

## REPORT

### NOTES ON THE BEHAVIOUR OF NEOTROPICAL RIVER OTTER (*Lontra longicaudis*) IN PALOMINO RIVER (LA GUAJIRA, COLOMBIA)

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**Abstract:** The Neotropical river otter is a semiaquatic mammal that occupies a large geographic distribution. It habitually defecates in conspicuous areas on land; these indirect indicators are the focus of most of the studies that involve them, but little is known about species' behaviour. In Colombia, the species is considered as Vulnerable and in the Northern area of the country (La Guajira) there are no studies focussed on it. In this paper, observations on *L. longicaudis* behaviour in the wild were made, as a first approach to it, while occurrence studies were carried out in the area. Observations were made in 2015 during the dry or non-raining season (February), in the middle and lower course of the Palomino River. Five observation sites were established along the river, and the observation method implemented was *ad libitum* sampling. As a result, a total of 31 different behaviours were recorded, from which immersion, breathing after immersion, superficial swimming and foraging were most frequent at 16%, 15.6%, 12.8%, and 10.7% respectively.

**Keywords:** Neotropical otter, otter behavior, Colombia endangered species, aquatic mammals.

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#### INTRODUCTION

The Neotropical river otter *Lontra longicaudis* (Olfers, 1818), member of the Mustelidae family, is a semiaquatic mammal that occupies a wide geographical distribution, occurring from Mexico to the north of Argentina (Waldemarin and Colares, 2000; Arellano et al., 2012). The species is found in rivers and water bodies that can be fresh, marine or brackish water (Kasper et al., 2004). They are abundant in rivers where the riparian vegetation is dense and the root of the trees form galleries. Rivers with this kind of vegetation are usually clear water, flanked by large rocky blocks (Parera, 1996; Larivière, 1999; Casariego-Madorell et al., 2006). Recently non-

invasive molecular approaches estimated a linear density of one otter per km from in an Atlantic Forest area in Southern Brazil (Trinca et al., 2013) and radio-telemetry in a mangroves area showed a movement of 2.6 km (Nakano-Oliveira et al., 2004).

In general, they have a habit of defecating in conspicuous places of the aquatic body, (Wemmer et al., 1996; Kasper et al., 2004) or in the adjacent terrestrial ecosystem. This behavior is the focus of most of the studies that involve them, and are being used for the definition of areas of occurrence (Chehébar, 1985; Chehébar et al., 1986; Blacher, 1987; Kasper et al., 2004) and diet studies (Beja, 1991; Brezinski et al., 1993; Passamani and Camargo, 1995; Pardini, 1998; Quadros and Monteiro-Filho 2000; Quadros and Monteiro-Filho, 2001; Kasper et al., 2004). However, the social behavior of this species has been slightly studied (Gorman and Trowbridge, 1989; Kasper et al., 2004).

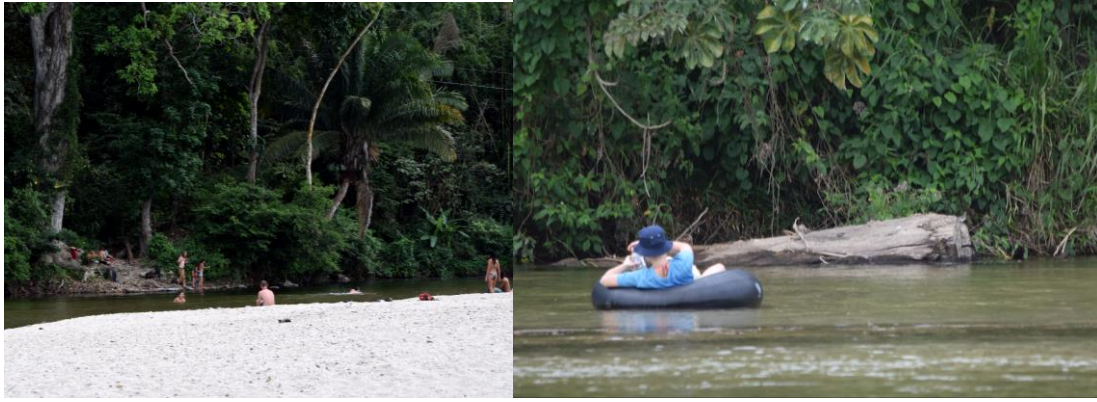
This species is currently included in the Convention on International Trade in Endangered Species of Wild Fauna and Flora- CITES Appendix I (2017), it is catalogue as Vulnerable in the Red List of Threatened Species of Colombia (Rodriguez et al., 2006), and is Near Threatened on a global scale by the International Union for the Conservation of Nature - IUCN (Rheingantz and Trinca, 2015). Nevertheless, their populations have declined due to the influence of anthropogenic activities such as hunting (Morales-Betancourt and Medina Barrios, 2018), spilling of industrial, and urban waste, drainages, intensive water extraction, high concentrations of pollutants (Gallo-Reynoso 1989; Foster-Turley et al., 1990; Sierra and Vargas 2002; Cirelli, 2005; Arellano et al., 2012), legal and illegal mining (industrial and artisanal), that modify the physical and chemical conditions of the water, the riverbeds and increase of deposits of heavy metals (Trujillo et al., 2013). In addition, other risk factors such as parasites, diseases, natural deaths, among others exists (Arellano et al., 2012). In general, due to its strong dependency of an adjacent terrestrial environment to the water bodies, river otters can be affected for negative changes of the margins of the tributaries (Foster-Turley et al., 1990; Quadros and Monteiro-Filho, 2002; Kasper et al., 2004; Santos et al., 2012; Trujillo et al., 2013).

As a contribution to the species, La Guajira's Environmental Authority – Corpoguajira subscribe with Omacha Foundation the contract “Otter (*Lontra longicaudis*) conservation at the La Guajira department, with focus on Forest Protective Reserve Montes de Oca” that focused on studies on occurrence and specific threats to the species in the area, as well as implementation of community awareness activities. Final objective of these studies were, to serve as inputs for the elaboration of the Conservation management plan of the Neotropical otter (*L. longicaudis*) in La Guajira.

## **METHODOLOGY**

### **Area of study**

The Palomino River is located between Magdalena and La Guajira, the Northern region of Colombia. Palomino headwater is 4600 meters above sea level in the Sierra Nevada de Santa Marta and main course is about 70 km length until its mouth in the Caribbean Sea (Neuta et al., 2017). The river water is extremely transparent, and people use the river for different activities as recreational (tubing and swimming) (Figure 1), harpoon fishing, clothes watching and sand and gravel extraction. Palomino beach is one of the emerging destinations for millennial tourist in Colombia since it has a snow mountain view and many trails that connect to the indigenous communities, in front of it the sea with surfing waves and hostels by the beach were the river ends. Although, no tourism development plan or tourism land use order had been implemented yet.



**Figure 1.** The left image shows the middle part of the Palomino River where tourists swim, and the right image shows leisure tubing activity; the log in the background is an otter latrine

During the dry season of the year 2015 (February), sampling was carried out in the middle and low areas of the Palomino River (municipality of Dibulla, La Guajira department) by the riverbeds and banks (Figure 2), for a total of 3 km segmented in six transects. Latrines were identified and those with fresh faeces were selected to locate, close by, sighting station to increase possibility of direct *L. longicaudis* observation. Methodology for detection through direct observation was implemented (Anguera, 1986), with an *ad libitum* method, annotating the behaviour observed over a designated period of time or frequency (Gras et al., 1990).



**Figure 2.** Lower part of the Palomino River where the type of shrub and arboreal vegetation on the bank can be seen.

Five sighting stations were established, from P1 to P5, where P1 was the closest one to the river mouth and P5 the farthest from the sea. GPS references are shown in Table 1.

**Table 1:** Observation stations in the Palomino River (Department of La Guajira, Colombia).

| Designation | Geographic position               | Metres above sea level |
|-------------|-----------------------------------|------------------------|
| P1          | N 11° 14' 54.7"; W 073° 34' 05.4" | 16                     |
| P2          | N 11° 14' 46.6"; W 073° 34' 04.1" | 16                     |
| P3          | N 11° 13' 54.3"; W 073° 34' 04.6" | 181                    |
| P4          | N 11° 13' 02.8"; W 073° 34' 50.9" | 22                     |
| P5          | N 11° 12' 59.4"; W 073° 34' 53.6" | 22                     |

The observation was made for a period of nine days, with a sampling effort 41 hours at not less than 20 meters from the latrines, with 143,07 minutes of behaviour observations.

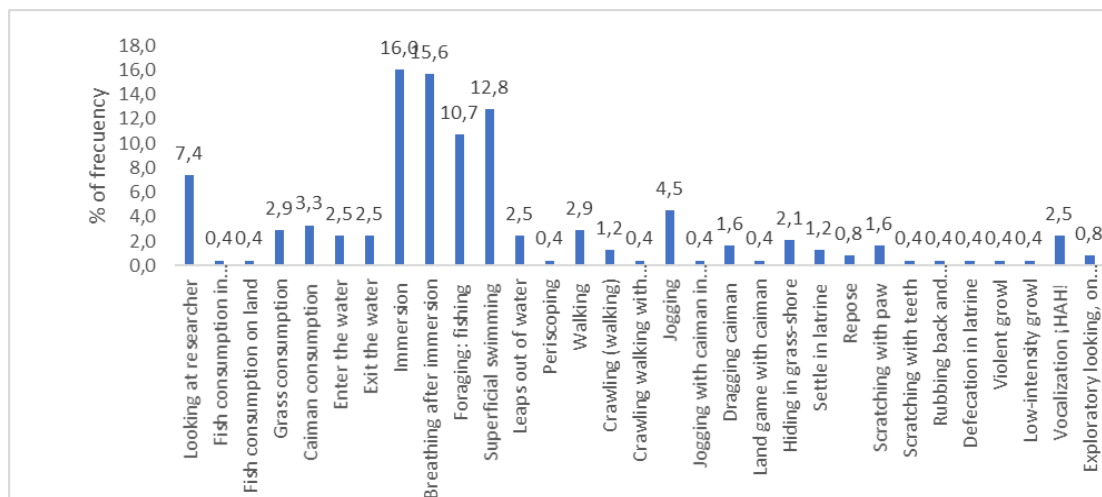
An observational chart was made for each sighting of *L. longicaudis*, specifying time and activity executed and grouped the behaviours found in categories, as implemented by Duplaix (1980) for Giant river otter (*Pteronura brasiliensis*). There was more observation time at some points given the better accessibility.

## RESULTS

Observation stations methodology for the direct observation using an *ad libitum* sample, made possible to register *L. longicaudis* four times, in four different days, three of them in the same latrine, observation station P1 located in the Global Positioning System- GPS Coordinates N 11° 14' 54.7"; W 073° 34' 05.4". Fourth sighting occurred during the morning in observation station P2, GPS Coordinates N 11° 14' 46.6"; W 073° 34' 04.1", which is approximately 200 m from observation station P1.

The observation station methodology for the direct observation using an *ad libitum* sample resulted in recording *L. longicaudis* four times, on four different days. Three of the records were at the same latrine, at observation station P1, located at GPS Coordinates N 11° 14' 54.7"; W 073° 34' 05.4". The fourth sighting occurred during the morning at observation station P2, GPS Coordinates N 11° 14' 46.6"; W 073° 34' 04.1", which is approximately 200 m from observation station P1.

In these four events, 31 different behaviours were recorded, of which immersion, respiration after immersion, surface swimming and foraging occupied the highest rate of frequencies with 16%, 15.6%, 12.8%, and 10.7% respectively (Figure 3). To group behaviors according to common characteristics (Table 2), variables described by Duplaix (1980) for *Pteronura brasiliensis* were used, since behavioural descriptors for *L. longicaudis* do not exist. Behaviors were clustered in groups and subgroups by Duplaix (1980) in order to facilitate the reading and to improve the understanding of the relations between behaviours.



**Figure 3.** Behaviours observed in *L. longicaudis* in Palomino River, La Guajira, Colombia.

**Table 3.** Groups, subgroup and behaviour unit observed in wild *L. longicaudis* in Palomino river, La Guajira, Colombia.

| Characteristics of the behaviours* |                                     | Behaviour  | % of frequency |
|------------------------------------|-------------------------------------|--|----------------|
| Group                              | Subgroup                            |  |                |
| Senses                             | Observation                         | Looking at researcher (Figure 4)                 | 7.4            |
| Maintenance activities             | Feeding                             | Fish consumption in superficial swimming         | 0.4            |
|                                    |                                     | Fish consumption on land                         | 0.4            |
|                                    |                                     | Grass consumption                                | 2.9            |
|                                    |                                     | Caiman consumption (Figure 5)                    | 3.3            |
| Locomotion                         | Aquatic locomotion                  | Enter the water                                  | 2.5            |
|                                    |                                     | Exit the water                                   | 2.5            |
|                                    |                                     | Immersion  | 16             |
|                                    |                                     | Breathing after immersion                        | 15.6           |
|                                    |                                     | Foraging: fishing (Figure 6)                     | 10.7           |
|                                    |                                     | Superficial swimming (Figure 7)                  | 12.8           |
|                                    |                                     | Leaps out of water                               | 2.5            |
|                                    |                                     | Periscoping                                      | 0.4            |
|                                    | Terrestrial locomotion and postures | Walking  | 2.9            |
|                                    |                                     | Crawling (walking)                               | 1.2            |
|                                    |                                     | Crawling walking with caiman in mouth (Figure 8) | 0.4            |
|                                    |                                     | Jogging (Figure 9)                               | 4.5            |
|                                    |                                     | Jogging with caiman in mouth (Figure 10)         | 0.4            |
|                                    |                                     | Dragging caiman (Figure 11)                      | 1.6            |
|                                    |                                     | Land game with caiman                            | 0.4            |
| Hiding in grass-shore              | 2.1                                 |  |                |
| Settle in latrine (Figure 12)      | 1.2                                 |  |                |

|                    |   |  |     |
|--------------------|---|--|-----|
| Comfort Activities | Resting and sleeping postures - Rest          | Repose (Figure 13)                       | 0.8 |
|                    | Cleaning - Scratching                         | Scratching with paw (Figure 14)          | 1.6 |
|                    | Cleaning - Skin biting                        | Scratching with teeth                    | 0.4 |
|                    | Cleaning - Rolling and rubbing                | Rubbing back and abdomen (Figure 15)     | 0.4 |
|                    | Elimination - Defecation                      | Defecation in latrine                    | 0.4 |
| Social activities  | Communication/Vocalization                    | Violent growl                            | 0.4 |
|                    |   | Low-intensity growl                      | 0.4 |
|                    | Communication/Investigation and alarm - Alarm | Vocalization ¡HAH! (Figure 16)           | 2.5 |
|                    | Investigation and alarm - Investigation       | Exploratory looking, on land (Figure 17) | 0.8 |

\*Based on groupings made by Duplaix (1980) for *P. brasiliensis*.

In Figures 4 to 17, images of behaviours referred to in Table 2 are shown with descriptions.



**Figure 4.** “Looking at the researcher” behaviour: after detecting the observer presence.



**Figure 5.** “Caiman consumption” behaviour: the ingestion of a juvenile spectacled caiman (*Caiman crocodilus fuscus*); feeding happened at the riverbank (Medina-Barrios and Morales-Betancourt, 2015).



**Figure 6.** “Foraging fishing” behaviour: the observed otters were swimming on the water surface and they dived at regular intervals. They lifted the chin, opening the mouth, taking in air, then lowered the chin, dipping the head, followed by curving the body into the water, finishing with the tail (Duplaix, 1980).



**Figure 7.** “Superficial swimming” behaviour: (in a similar way to a dog) (Duplaix, 1980): in shallow waters, when entering from bank, with the head out of water.



**Figure 8.** “Crawling walking with caiman in mouth” behaviour: movement with low body to avoid being seen.



**Figure 9.** “Jogging” behaviour: crossing exposed areas of river bed to enter deeper water



**Figure 10.** “Jogging with caiman in mouth” behaviour: seeking a safe refuge for prey consumption.



**Figure 11.** “Dragging caiman” behaviour: to hide prey and be able to eat it in a refuge.





**Figure 12.** “Settle in latrine” behaviour: possibly in order to improve visibility for detecting fish or threats.



**Figure 13.** “Repose” behaviour: Otter resting with flexed legs, ventral surface and tail resting on the substrate.



**Figure 14.** “Scratching with paw” behaviour: Otter N2 did this behaviour on the neck, right flank and belly, and on the same flank with its hind right paw.



**Figure 15.** “Rubbing back and abdomen” behaviour: when N2 was feeding on the juvenile caiman, N1 performed this activity by rubbing abdomen and back against substrate.



**Figure 16.** “HAH! Vocalization” behaviour: N1 vocalized an alert multiple times when the researcher was noticed (Larivière, 1999; Parera, 1993; Harris, 1968).



**Figure 17.** “Exploratory looking, on land” behaviour: N1 raises its head leaving the neck exposed and looks forward, perhaps to locate sources of different sounds, to locate things that have attracted attention or to search for conspecifics lost from sight.

## DISCUSSION

From the observed behaviours, it was possible to identify juvenile spectacled caiman (*Caiman crocodilus fuscus*) being taken in riparian vegetation on the riverbank (Medina-Barrios and Morales-Betancourt, 2015) and fish consumption in the water with the head raised out of the water, confirming that during the dry season in the lower Palomino river, this species behaves as an opportunistic predator, as had been previously documented in other areas of the continent.

In a 3 km length of river length, close to the active latrines, the most common behaviours were related to aquatic locomotion, and were only observed in the morning (from 6:58 am to 9:04 am). Tourist activity, such as tubing, occurs from 9 am to 6 pm. This could indicate that later in the day, the otters are engaged in other activities far from latrines, or it could be that human activities cause a reduction in activity, or temporal displacement to, for example, night time. Obviously, more behavioural studies are needed to complete the information on Neotropical otter habitat use in this type of rivers with the active presence of humans.

The environment of the latrine at which the four sets observations were made presented features that made it suitable (without being ideal) for the observing the activities of the otters, with bushes and herbaceous plants on the riverbank adjacent to water (Figure 2). This vegetation type was also reported by Santos and Reis (2012), and guaduales (*Guadua angustifolia*) vegetation was mentioned by Waldemarin (2004). For this reason, the conservation of bankside vegetation is crucial for the presence of the otter in the Palomino River.

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## RÉSUMÉ

### NOTES SUR LE COMPORTEMENT DE LA LOUTRE À LONGUE QUEUE (*Lontra longicaudis*) SUR LA RIVIÈRE PALOMINO (LA GUAJIRA, COLOMBIE)

La loutre à longue queue est un mammifère semi-aquatique qui a une large répartition géographique. Elle a l'habitude d'épreindre dans des zones visibles en dehors des plans d'eau ; ces indices de présence indirects sont au centre de la plupart des études les concernant, mais le comportement des espèces reste mal connu. En Colombie, l'espèce est considérée comme vulnérable et dans le nord du pays (La Guajira), aucune étude n'a été menée. Dans ce schéma, des observations sur le comportement de *L. longicaudis* dans la nature ont été répertoriées, en tant que première approche, tandis que des études d'occurrence ont été réalisées dans la région. Des observations ont été effectuées en 2015 pendant la saison sèche ou en l'absence de pluie (février), dans les cours moyen et inférieur de la rivière Palomino. Cinq sites de repérage ont été définis le long de la rivière avec une méthode d'observation par échantillonnage ad libitum. En conséquence, 31 comportements différents ont été observés, parmi lesquels l'immersion, la respiration après immersion, la nage superficielle et la

recherche de nourriture qui ont obtenu le taux le plus élevé de fréquence, avec respectivement 16%, 15,6%, 12,8% et 10,7%.

## **RESUMEN**

### **NOTAS SOBRE EL COMPORTAMIENTO DE NUTRIA NEOTROPICAL (*Lontra longicaudis*) EN EL RÍO PALOMINO (LA GUAJIRA, COLOMBIA)**

La nutria neotropical es un mamífero semiacuático que ocupa una amplia distribución geográfica. Tiene el hábito de defecar en áreas conspicuas fuera de los cuerpos de agua, por lo que este rastro indirecto es el foco de la mayoría de estudios sobre la especie, pero poco es conocido sobre su comportamiento. En Colombia es considerada Vulnerable y, en la zona norte del país (La Guajira), no se han realizado estudios. En este marco, se realizaron observaciones de comportamiento de *L. longicaudis* en vida silvestre, como una primera aproximación, mientras se llevaban a cabo estudios de presencia en el área. Las observaciones fueron realizadas en 2015 durante la estación seca o de no lluvias (febrero) en la parte media y baja del río Palomino. Cinco estaciones de observación fueron establecidas y se implementó el método de muestreo *ad libitum*. Como resultado, un total de 31 comportamientos diferentes fueron registrados, en los cuales inmersión, respirar tras la inmersión, nado y forrajeo tuvieron las frecuencias más altas con 16%, 15.6%, 12.8% y 10.7%, respectivamente.