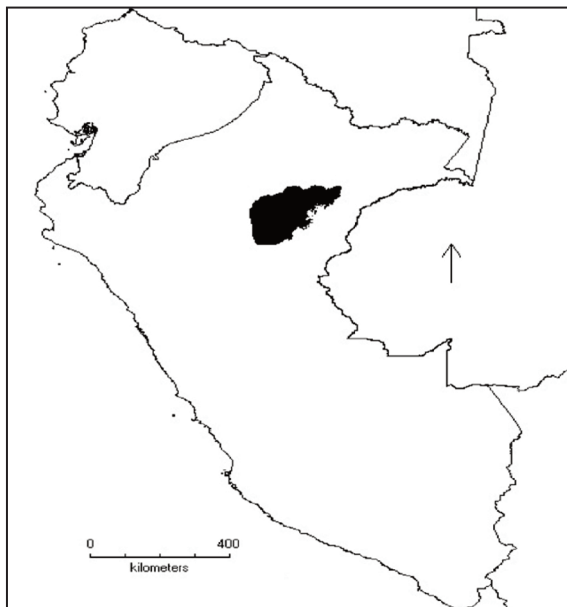


Figure 1. Pacaya-Samiria National Reserve in Northeastern Peru.

Locals stated that otters can be observed throughout the year (40% of interviewees), but that are easier to detect during the dry season (43%). These observations can be explained because their movements are concentrated to lakes and rivers during the dry season, while they move to flooded forests and small creeks during the wet season (Hajek & Groenendijk, 2006), becoming scattered and harder to detect. Moreover, 53% of the respondents identified both river and rainforest as preferred habitats and another 41% considered river as the main one. Locals also reported diurnal observations (54% of interviewees), especially during the early hours of the morning (34%). This is supported by Carter & Rosas (1997), who identified giant river otters as diurnal. Interviewees reported that the main activities conducted by the river otters were playing, feeding, fishing, and vigilance, which correspond with previous reports about their daily activity (Carter & Rosas, 1997; Hajek & Groenendijk, 2006).

The diet of the giant river otter varies with habitat type and species diversity in the area (Hajek & Groenendijk, 2006). Fish are the main diet component (Carter & Rosas, 1997; Hajek & Groenendijk, 2006), but other groups such as mammals and crabs have also been recorded (Hajek & Groenendijk, 2006). Preferred fish consumed by the giant river otter belong to the suborders Characoidei (characins), Percoidei (perch) and Siluroidei (catfish) (Carter & Rosas, 1997). Accordingly, interviewees identified fish of different species such as carachama (*Pseudorinelepis* spp.) and different types of piranha (Characoidei) as the main diet component of the species.

Knowledge about reproduction and cub development tended to vary. All interviewees considered that otters reproduce in the Samiria River, but only 80% have seen cubs. Eighty-eight percent of locals reported that otters breed during the dry season (May-September), which corresponds with observations in other areas (Duplaix, 1980; Hajek & Groenendijk, 2006). Although litter size is known to vary between one and five cubs per season (Carter & Rosas, 1997; Hajek & Groenendijk, 2006), locals have little knowledge about this fact as just 29% consider that the species had just one cub per year. It is noteworthy that interviewees claimed they cannot differentiate pregnant from non-pregnant females (62%); but they can differentiate adults and cubs by size (76%).

The success on conservation measures that have resulted in river otter population increase (Recharte & Bodmer, 2010) has been noted by interviewees, where 91% considered that the otter population was growing. Otter population increases may lead to a raise in human-otter conflicts. In fact, 49% of them considered the species as harmful to fishing nets and fish stocks, 46% stated that locals are afraid of the giant river otter, and 21% reported known previous attacks to humans. This corresponds with observations made by Carter & Rosas (1997), where people in recently colonized areas of the Amazon forest feared giant river otters. Interviewees suggest fears result from lack of knowledge about the species. Regardless, 91% of the interviewees claimed local communities know that the giant otter is protected. Also, 91% of the respondents considered the giant otter as an important and emblematic species in the area because it represents the reserve and is part of the ecosystem. This is supported by the fact that 92% of them reported that this species is no longer hunted in the area as it is extremely prohibited, except occasionally when cubs are captured to be kept as pets or to be sold to zoos, as previously reported (Duplaix, 1980; Carter & Rosas, 1997).

Our results indicate that, despite the species is still at low densities and was carried almost to the point of local extinction, local people who visit this reserve are well informed about the presence, ecology and distribution of the species. The latter can be confirmed by comparing published information from zoos and field observations about the species with local knowledge. In the specific case of the giant river otter, results showed that it is possible to use local knowledge as baseline information to generate conservation projects and community projects. Thus, it can be considered that for regions with limited information about species and ecosystems it is possible to use public participation, especially of community conservation groups, where available, in order to generate management plans or even monitoring programs.

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