EXPERIMENTAL REINTRODUCTION OF THE GIANT OTTER (*Pteronura brasiliensis*) IN THE IBERÁ PARK (Corrientes, Argentina)

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CLT

THE CONSERVATION LAND TRUST

SUMMARY

The giant otter (*Pteronura brasiliensis*) is extinct throughout Argentina. Hunting, habitat alteration and dog attacks are mentioned as the main causes that led to the extinction of this species. The giant otter is internationally listed as Endangered by the IUCN; thus, efforts must be directed to boost existing otter populations and increase, through reintroductions, its geographic range within the historical area of distribution of the species. The giant otter, the largest aquatic mammalian carnivore in the Neotropics, is a top predator; thus, it is a critical element in freshwater systems. In areas where they still exist, giant otters also represent an important ecotourism resource as they add great value to wildlife watching trips.

Specifically in Corrientes province, the giant otter was known to inhabit the Iberá wetlands, which is currently protected by the 700,000 ha Iberá Park and the adjacent 600,000 ha Iberá Reserve, where the threats that caused its extinction have been eliminated or controlled.

Here we propose the experimental reintroduction of giant otters in the Iberá Park to develop tools and techniques that can be used in the future to establish self-sustaining populations of giant otters in Argentina and other regions of South America, where the species has undergone sharp population reductions.

As required, this project fulfils all the criteria set by IUCN for this type of initiative. Indeed, the Iberá Park presents favorable habitats for the establishment of giant otters including extensive undisturbed areas, where preys are abundant, and threats are negligible.

We will obtain founder animals from European Zoos in accordance to the international giant otter studbook and following guidelines from the IUCN Otter Specialist Group. Selected individuals will be quarantined in origin and destination, then kept in a pre-release pen with access to terrestrial and aquatic habitats, and finally released in the Carambola creek and the Paraná Lagoon. We will monitor reintroduced otters using radio-telemetry techniques during the first 12 months after release.

Once the released individuals that come from captivity are well adapted to natural conditions, the initial population will be supplemented through the translocation of wild individuals from sites where populations have reached their carrying capacity in other Latin American countries (ideally from Pantanal, Brazil).

The Conservation Land Trust Argentina (CLT) has a broad experience in successfully reintroducing vertebrates in the Iberá Park. In fact, within the last 12 years CLT staff has used a diverse array of tools, ranging from rehabilitating (giant anteaters) and translocating (pampas deer) wild individuals to releasing captive individuals back into the wild (collared peccary, tapir and green winged macaw), in order to reestablish ecologically functional populations of these species. Therefore, we are confident that we will be able to achieve all the goals presented in this proposal.

With this project we aim to develop a strong technical basis to trigger and support robust and ambitious reintroduction efforts that should result in the reestablishment of giant otter populations over most of their historical range. In doing so we will restore a magnificent and critical ecological player to the fresh water systems of South America for the benefit of the ecosystems and the enjoyment of future human generations.

This project has been formally approved by provincial (Corrientes province) and federal authorities.

INTRODUCTION

1. 1. THE GIANT OTTER

1.1- General characteristics

The giant otter (*Pteronura brasiliensis*) is a carnivore native to South America that belongs to the Mustelidae family. It is the largest aquatic carnivore in this region and the largest otter in the world. An adult male can reach 1.8 m in length and weigh 33 kg, while an adult female can reach 1.7 m and weigh up to 29 kg (Rosas et al., 2009; Leuchtenberger pers com). In addition to its large size, the species most distinctive physical characteristics are the long-flattened tail and the white marks on the throat; these marks are visible in most individuals and with a specific pattern in each of them, which allows individual identification.

The life expectancy is up to 13 years in males and up to 11 years in females. It can extend up to 15 or 16 years in captivity. The generation time is 7 years (Groenendijk, 2015; Davenport, 2010).

1.2- Social Behavior

Giant otters are social and territorial animals. They generally live in family groups of 2 to 15 individuals, not necessarily related, in well-established territories (Duplaix, 1980). Dominant males play an important role in the defense of the territory, which they mark using latrines and vocalizations (Groenendijk, 1998). In Pantanal (Brazil), the territory size varies greatly between the dry and wet seasons, and can increase up to 50 times in area, from 0.1 - 2.3 km² (dry season) to 3.6-7.9 km² (wet season; Leuchtenberger et al. 2013).

Individuals from the same group and from different groups communicate with visual, chemical and vocal signals and through physical contact.

Giant otters use water courses to feed and move, although they spend much of their time on the mainland. They usually use sites with bare ground near water courses (camps) where they mark the territory with latrines, sunbathe or rest. In addition, they dig dens with several exits, usually under root systems or fallen trees, where they sleep, give birth and care for newborns (Groenendijk, 1998).

1.3- Reproductive Behavior

Males reach sexual maturity at two years of age (Oliveira et al., 2011). The members of the group cooperate with the reproduction, in which only the dominant female gives birth, while the other members help in the care and defense of the offspring (Duplaix, 1980). However, groups with two females nursing puppies have been observed, postulating the existence of two mothers or the help of a second female that in this way is socially positioned, increasing the chances of becoming dominant (Davenport, 2010). It has even been suggested that reproductive suppression mechanisms could exist to inhibit non-dominant females from entering estrus. After 60 days of gestation, the female gives birth one to three pups, usually once a year (Davenport, 2008; Duplaix, 1980), but groups with up to six pups have been observed (Leuchtenberger and Mourão 2008; Groenendijk et al., 2015; Bozzetti et al., 2015). Each group is capable of successfully raising an average of 1.5 pups per year (Groenendijk et al., 2015). This is

one of the main factors limiting the rate of population recovery and the repopulation of low-density areas (Groenendijk, 1998; Noonan et al., 2017).

The offspring disperse at an average age of 2.4 years (females) and 2.9 years (males), although some individuals disperse at 10 months and others remain in the parental group until the age of 6 years (Groenendijk et al., 2015; Leuchtenberger and Mourão, 2008).

1.4- Feeding

Otters feed mostly on fish, occasionally preying on crustaceans, mollusks and vertebrates such as sub-adult caimans, birds and rodents (Duplaix, 1980). An adult otter consumes 2 to 3 kg fish/day, while a juvenile consumes 1.5 kg fish/day (Duplaix, 1980; Schweizer, 1992; Noonan et al., 2017). Depending on the regions and prey availability, otters usually concentrate their diet on fish of the orders Characiformes, Perciformes and Siluriformes (Davenport, 2008). In the Manu Reserve (Peru), for example, the species consumes fish of the genus *Prochilodus* in greatest proportion (Davenport 2008), while in Pantanal (Brazil) main prey are fish of the genera *Hoplias* and *Serrasalmus* (Duplaix, 1980; Cabral, 2010).

Otters fish alone, in pairs or in groups (Davenport, 2008, Duplaix, 1980), but they do not share food. In fresh water ecosystems, giant otters are considered top predators; as such, they are deemed critical for the systems they inhabit (Davenport, 2008).

1.5- Habitat

The giant otter prefers, although is not specifically restricted to, clear slow-flowing rivers, streams and lagoons (Duplaix, 1980; Carter and Rosas, 1997). Habitat selection is determined by refuge availability, amount of food, vegetation cover, and form, structure and access to river margins and banks and to water depth (Lima et al., 2012).

Although the giant otter is usually associated with steep river margins (Duplaix, 1980), this characteristic does not seem to be as important for the species as other variables (Muanis and Oliveira, 2011).

1.6- Past and current distribution

The species distribution used to be widespread in the past, ranging from Guyana, Venezuela and Colombia, to northern Argentina and Uruguay and eastern areas of the Andes (Fig. 1, Carter and Rosas, 1997).

Most of the giant otter populations are currently discontinuously distributed in the Pantanal, the Brazilian Amazon and immediately adjacent regions including French Guyana, Surinam and Guyana (Fig. 1, Kruuk, 2006; Duplaix et al., 2008).

Figure 1. Historical (orange + green, adapted from Ferrero and Noriega, 2009) and current (green, IUCN, 2015) distribution range for giant otters. The solid white circle indicates the proposed reintroduction site.

1.7- Genetic structure

Although the existence of two subspecies was considered, genetic studies do not support any differentiation and the species is thus considered as monotypic (García et al., 2007; Noonan et al., 2017).

There are four different genetic lineages: Madre de Dios-Madeira, Itenez, Amazonas-Orinoco-Guyanas and Pantanal (Fig. 2). The genetic variability in these lineages is high (h = 0.91) except for Pantanal (h = 0.44, Pickles et al., 2011, 2012). Probably the low genetic variability found in Pantanal resulted from the almost extinction of this population due to high hunting levels (e.g., at least 12,000 pelts were exported from Pantanal in the 60's, representing for Brazil a quarter of its production in that period (Harris et al., 2005)).

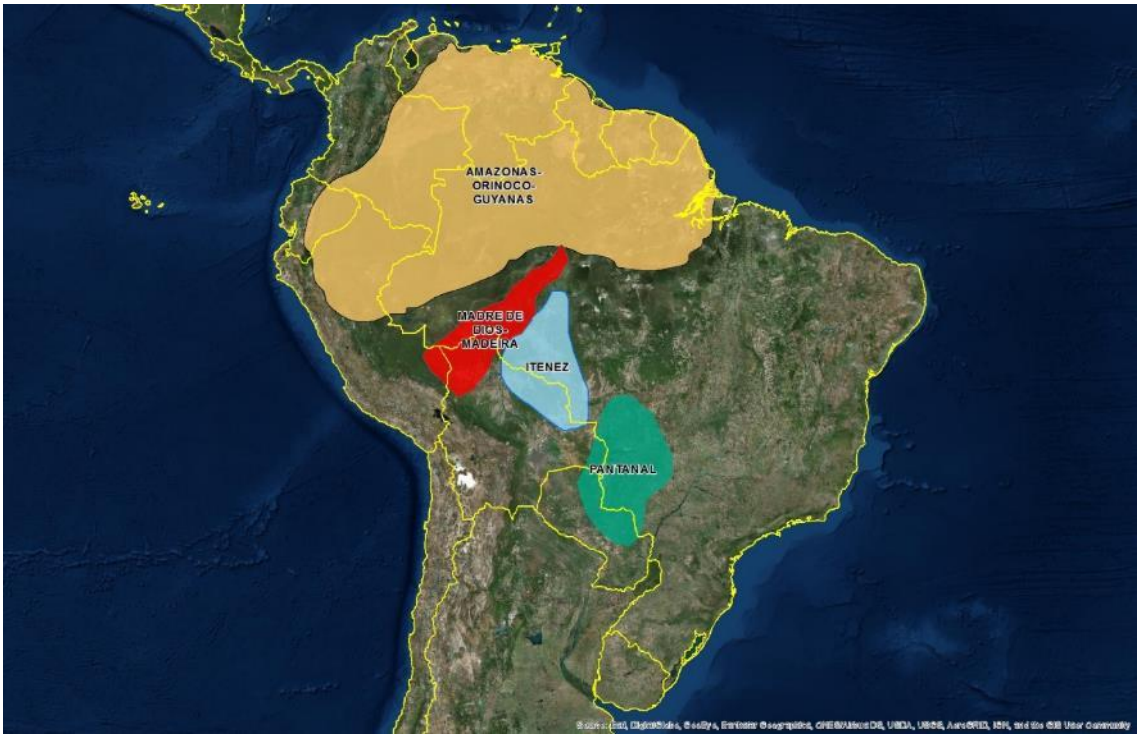

Figure 2. Distribution of the four identified giant otter lineages (Source: Pickles et al., 2011).

1.8- Historical presence in the region

The giant otter inhabited Argentina in the basins of the Paraná and Uruguay rivers in the Argentine Mesopotamia including the Iberá wetlands (Chehebar, 1991). It also penetrated the Chaco region through rivers such as the Bermejo, reaching west as far as Jujuy province (Chébez and Gil, 2008). The last records of the species in the country date back more than two decades, in the basins of the Iguazú, Paraná and Urugua-í rivers in the province of Misiones (Chébez and Bertonatti, 1994), with a single recent sighting in 2010 on the upper Iguazú River, in the area of 'Garganta del Diablo' (Valente, 2016).

In the province of Corrientes sightings are cited mainly along the Paraná (D'Orbigny, 1998) even up to the year 1993 (Becacecci and García Rams, 1995), and Uruguay rivers. There are also unconfirmed records in the departments of Ituzaingó and Paso de los Libres (Chébez and Betonatti, 1994).

Within the Iberá wetlands, connected to the Paraná River through the Corrientes river and to the Uruguay river through the Miriñay River, the most well-known evidence of the species presence is a skull (currently deposited in the Collection of the Natural Sciences Museum in La Plata) collected by Domingo Cabrera, a former local hunter and later park-ranger on April 19th, 1999 together with other people (Roque Pera, Marcelo Noailles, Pedro Noailles and Tabela Madariaga). The finding was made on a sandbar on the island of Biombo (currently disappeared) in the Fernández lagoon. According to Cabrera (personal communication), while walking along the coast of the island, he observed the back of the buried skull and extracted it easily with his knife. He could recognize that the skull belonged to a large otter, although he had never observed the species. He immediately differentiated the skull because it was the same as that of the neotropical river otter (*Lontra longicaudis*) but larger. In addition, his father (Pablo Cabrera) who had also been a local hunter, had mentioned the presence of the giant otter in the areas of Rincón del Diablo, Capitá Miní, Yahaveré and Itatí Rincón lagoon. Domingo Cabrera could not assure us that his father had seen or hunted any individual of the species, but he did know of its existence in the wetlands.

Also, Mr. Osvaldo Sandoval, local from the village of Yahaveré and the living hunter with greatest knowledge of the wetlands, told us that his mother's cousin, Serapio Cabrera, had hunted a large otter in the Corredera de Silva, in one of the ends of the Misteriosa Lagoon approximately in the year 1942 or 1943 (Sandoval had not yet been born on that date). Sandoval said he knew the giant otter and that the only time he had seen it was in the year 1987 in Sánchez creek, a few kilometers north of the town of Colonia Carlos Pellegrini, more precisely in the vicinity of where Route 40 crosses the aforementioned stream, in the village Las Madreselvas (San Solano field from the Santa Catalina Ranch). He mentioned that they were hunting with dogs on horseback and that the dogs cornered the animal in that stream, without being able to catch it. He described it very well, highlighting the white spots on the throat.

Finally, the veterinarian Marcelo Romano observed in mid-1985 a juvenile male in the Miriñay wetlands, west of the town of Tapebicuá. The animal was killed by a person on horseback and could be measured (110 cm total length). It was immediately recognized as a giant otter by the white coloration in the throat.

Other authors have also recorded sightings of the species based on interviews with locals, mainly on the Paraná River and the vicinity of the Miriñay and Corrientes rivers (Fig. 3, Parera, 1992).

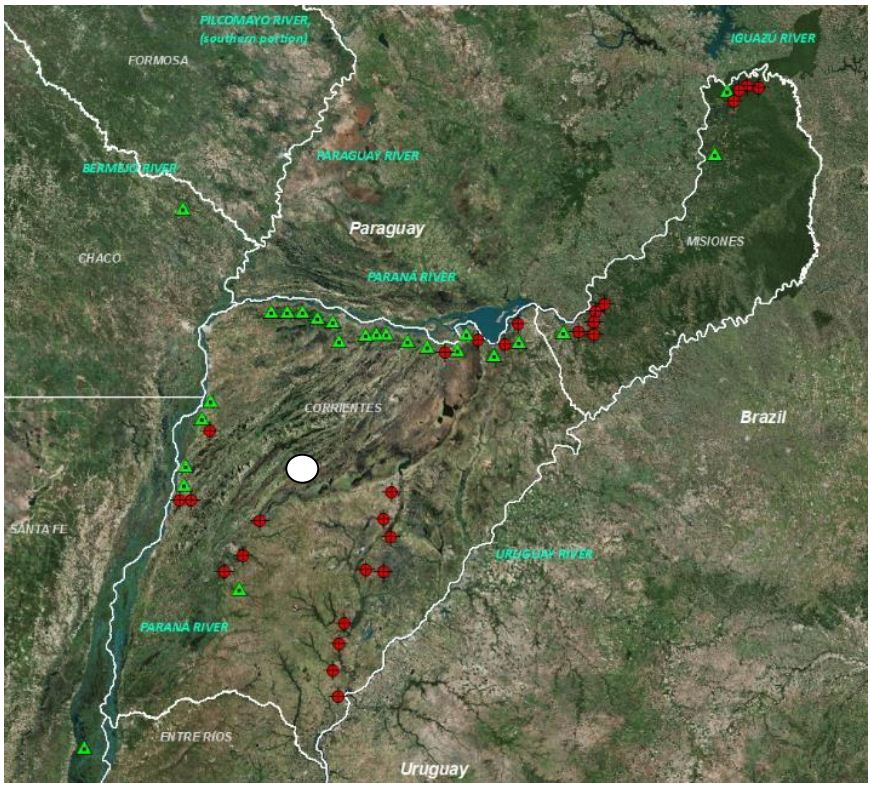

Figure 3. Giant otter records through interviews with locals. Green solid triangles: sightings of family groups, red solid circles: solitary individuals (redraw from Parera, 1992). The solid white circle indicates the proposed reintroduction site.

1.9- Causes for the declining and regional extinction of giant river otters

The species is sensitive to habitat alteration, including dam construction, pollution (Foster- Turley et al., 1990; Parera, 1996), hunting and poaching (Foster- Turley et al., 1990) and conflicts with fishermen throughout their distribution (Marmontel et al., 2015). Commercial hunting was the main threat to the species until the end of the 70's, suffering an important persecution for its fur or to be sold as pets,

which led giant otter populations to decline throughout their distribution (Schweizer, 1992; Carter and Rosas, 1997; Díaz and Sánchez, 2002; Utreras and Jorgenson, 2003). Also, its leather was considered to have medicinal attributes such as relieving pain in the waist. Finally, giant otter leather was used in clothing for its softness (Parera and Erize, 2002). Parera and Erize (2002) suggest that all these factors operated in Argentina, leading to the retraction and probable extinction of the giant otter in Argentina.

1.10- Conservation status

The species is listed as Threatened at an international level, Critically Threatened in most countries where it is distributed, and Probably Extinct in Argentina according to the IUCN (2015). The Argentine Society for Mammals Study (SAREM) considers it Critically Endangered and mentions no records of a stable population or adult individuals with stable territories in Argentina for at least the last 30 years (Ojeda et al., 2012).

2. PROTECTED AREAS IN IBERÁ AND REWILDING

The Iberá Nature Reserve (INR) is one of the most biodiverse protected areas with the greatest tourism potential in northern Argentina (Canziani et al., 2003). The area suffered a severe defaunation processes until 1983, due to human activities carried out in the area, causing the local decline of many species and the extinction of others. Among them, five species of mammals: giant anteater (*Myrmecophaga tridactyla*), collared peccary (*Pecari tajacu*), tapir (*Tapirus terrestris*), giant otter and jaguar (*Panthera onca*); and three species of large birds: bare-faced curassow (*Crax fasciolata*), green-winged macaw (*Ara chloropterus*) and glaucous macaw (*Anodorhynchus glaucus*), the latter globally extinct, disappeared from the INR region in the last century.

Since the creation of the INR of around 1,300,000 ha in 1983, the recovering process of the region's biodiversity allowed a remarkable population increment of many species. The INR includes 550,000 ha of public lands (Iberá Provincial Park, created in 2009) and 600,000 ha of private property (Iberá Provincial Reserve) in which different productive activities are carried out. The conservation organization The Conservation Land Trust (CLT) has acquired 150,000 hectares of private lands adjacent to the Provincial Park, which have been destined to conservation and are being progressively donated to the Argentine Federal government since 2016 to create the Iberá National Park. Altogether, the Provincial Park and the Iberá National Park make up the so-called Great Iberá Park, which, in its 700,000 ha, constitutes the most extensive IUCN's Category II protected area in the country.

Among other conservation activities aimed to recover biodiversity, specialists have recommended the reintroduction of various extinct species in the Iberá area, as a management action for the reestablishment of their populations (Parera et al., 2004). Among the species of mammals with potential to be reintroduced, the giant anteater, the tapir, the collared peccary, the pampas deer (*Ozotoceros bezoarticus*), the jaguar and the giant otter, were cited.

Based on these recommendations, CLT has been successfully developing a large-scale ecological restoration process that includes the reintroduction of locally extinct large mammals. This integral project of wildlife reintroduction constitutes one of the most ambitious and complex of the Neotropics (Zamboni et al., 2017).

The project formally began in 2006 with the reintroduction of the giant anteater, followed by the reintroduction of the pampas deer in 2009, the green-winged macaw and the collared peccary in 2015

and the tapir in 2016, added to the establishment of the Jaguar Experimental Breeding Center (CECY) for reintroduction purposes in 2015 (Zamboni et al., 2017). In this context and based on the species recommended to be reintroduced in Iberá, the reintroduction of giant otter is proposed. The reintroduction of the giant otter, together with the return of the jaguar, will reestablish the two mammalian top predators in the aquatic and terrestrial systems in the region.

In addition to the ecological effect of restoring a top predator in the ecosystem, the reintroduction of the giant otter will enhance ecotourism activities, which are steadily growing in the region. Indeed, giant otters became a valuable resource for wildlife sightings in the Brazilian Pantanal and the Peruvian Amazon. We expect a similar positive effect in Iberá.

3. OBJECTIVES

The main goal of this project is to develop the tools and techniques needed to successfully restore populations of giant otter in areas where they have vanished. Accomplishing this goal will also result in the reintroduction and establishment of a functional population of giant otters in the Iberá ecosystem.

During the first phase (2018-2020) of the project we will implement the experimental release of at least two consolidated groups of giant otters in the Iberá Park. In this phase we will develop and adjust methods of transportation, quarantine, acclimatization, and marking and monitoring.

During the second phase (2020-2022) we will evaluate the performance of the released animals. Specifically, we will monitor diet, habitat use and selection, reproductive success, survival and mortality rates, mortality causes, dispersal and individual and group behavior. This data will provide unambiguous information on the success of the reintroduction and expose the improvements that might be needed for efficient and successful reintroduction of giant otters.

Information obtained from the experimental reintroduction phase will be used to propose a reintroduction methodology that could be applied in the Iberá Park or in other areas where the species has disappeared and where habitat is suitable to propose a repopulation.

The third and final phase (2022 and onwards) will entail using the knowledge gained during this experimental reintroduction to implement a large-scale restoration program through which founder populations of giant otters would be released in as many sites as possible within this species' historical range in Argentina and later in South America.

4. CONDITIONS FOR THE EXPERIMENTAL REINTRODUCTION OF THE SPECIES IN IBERÁ

1- Selection of suitable release sites

The giant otter inhabited the Iberá wetlands (Parera, 1992). However, information about giant otters in Iberá is restricted to a few sightings recorded over a long period of time. Historical records suggest that the abundance of giant otters decreased sharply soon after humans began settling in the area. As a result no information is available regarding the habitats used by giant otters in the Iberá ecosystem.

In Pantanal, giant otters frequently use floating islands as refuge and marking sites (C. Leuchtenberger, com pers). The Iberá wetlands exhibit numerous large floating islands that could be used by giant otters as reported in Pantanal. Also, the closely related neotropical river otter (*Lontra longicaudis*), a species

that usually digs dens where they give birth, uses floating islands to build dens and raise its offspring in Iberá (S. Heinonen, com pers).

In the Iberá ecosystem the Carambola creek and the Corrientes river present large tracks of riparian habitat, which is critical for den construction and latrine formation by giant otters. Both water bodies present diverse and abundant fishes (Almirón et al., 2003), including those that are prey of giant otters.

The Corrientes River is the Iberá's most developed watercourse connecting the wetland with the Paraná River. Along its course, the Corrientes River coasts (north of route No. 12, within the Iberá Reserve) have sectors with ravines up to 3 meters high, depending on the water level. This river runs through an unconsolidated portion of the Iberá Reserve, since lands alongside are mostly private ranches, where control by provincial park rangers is weak and human activities are intense. Indeed, besides ranching, river banks are commonly used by fishermen. Conversely, the Carambola creek runs mostly through a consolidated portion of the Iberá (figs. 4 and 5), where lands alongside belong to the state and thus are under greater levels of vigilance than those lands in the Corrientes river. Furthermore, the Carambola creek presents islets of forests that can support the construction of dens and deposition of latrines.

For these reasons, we propose releasing two groups of giant otters in the Carambola creek, more specifically where it widens to form the Paraná lagoon, which is in turn associated with the San Alonso island that provides suitable riverine habitat (Fig. 5). We also plan to reintroduce a third group in the Carambola creek, on the high land of Guayaibí, since this portion would also provide suitable riverine habitat.

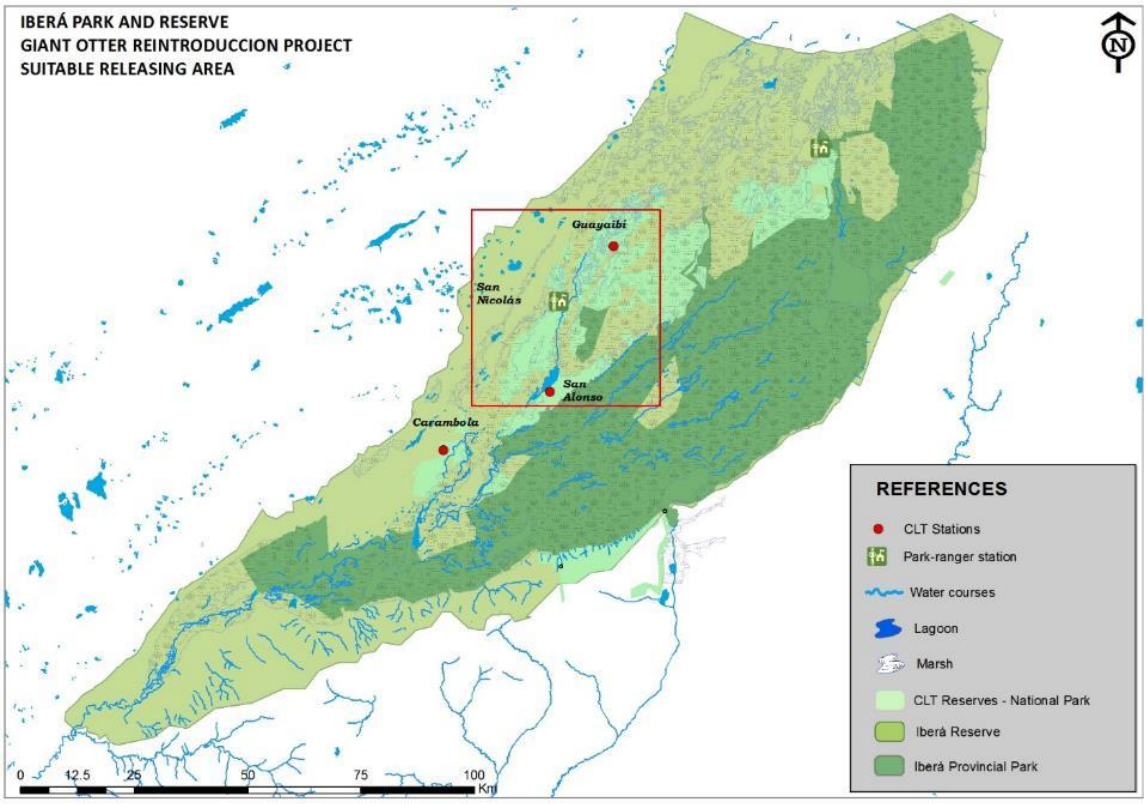

Figure 4. Location of suitable area for giant otter release in the Iberá Nature Reserve.

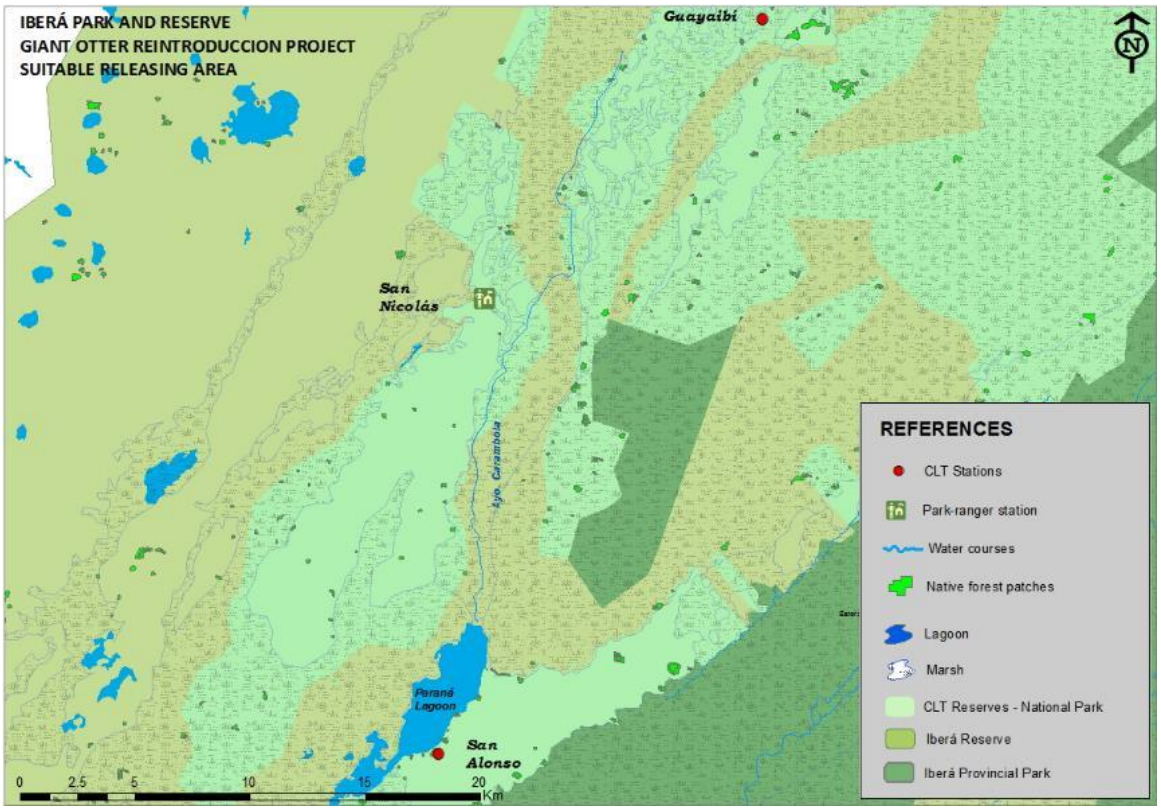

Figure 5. Detail of suitable area for giant otter release on the shores of San Alonso Island, on the Paraná lagoon, and on the Carambola stream.

2- Food availability for the giant otter in the Carambola stream

Fish diversity in Iberá is high, with 126 species recorded to date (Almirón et al., 2003). The creation of the Iberá Park and the fishing ban within it allowed for the recovery of species that suffered great fishing pressure in the past (Parera *et. al.,* 2004)

Most of the fish species in Iberá are small or medium sized and present sedentary habits, although the western sector that drains to the Corrientes river (including the Carambola creek and the Paraná lagoon) has a predominance of medium and big sized Characiformes and Siluriformes orders, with high abundance of migratory species of large size such as *Prochilodus lineatus* and *Salminus maxillosus* (Ruiz Díaz et al., 2002; Almirón et al., 2003), which are the most consumed genus by giant otters in Manu Reserve and Pantanal (Davenport 2008; Duplaix, 1980; Cabral, 2010)

Several fish genera and species known to be consumed by giant otters in Pantanal and Manu (Rosas, et. al., 1999; Davenport, 2008) are present in Iberá. Among the Characiformes, there are species of mojarra fishes such as *Astyanax spp.*, *Poptella paraguayensis*, *Hyphessobrycon spp*. and *Moenkhausia spp*., piranhas such as *Serrasalmus spilopleura* and *Pygocentrus nattereri*, tarariras such as *Hoplias malabricus* and *Hoplerythrinus unitaeniatus* and other species such as *Schizodon borellii* and *Leporinus optusidens*. Among the Siluriformes there are species of catfish such as *Pimelodella spp., Pimelodus spp., Rhamdia* and *Corydoras spp*., and armored catfish including *Loricariichthys spp*. and *Hypostomus spp*. (Benzaquén, 2013; Casciotta et al., 2003).

Caimans can compete with the giant otter for food and sometimes prey on otter cubs (Davenport, 2008). In turn, giant otters prey on juveniles and subadults caimans, especially during periods of food shortage (Ribas et al., 2012; Chébez and Bertonatti, 1994). In any case, both species coexist naturally (Ribas et al., 2012), although otters tend to be active during the day, while caimans are mostly active at

night (Rosas, *et. al.,* 2009; Chébez and Bertonatti, 1994). The neotropical river otter also coexists with the giant otter. Competition for food among both otter species is usually reduced by selection of different prey sizes and microhabitats (Davenport, 2008).

3- Criteria for evaluating the reintroduction

As suggested by Kleiman et al. (1994), we evaluated the potential for giant otter reintroduction according to a set of variables (Table 1).

Table 1. Criteria to evaluate the feasibility for the species reintroduction proposed by Kleiman et al. (1994).

Variables to be evaluated	**Fulfillment for the considered species**
Species status	
1. Need to increase the local wild population	Yes, the species is regionally extinct.
2. Existence of an adequate source population	Yes, there are animals in zoological collections to implement this experimental reintroduction (Schikora, 2017). Furthermore, there are individuals available from wild populations in neighboring countries (Brazil) if in the future supplementing the reintroduced population were needed.
3. Does not suppose threats to wild populations	It does not suppose any threats. The species went regionally extinct; no other populations are nearby.
Environmental conditions	
4. The causes that generated its disappearance have been eliminated	Yes, all threats have been eliminated in the area (Iberá Park, 700 thousand hectares) where the reintroduction will take place.
5. There is enough protected habitat	Yes, along the Carambola stream and the Paraná lagoon, on the high lands of San Alonso and Guayaibí. All this places are protected in the Iberá Park (700,000 ha)
6. The habitat is not saturated	It is not. The species is absent and there is no other mammalian top predator in the freshwater systems of Iberá.
Sociopolitical conditions	
7. It does not have a negative effect on the local population	The species does neither represent risks for humans nor their resources.

8. There is support from the local population	Yes, locals have been supporting reintroductions in Iberá since the first projects in 2006. Further support would be gained as giant otters become a key attraction for tourists boosting the growing local tourism industry.
9. There are NGOs and GOs actively supporting	Yes, there is a long-term commitment from CLT, the Corrientes province government and the Federal government of Argentina, who had approved the project. Also, wildlife reintroductions were included as provincial and national policies in the Iberá Park management plan.
10. Conformity with national and provincial laws	Yes, the reintroduction of this species conforms all current federal and provincial laws. Furthermore, this project is in accordance with the Convention on Biodiversity and the conservation goals defined for the Iberá Park.
Existing resources	
11. The technology for carrying out the reintroduction is known	Yes, partially. There are experiences of rehabilitation and release of young individuals in areas where the species is present. There are manuals for the species management for captive breeding projects, work on telemetry monitoring and sanitary aspects. This experimental project will complement previous knowledge by further developing reintroduction techniques.
12. Knowledge about the species biology	Yes, there is enough information to make informed management decisions.
13. There are enough resources for the program execution	Yes, CLT has secured enough funding to execute the project.
Is reintroduction recommended?	**Yes, it is recommended as the proposal meets all requirements.**

5. DESIGN OF TECHNICAL PROCEDURES FOR REINTRODUCTION

1- Expected release site

Carambola Stream

The Carambola creek (291,580 ha) belongs to Iberá's western hydrological subsystem. This creek collects the waters of several wetlands located towards the north (Canziani, et al., 2003). Its volume is quite dynamic and positively correlated to rainfall (Parera et al., 2004). Carambola is immersed in a complex system of interconnected wetlands and swamps that opens in the Paraná lagoon. This lagoon is elongated and limited by marshy vegetation that grows on peaty soils and a coastline formed by floating islands composed of dense vegetation. The bottom of the lagoon is sandy and firm and presents a slight

slope towards its center, where it reaches about 3 m deep. Water is transparent most of the time, especially on windless days (Parera et al., 2004).

San Alonso Island

San Alonso is a 114-km^2 island is bounded by the Paraná lagoon and the Carambola creek on its west side and by swamps on its east, north and south sides. This island represents the highest land in the area, which contributes to its high vegetation diversity, composed by large areas of wiregrass (*Elionurus muticus*) and tall grasses (*Andropogon lateralis*) as well as grasslands of *Paspalum durifolium* surrounding inland lagoons and swamps, in addition to patches of forest with a notable development of vertical structure and *Butia paraguayensis* palm groves (Neiff and Poi de Neiff, 2006). There are patches of forests on the western shore of San Alonso that could serve as place for den construction.

2- Source population

Availability of founder individuals

Argentina lacks giant otters that could be used in this project. It is therefore necessary to import otters from other countries that successfully maintain ex-situ populations.

Giant otters are poorly represented within ex-situ populations in Latin America and there is no captive population that could serve as a donor of animals to support a reintroduction project. In contrast, the European Association of Zoos and Aquariums (EAZA) and the Association of Zoos & Aquariums (AZA) maintain breeding programs for the species with considerable success.

The EAZA successfully carries out the European Endangered Species Program project (EEP) and has a current population of 35 males, 24 females, and 3 unknown individuals in 18 institutions (Schikora, 2017). Due to the limited facilities available in zoos for the species, and considering that building new facilities is costly and complex, the EEP is on its carrying capacity, thus being currently able to generate surplus animals capable of sustaining a reintroduction project.

The AZA maintains the Species Survival Plan project (SSP) for the species that has also succeeded in producing offspring. In 2017 the population was composed of 19 males, 17 females, and 1 unknown individual in 8 different institutions (Schikora, 2017).

When it comes to wild populations, there are regions in Brazil, especially areas of Pantanal, where giant otters' populations are abundant and likely close to carrying capacity. Indeed, these populations are known to produce a high number of dispersing individuals that end up in sub-optimal areas, where their survival probability is low (Leuchtenberger, 2012).

These wild populations may become important after successful reintroduction of captive animals. Indeed, we expect to supplement the founder population with wild animals to increase genetic diversity. To do so, in parallel to the experimental reintroduction of individuals coming from ex-situ breeding programs from zoos, we will begin the process needed to obtain permits that should allow us to import individuals from wild populations.

The advantage of starting an experimental reintroduction with captive individuals is given by a greater facility to manipulate, manage and monitor them, as well as to avoid long distances dispersion. Indeed, previous experiences led by CLT personnel showed that captive animals were easier to manage than wild ones (Zamboni, *et. al.*, 2017).

3- Founders selection. Genetic aspects

The following aspects will be prioritized to select animals that will be part of the reintroduction project:

A. – Family groups. Cohesive family groups with the largest possible number of individuals. The family group will consist of at least one reproductive male and one reproductive female. Additional non-breeding individuals will be considered as an advantage, since groups with the greatest number of individuals exhibit best performances than small ones, since they cooperate with defense, feeding and offspring care (Groenendijk, 2015).

B.- Age. Individuals should be between three and seven years old.

C.- Reproductive experience. Individuals with previous reproductive experience will be favored over individuals without such experience. Ideally, we will aim to reintroduce pairs that present a record of previous successful reproductions.

Two subspecies of giant otters, represented in the Amazon-Orinoco and the Parana-Paraguay river basins, have been proposed (reviewed by Harris 1968); however, genetic evidence lent no support to such differentiation at the level of subspecies and concluded that giant otters belonged to a monotypic species (Garcia et al., 2007). Recently, Pickles et al (2012) described four genetically distinct lineages of giant otters across most of the otter´s current range; but whether these lineages represent significant evolutionary units remains controversial. Furthermore, genetic structure in these lineages was not related to distance; indeed, lineages within the Amazon basin were clearly distinct from other Amazonian populations, which were in turn closely related to populations from the Orinoco basin and a Pantanal lineage (Pickles at al., 2012). The genetic lineage of the giant otters that inhabited Argentina is unknown; it could be argued that Argentine giant otters were more closely related to those inhabiting the Pantanal than the Amazon, but available genetic data does not seem to support this hypothesis. Thus, we propose the reintroduction of a monotypic species that went extinct in Argentina, using readily available founders, mostly having an Amazonian origin, that will be provided by European Zoos.

4- Animal transportation

Otters will be transported by plane in specially designed containers (Fig. 6, Container No. 80), according to the regulations for the transportation of live animals of the International Air Transportation Association (IATA).

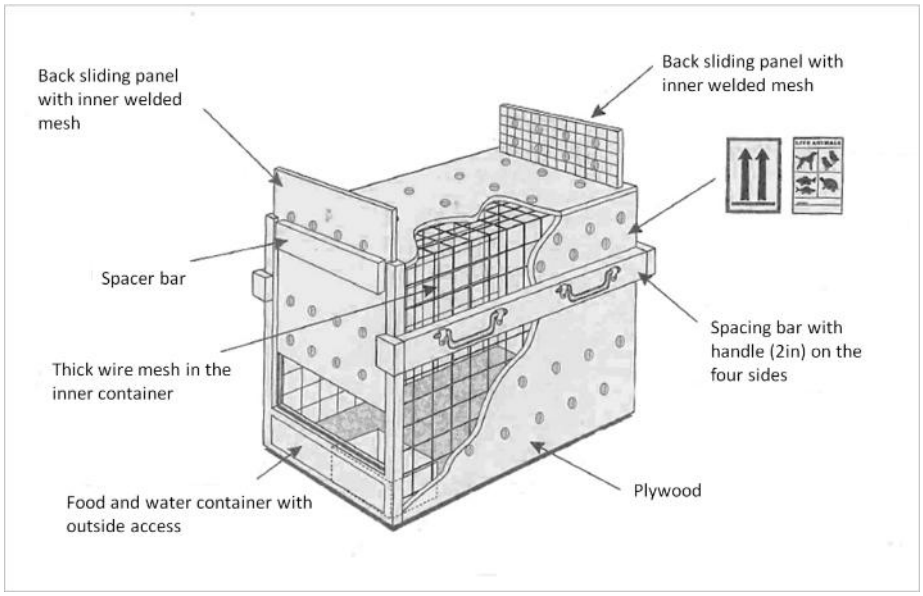

Figure 6. Detail of the transport box recommended for giant otter. Source: IATA live animals regulations.

IATA (2018) transportation guidelines establish that the height of the box must allow animals to stand in a natural position, with the head extended; whereas the width of the box must allow animals to turn completely and lie down comfortably. According to Sykes-Gatz (2005) successful transportation for giant otters has been made in 140-cm long x 60-cm wide x 57-cm high containers. Plastic containers of those manufactured for dogs and cats should not be used beyond short movements within the same institution (Sykes-Gatz, 2005).

Furthermore, box floors made of metallic mesh should be avoided because these animals have plantar pads and extremely sensitive interdigital membranes between the feet (Sykes-Gatz, 2005). Even if this material does not seem necessary to guarantee safety in the case of transporting this species, IATA requires the floor to be metallic, spill-proof and covered with a thick layer of absorbent material. Some institutions use the "ZooPro model crate" (Knapp Manufacturing, Fig. 7). This box is entirely built in metal, with adequate ventilation and spill-proof.

Figure 7. Transport box specially designed for the species. Source: http://knappmanufacturing.com/Zoo%20Pro/Zoo%20Pro.htm

It has been observed that giant otters from captivity have a low tolerance to heat (Carter and Rosas 1997; Sykes-Gatz and Gatz, pers. obs.). It is also necessary to be very careful when moving these animals in very cold temperatures. Transportation temperatures between 15.5 °C and 26.6 °C are considered adequate (Sykes-Gatz, 2004).

5- Quarantine

Giant otters that become part of the reintroduction project will undergo quarantine periods at both donor and receiving institutions. A 20 days quarantine at the donor institution will follow regulations issued by the Argentine Animal Health Service (SENASA) and the requirements established to import mustelids into Argentina (See Appendix I).

Quarantine at destination will last a minimum of 30 days in the facility that CLT owns at the Corrientes Biological Station, Corrientes province. This period would allow the development of clinical signs of diseases that the animal may have been incubating prior to transportation. No other species from the Carnivore Order will be allowed in the facilities during the quarantine. However, species from other Orders might be allowed in the facilities as their presence will not require reassuming the quarantine process (AZA Small Carnivore TAG, 2009).

Staff will be especially alert to signs that may be associated with disease, such as sneezing, coughing, vomiting, diarrhea, ocular and nasal discharge. Each individual will receive a complete physical examination. In addition, we will check their mouths, presence of ectoparasites and perform complete blood tests. Samples will be stored if possible for a retrospective disease assessment.

Furthermore, fecal samples will be collected to analyze the presence of gastrointestinal parasites, treating the animals according to the results. The presence of Strongiloid species will be specifically checked (Wünnemann, 1995).

Vaccines will be updated if needed; if the vaccination history is unknown (Annex III), the animal will be considered as not vaccinated, and the corresponding vaccines will be administered according to the vaccination protocol. Routine tuberculin tests are not used for this and other mustelid species since they are not as efficient as other techniques.

We will use the patterns of white spots in otter's throat to permanently identify them; such patterns are unique to each individual. We will also evaluate the use of an identification microchip, which will be located subcutaneously in the interscapular area at the base of the ears (Myers, 2011).

Family groups will be kept together during quarantine as much as possible, since they may develop abnormal behaviors such as stereotypes or self-mutilations due to over-grooming if they spend long periods in isolation.

It is important to obtain detailed and easily accessible medical records of each animal that passes the quarantine period. Upon receipt of the appropriate serologic test results and after two separate negative stool analyses within two weeks, the animals will leave the quarantine phase and will be transported to the pre-release pens.

If an animal dies during the quarantine, we will perform a necropsy to determine the specific cause of death and to decide the best way to eliminate the body based on the results obtained. The necropsy will include detailed descriptions of the outer and inner organs; representative samples of the organs will be sent for histopathological analysis (AZA Small Carnivore TAG, 2009).

Quarantine facilities at the receiving institution

The facility guarantees the necessary biosecurity conditions to isolate animals from any infectious disease or disease-transmitting vectors (Fig. 8).

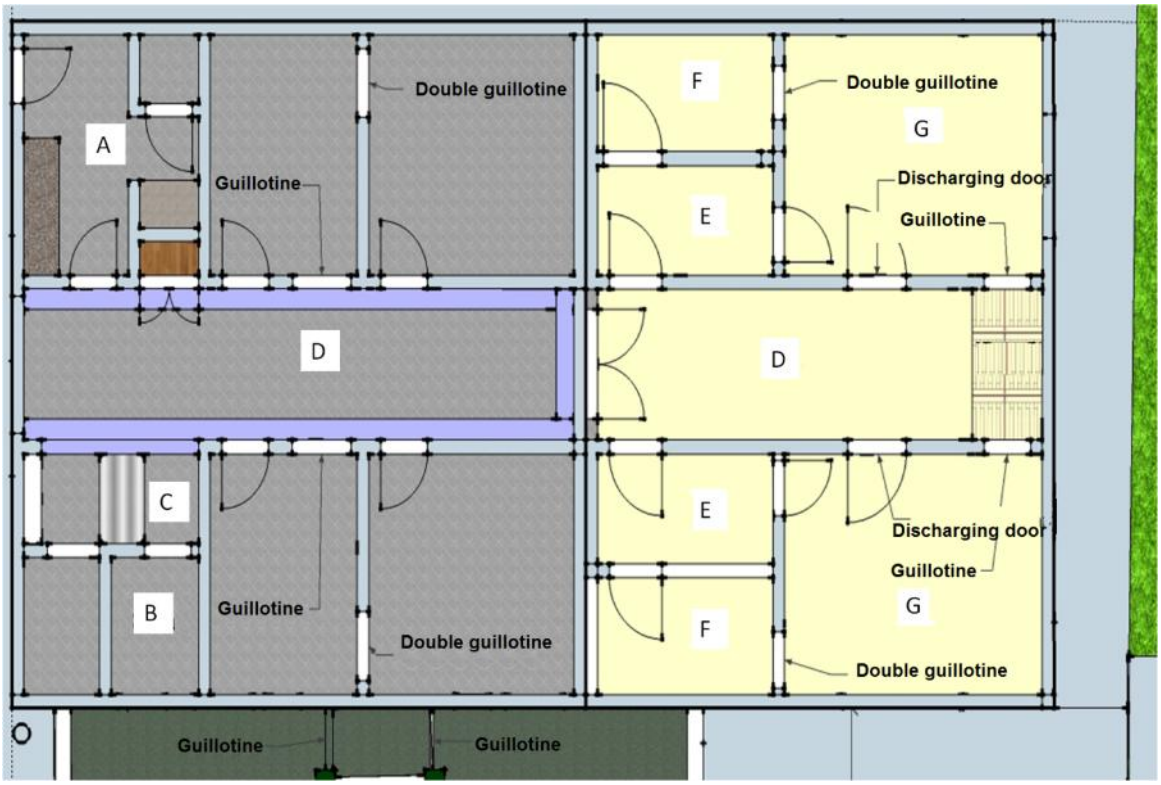

Figure 8. Design plan of the quarantine facilities.

Quarantine Facility description

- A: Entrance, wardrobe and sanitation area - Surface: 4.95 m^2

It is the quarantine entry room, where the staff changes clothes and stores the cleaning material. All the cleaning, work and maintenance material existing in the quarantine is exclusive to this building. The room has a sink for washing and disinfecting hands, a small bathroom and a storeroom.

- B: Kitchen area- Surface: 3.68 m^2

It is the room where food is stored and processed for animals. It has a "dirty" area, where food is received from outside through a window designed for that purpose and where the dirty animal feeders are received for cleaning and disinfection. Processed foods and clean utensils pass through a window into the "clean" area where each individual ration is prepared.

- C: Intervention area - Area: 3 m^2

It is the room where small interventions, such as collecting samples, cures, dental work and clinical examinations, are performed usually in anesthetized animals.

- D: Hall distributor - Area: 17.4 m^2

This hall has a 3.3 m^2 management tunnel (H) where animals can be isolated for medical training, weighing or visual explorations; it also allows animals to move from one enclosure to the other. It facilitates animals that live in social groups to spend their quarantine periods in visual contact with each other. There are two 60 x 30 cm windows in the corridor that allow staff to see each of the main enclosures and locate the animals quickly and easily. Windows are protected with safety glass in their internal part that completely isolates the enclosure from the corridor, avoiding the propagation of possible infectious diseases by airborne.

- E: Caregiver room - Area: 4.8 m^2

It is a small room used to store the cleaning material. It also fulfills a safety function as it is necessary to go through two doors to enter the area where otters are held; thus, decreasing the likelihood of animals escaping due to human errors. It allows access to the management room (see below) and the main enclosure. It also allows the storage of exclusive cleaning material for each facility and physical barriers to prevent the spread of infectious diseases among different animals housed in quarantine (foot baths, latex gloves, rubber boots or surgical). There is a tap to clean the interior facilities using a hose.

- F: Management room - Area: 5.1 m^2

Containment zone to house the animals while the main enclosure is cleaned. Due to its small size and easy access, it is the ideal place to inject anesthetics or other drugs using tele-injection techniques, since it has a double guillotine with sheet and grille and a grille window without glass. The grilles are made of a 15 cm x 15 cm x 8 mm mesh, protected inside by a fine 5 cm x 5 cm mesh. It has light coming from a skylight in the roof that can be darkened if necessary to create a burrowing sensation where the animal could feel safe.

- G: Main enclosure - Area: 15.4 m^2

Main room designed to house the animals during their quarantine period. Besides the entry door, this enclosure has another 1 x 1 m door for placing or removing the transportation box, and in no case will be used during the routine tasks of cleaning facilities.

This room has plenty of natural light from two 40x 60 cm skylights and two 75 x 180 cm windows. These windows are protected by both, a 15 cm x 15 cm x 8 mm mesh and a 5 cm x 5 cm mesh. On the outer side, a transparent PVC sheet insulates against possible bacterial contamination in both directions and can be removed for ventilation during cleaning activities. This enclosure has an automatic water sprue.

To cover the needs of swimming and cooling, a pre-fabricated pool of 2000 liters will be used (Fig. 9). This design is suitable for these animals for short periods of time and has been successfully used in several institutions that maintain the species for a long time. The water used to fill the pool is running water. A quality analysis of this water will be carried out shortly before the entry of the animals in quarantine to ensure that all parameters are within the recommended values for the species.

Figure 9: 2000 liters pool used for giant otter in captivity.

- Health check and deployment of telemetry transmitter

wo visual examinations will be conducted, at the beginning and end of the quarantine period, in ddition to a complete examination under anesthesia during the first week (AZA Small Carnivore AG, 2009). This health check will be conducted after the first week once the animals have adapted ɔ the new site and are eating on a regular basis.

horax X-rays will be taken during this health check to create a baseline to which future radiographs ɔuld be compared (AZA Small Carnivore TAG, 2009).

uring the check under chemical immobilization, the following tasks will be carried out:

To check microchips and tattoos and implant a microchip in the case that the original is not ɾorking properly.

To obtain a basic record of physiological parameters: heart rate, weight, body temperature, and ɛspiratory rate.

To examine the oral cavity and the dental pieces, cleaning the mouth if necessary. Any fractured ɔoth that needs to be repaired will be recorded and treated as soon as possible.

To carry out an evaluation of the reproductive system, recording characteristics of the external ɛnitalia, such as vulvar discharge, the shape or size of the testicles and the morphology of the ɱammary glands.

To take radiographs to evaluate morphological abnormalities; if renal cysts are observed, the umber, location and approximate size will be noted.

To collect blood samples and perform complete blood tests, including hematology and serum iochemistry. In the case of the giant otter, the extraction is usually done using the antebrachial ɛphalic vein (AZA Small Carnivore TAG, 2009). Aliquots of these frozen samples will be kept for ɯture studies. Annex III summarizes the samples to be obtained during the check-up and the tests ɔ be carried out with each sample.

To conduct an ELISA tests in animals originally housed in outdoor facilities in endemic places of *ilofiaria inmitis*. It is necessary to differentiate this parasite from *Dirofilaria lutrae*, which can be ɔund in blood, subcutaneous tissue and coelomic cavity of adult otters and that does not generally ɑuse disease.

To collect urine whenever possible to perform complete urine analysis. It is not recommended to

erform cystocentesis in giant otter because of the risk of bacterial infection; it is recommended to erform urethral catheterization or to obtain the sample by abdominal massage (AZA Small arnivore TAG, 2009).

uring quarantine, at least two copro-parasitological analyzes will be carried out. These analyzes hould include direct observations under the microscope together with the use of flotation and edimentation techniques. A Baermann test aids in the identification of certain parasites that are therwise difficult to detect.

Telemetry transmitter

It is not possible to use collars in giant otters because of the similar circumferences of head and neck (Ó Neill et al., 2008). Therefore, during quarantine, a telemetry transmitter will be implanted in the abdominal cavity of the animals.

The following radio transmitter brands and models have been used in different species of otters:

-ATS: Advanced Telemetry Systems (470 First Avenue, Isanti, Minnesota 55040, -USA; 32-42 g).

- Telonics (932E, Impala Avenue, Mesa, Arizona 85204, USA; 30 g).

-Wagener (Herwarthstr 22, Ko¨ln 50672, Germany; 30 g).

Advanced Telemetry Systems radio transmitters have been successfully deployed in giant otters. The radio transmitter plus a battery are contained in a cylindrical silicone casing that measures 102 × 20 mm and weighs 42 g; the weight of the transmitter represents 0.2% of the body weight of a medium-sized adult giant otter (Rosas et al., 2009).

Surgery for implanting transmitter is widely described in several publications (Silveira et al., 2011). The giant otter is placed over the surgery table in dorsal decubitus and the surgery area is shaved, disinfected with water, soap, alcohol and povidone-iodine and covered with a disposable surgical drape with an opening of about 10 cm length. The radio transmitter and the surgical material are disinfected by immersion in glutaraldehyde solution or by ethylene oxide and subsequently washed in sterile physiological saline. In some cases the radio transmitter is preheated to a temperature of 38ºC prior to its use (Fernandez Morán et al., 2002).

The access to the abdominal cavity is made through an incision of approximately 3.5 cm in length, below the umbilical scar. Subcutaneous tissue, fat and abdominal muscle are affected until reaching the peritoneum. The implant is inserted freely in the abdominal cavity. The abdominal muscle is sutured with polygalactin 2.0 by discontinuous suture, the subcutaneous is closed with polygalactin 2.0 by continuous suture and the skin is closed with 0.0 nylon using continuous intradermal suture. Afterwards a methyl methacrylate glue for tissues is used to seal the wound in a waterproof way. A LA antibiotic and an anti-inflammatory drug are given preventatively. This complete procedure lasts between 40-80 minutes.

In some cases (Fernandez Morán et al., 2002) the otters are anesthetized again at 10-12 days post-anesthesia for clinical examination, weighing and taking radiographs to determine the exact abdominal location of the radio transmitter before release.

7- Pre-release phase

Transportation

Once the quarantine is completed, the animals will be transferred to the prerelease facility at Iberá Park. The transportation will be carried out individually in containers of the same characteristics as those described in section 4. Animals will be in contact with the containers at least one week before transportation, so that they become familiarized with it and they enter inside the container by themselves, without the need to perform an immobilization. Transportation will occur during night hours to avoid overheating.

Pre-release (design and management)

Several previous successful experiences of pre-release facilities for the species have been reported. These experiences were associated to a few animals rescued from illegal wildlife traders.

The Omacha foundation in Colombia released five animals of which four became successfully adapted to a 40-172 m2 pre-release corral that included water for bathing; water always was from a non-natural water source.

In this project, the pre-release corral will be located in the same place where animals will be released. Thus, it will fulfill the dual purpose of adaptation to the new medium and anchoring; thus, decreasing the likelihood of individuals dispersing soon after they are freed. We will build a 300-m^2 corral that will include a shore area, with continuous flow of water and abundant vegetation, as well as resting and shelter areas with logs, burrows and covered areas (Fig. 10).

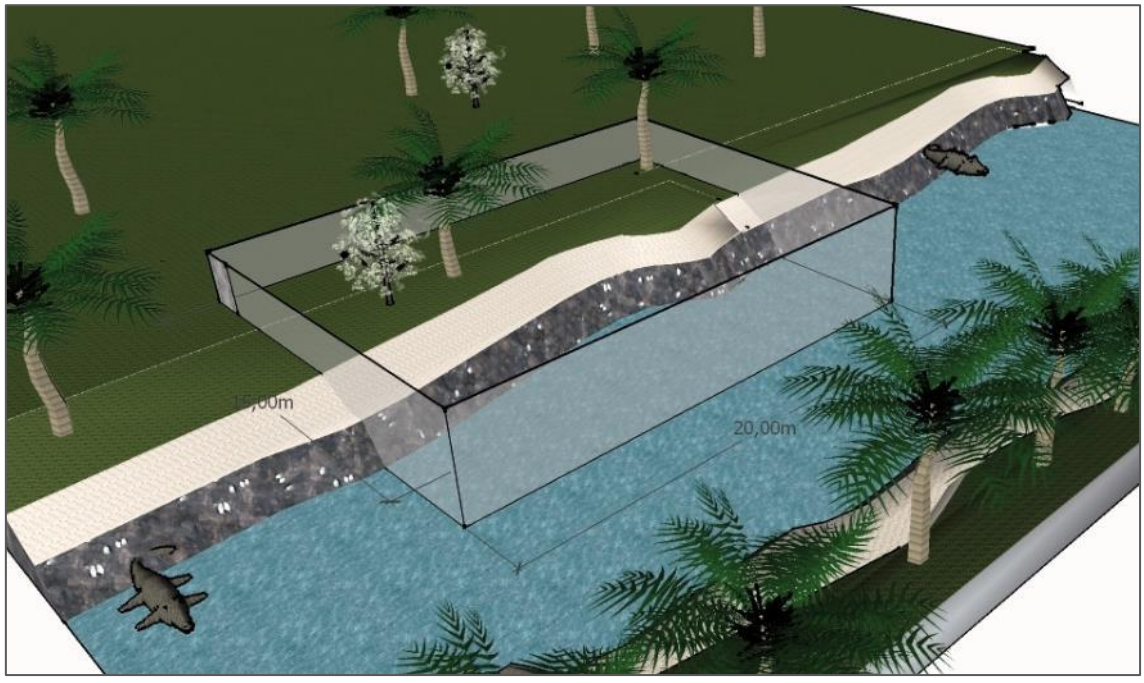

Figure 10. Design of pre- release corral for giant otter.

The corral will be approximately 15 m x 20 m, with a total land area of 200 m^2 and an aquatic area of 100 m^2, as recommended in AZA Small Carnivore TAG (2009). The corral will have a burrow-like

structure, similar to what the animals used in the zoo, to be used until they are able to dig their own refuge.

During this period, three times a day, animals will be offered food consisting of local fish, especially Siluriformes, piranhas and tarariras fishes, which are the most preyed species by giant otters in their distribution area. Progressively, live fish will be supplied to promote and evaluate their capture skills prior to release. This phase is also very important to evaluate the functioning of telemetry prior to release.

8- Release and telemetry monitoring

Once the animals have passed the corresponding acclimatization period in the pre-release corral and when they are able to successfully feed on several species of fish present in the release site, the enclosure doors will be opened for animals to leave. Movements that could scare the animals at that moment will be avoided to promote animals to leave calmly showing an adequate exploratory behavior. They will also be able to return to the corral when they consider it appropriate since it is possible that they relate the corral with safety. In this way the reintroduction will be done gradually allowing the animals to return to this facility in case it is necessary to carry out food supplementation at some point.
Within the area adjacent to the pre-release corral, where the animals are expected to constitute their territory, artificial burrows will also be built so that otters can use them.
The animals will be monitored by VHF radio tracking by a person exclusively dedicated to this task. The monitoring will be conducted on foot or from motor boats and kayaks using fixed and mobile antennas developed to track other wildlife species (anteaters, peccaries) in the same place. In addition, a small plane equipped with a whip antenna is available to track animals in the case that they disperse large distances.
The monitoring of the specimens through telemetry will allow to examine both demographic aspects (mortality, survival, births), and behavioral aspects (feeding, social behavior, dispersion), and the health status of the individuals. Likewise, when the population has a considerable size, the monitoring of ecological (effects on the environment) and genetic (genetic variability) aspects will be considered (IUCN, 2013).
If a dead animal is detected, a necropsy will be performed as soon as possible to try to determine the cause of death and to recover the transmitter. The results of this monitoring will be used to adapt and improve methods for future releases of the species in Argentina and other countries.

9- Recaptures

Recapturing reintroduced animals will be considered if:
- Animals present traumatisms or diseases that threat their lives.
- Animals are unable to adapt to the wild environment (eg. inability to find food by themselves).
- Transmitters need to be removed or replaced.
- Animals disperse to not suitable areas.

There is experience in capturing wild giant otters. The technique most commonly used is the placement of a net at the exit of the burrows and closing the nets once the animals are captured to prevent them from escaping through the entrance holes (Silveira et al., 2011, Leuchtenberger pers. com.). This technique has the limitation that it only works for capturing animals within the burrows.

Other non traumatic traps have been used with great success in other otter species (# 1-1.5 Soft Catch, Woodstream Corp., Lititz, Pennsylvania 17543, USA; Fernandez Morán et al., 2002) and "Tomahawk trap boxes" with less success. These capture techniques, along with the use of anesthetics administered by tele-injection, would be the most appropriate to relocate animals that may eventually disperse.

10- Outreach

Following the tradition of previous reintroduction projects carried out by CLT, positive and negative results of the giant otter project will be proactively communicated to the society through annual technical reports that will be presented to authorities and available on the website, Wildlife Restoration Program newsletters, a website, Facebook, informative brochures, technical or educational talks, videos and scientific articles. This proactive communication policy can be seen in other projects by consulting http://www.proyectoibera.org/en/english/especiesamenazadas.htm.

11.- Project approval

The project “EXPERIMENTAL REINTRODUCTION OF THE GIANT OTTER (*Pteronura brasiliensis*) IN THE IBERÁ PARK (Corrientes, Argentina)” has been formally approved by provincial (Corrientes province) and federal authorities.

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APPENDIX I: SANITARY REQUIREMENTS FOR IMPORTING GIANT OTTERS

DIRECCION DE CUARENTENA ANIMAL

REQUISITOS SANITARIOS PARA LA IMPORTACION DE MUSTÉLIDOS [1] PARA REPRODUCCION

I. INFORMACION GENERAL

Los animales objeto de la operación y la documentación respectiva deben ajustarse a la "NORMATIVA PARA LA AUTORIZACION DE LA IMPORTACION A LA REPUBLICA ARGENTINA DE ANIMALES VIVOS Y/O SU MATERIAL REPRODUCTIVO" establecidas en la Resolución SENASA Nº 1354/94, y estar amparados por un Certificado Zoosanitario de Origen emitido por la Autoridad Oficial.

Quedan expresamente excluidos del alcance del presente requisito los visones (entre las especies más comunes se encuentran VISON EUROPEO - *Mustela lutrolea* y MINK O VISON AMERICANO -*Mustela visón*), para los cuales regirá un requisito específico.

Los animales deberán ingresar a la República Argentina, amparados por un Certificado Zoosanitario extendido por el Servicio Veterinario Oficial del País de Origen de los mismos, debiendo constar en dicha certificación los datos de identificación del propietario de los animales, y las cláusulas sanitarias que son exigidos en la presente Normativa.

El interesado o un representante deberá tramitar la correspondiente Solicitud de Importación ante la Dirección de Cuarentena Animal del SENASA, previamente al embarque de los animales en el país de origen, la cual incluye entre los datos a consignar, el Punto de Ingreso y fecha de arribo de los animales, así como su destino en la República Argentina, debiendo abonar asimismo, los aranceles que en concepto de inspección veterinaria de importación correspondan a la especie al momento de la importación.

Para los ejemplares que se encuentren alcanzados por los Apéndices de la Convención sobre el Comercio Internacional de Especies Amenazadas de Fauna y Flora Silvestres (CITES), se deberá presentar la documentación correspondiente, debiendo intervenir al efecto para todas las especies que así lo requieran, la Dirección de Fauna y Flora Silvestre o Autoridad Competente que entienda en la materia en la República Argentina.

Al menos uno de los idiomas utilizados en la redacción del Certificado Zoosanitario de Origen será el español.

DATOS DE IDENTIFICACIÓN:

1. De los Operadores

A. Exportador
- Apellido y Nombre o Firma Exportadora
- Dirección Postal y telefónica o fax

B. Importador
- Apellido y Nombre o Firma Importadora
- Dirección Postal y telefónica o fax

C. Tránsito
- En caso de realizar tránsito por un tercer país previo al arribo a la República Argentina, el mismo deberá ser claramente consignado en la Solicitud de Importación.

D. Del Transporte
- Fecha de arribo prevista
- Punto de ingreso al País
- Medio de Transporte Internacional a utilizar

2. Del Establecimiento de Origen de los Animales

A. Nombre del Propietario o de la Firma Propietaria

B. Dirección Postal y telefónica o fax

3. Del Establecimiento de Destino de los Animales en la República Argentina

A. Nombre del Propietario o de la Firma Propietaria
B. Dirección Postal y telefónica o fax

4. De los Animales

A. Cantidad
B. Especie (nombre vulgar y científico).
C. Sexo
D. Tatuaje o identificación individual
E. Raza

II. DATOS SANITARIOS

En el Certificado Zoosanitario de Exportación, extendido por las Autoridades Veterinarias Oficiales del país de origen, deberá constar:

1. DE LA ZONA DE ORIGEN

a) Que en el Establecimiento de origen y en un radio de 25 Km. en los últimos 12 meses, no se han registrado oficialmente casos de Rabia y Enfermedad de Aujeszky.

2. DE LOS ESTABLECIMIENTOS DE ORIGEN / PROCEDENCIA

a) Que en el Establecimiento de origen en los últimos 12 meses no se han registrado enfermedades infectocontagiosas propias de la especie, con especial referencia a:

- Tuberculosis.
- Moquillo Canino.
- Gastroenteritis Catarral Epizoótica.

3. DE LOS ANIMALES CERTIFICADOS

a) Que han nacido y permanecido bajo cautiverio en un establecimiento habilitado y supervisado por las Autoridades Sanitarias Oficiales del país exportador.

b) Que han sido vacunados contra la Rabia con una antelación no mayor a los 180 días previos a la exportación. Debe constar en el certificado el tipo de vacuna, marca, número de serie y fecha de vacunación vigente.

c) Que los animales están libres de parásitos internos y externos y que durante el período de cuarentena no presentaron evidencias clínicas o diagnósticas de enfermedades infectocontagiosas propias de la especie.

4. PRUEBAS DIAGNOSTICAS

a) Que durante el período de aislamiento cuarentenario, los animales han sido sometidos con resultado negativo a un examen coproparasitológico sobre una muestra representativa del plantel a exportar.

5. DEL EMBARQUE DE LOS ANIMALES

a) Que el día del despacho de los animales, los mismos se presentaron clínicamente sanos.

b) Que los animales serán transportados hasta la República Argentina en contenedores de primer uso que aseguren la salud y el bienestar de los animales, así como la seguridad de los operadores.

c) Que durante los 21 días anteriores al embarque no se han reportado oficialmente en la zona de procedencia de los animales, casos de enfermedades infecto-contagiosas y/o parasitarias propias de la especie capaces de ser vehiculizadas a través de los mismos.

6. CUARENTENAS

a) Los animales motivo de la exportación harán una cuarentena en el país de origen durante los veintiún (21) días previos al embarque de los mismos, en un Establecimiento habilitado y supervisado por el Servicio Veterinario Oficial del País Exportador.

b) A su arribo a la República Argentina deberán cumplir con una cuarentena de veintiún (21) días en el Establecimiento de destino, bajo supervisión del SENASA.

Buenos Aires, Enero de 2002

***(1) LISTADO DE MUSTÉLIDOS MÁS COMUNES**

MARTA CEBELINA (Martes zibellina)
MARTA COMÚN (Martes martes)
GRISON (Grison vittatus)
ARMIÑO (Mustela erminea)
MOFETA EUROPEA (Mustela foetidus)
COMADREJA ALPINA (Mustela nivalis)
HURON COMUN (Mustela putorius furo)
MOFETA SKUND RALLADO (Mephitis mephitis)
TEJON FETIDO (Midaus javanensis)
TEJON (Meles meles)
GLOTON (Gulo gulo)
MELIVORA (Mellivora capensis)
NUTRIA
TURON

APPENDIX II: SUMMARY OF TESTS AND SAMPLES TO PERFORM

Sample	Indicted	Test	
Blood	EDTA	Hemogram	Full
		PCR	Feline / canine parvovirus
			Feline leukemia
			Feline immunodeficiency
			Canine distemper
		Knott test	Dirofilaria Inmitis
	Serum	Biochemistry	Full
		Proteinogram	Full
		Serology	Feline / canine parvovirus
			Feline leukemia
			Feline immunodeficiency
			Canine distemper
			Rabies
			Brucella spp.
			Leptospira spp.
			Dirofilaria immitis
			Toxoplasma goondi
			Tripanosoma cruzi
			Leishmania spp.
			Chlamydia
			Erlichia canis
			Paratuberculosis
	Smears	Giemsa	Erlichia spp.
			Hemoplasma
			Cytauxzoon felis
			A. phagocytophilum
			Tripanosoma cruzi
			Babesia spp.
			Hepatozoon spp.
Feaces	Hyssop	PCR	Feline / canine parvovirus
	Sterile Container	Floatation	Nematodes
			Cestodos
			Coccidia
			Flagellates
		Cultive	General
			Discard Salmonella, Shigella, Campylobacter
	Smears	Ziehl Nielsen	Cryptosporidium
			Micobacterias
Tracheo-bronchial exudate	Hyssop	PCR Cultive	Micobacterium bovis
Skin	Skin scraping	Identification	Sarcoptes scabiei
			Notoedres cati
	Cutaneous swab	Cytology Culture	Dermatophytes, yeasts
			Piodermas
Fur	Paper bag	Genetics	
Ectoparasites	Alcohol	ID	

APPENDIX III: VACCINATION PLAN

Vaccination: The following vaccination schedule is recommended by the AZA Otter SSP Veterinary Advisor. Vaccination product recommendations are based on clinical experience (as of 2006) in most cases, and not necessarily on controlled scientific study.

Canine distemper: In general, the use of recombinant vaccines is recommended for the vaccination of giant otters in captivity. As these are not available in Argentina it will be necessary to resort to the second option if available; Galaxy D vaccine (Schering-Plow Animal Heath Corporation, PO Box 3113, Omaha, NE 68103), a modified live vaccine generated in primates kidney. The safety and efficacy of live distemper vaccines in exotic carnivore species has been very controversial since the disease has developed in a variety of wild vaccinated mustelids with this type of vaccine. Dead vaccines have not been shown to be effective in the long term and for this reason are not currently marketed. To date there have been no cases of distemper in otters using the Galaxy D vaccine and good seroconversions have been documented in North American river otters using this product (K.Petrini, unpublished data, Petrini et al., 2001).

Parvovirus: The efficacy of canine or feline parvovirus vaccines has not been proven in giant otter. One ml of IM vaccine should be administered for a total of 2-3 doses, separated by 3 weeks. Then it will be revaccinated annually. Parvocine ™ (Biocor Animal Health Inc., 2720 North 84th Street, Omaha, NE 68134) is a dead univalent vaccine that has been used in otters.

Rabies: The effectiveness of the rabies vaccine has not been proven in exotic mustelids, so otters vaccinated with rabies should not be considered protected from rabies. Only dead vaccines should be used, the most commonly used vaccine is Imrab® 3 (Merial Ltd., 3239 Satellite Blvd., Duluth, GA 30096), which is a vaccine widely used in small animals with no apparent adverse effects. In otters 1 ml IM should be administered once, at 16 weeks of age followed by an annual recall.

Leptospirosis: The otter's susceptibility to leptospirosis is not well recorded in the literature, and the benefits of vaccination are not known. There are dead leptospira bacteria and could be used in places where leptospirosis may have been a problem. Two doses should initially be administered with an interval of 3-4 weeks. The efficacy and duration of immunity for this species has not been studied.