

REPORT

DATA ON *Lontra longicaudis* (CARNIVORA: MUSTELIDAE) MORTALITY IN SOUTHEAST AND SOUTHERN BRAZIL

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Abstract: Herein we present data on *Lontra longicaudis* mortality in Minas Gerais (n=12) and Rio Grande do Sul (n=14) states, Southeastern and Southern Brazil, respectively. In Minas Gerais most deaths were caused by entanglement and drowning in fishing gear (n=5; 42%), followed by roadkill (n=3; 25%), dog attack (n=2; 17%), hunting and undetermined cause (n=1; 8% each). In Rio Grande do Sul, the major cause of death was roadkill (n=10; 72%), followed by hunting (n=2; 14%), dog attack and undetermined cause (n=1; 7% each). The habitats associated with the highest number of deaths were reservoirs in Minas Gerais (n=8, 67%) and pluvial channels in Rio Grande do Sul (n=7, 50%).

Keyword: Neotropical otter; deaths; roadkill; fishing gear

The neotropical otter *Lontra longicaudis* Olfers, 1818 is a semi-aquatic mustelid, reaching up to 1.4 m in length and 14 kg of body weight (Emmons and Feer, 1997) and distributed from northeastern Mexico south to Uruguay, Paraguay and across the northern part of Argentina to Buenos Aires province (Larivière, 1999). In the 20th century, hunting for fur caused local extinctions of *L. longicaudis* populations (Waldemarin and Alvarez, 2008). Loss and fragmentation of habitats, water pollution and conflicts with fisheries also contributed to the species decline and still represent

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current threats to the remaining populations (Indrusiak and Eizirik, 2003; Waldemarin and Alvarez, 2008; González and Lanfranco, 2010). The species is listed in the IUCN 2011 World Red List as Data Deficient, with a decreasing population trend (Waldemarin and Alvarez, 2008). It is considered Endangered in Argentina (Diaz and Ojeda, 2000), Susceptible in Uruguay (González and Lanfranco, 2010) and Vulnerable in the Brazilian states of São Paulo (PROBIO/SP, 1998), Minas Gerais (Machado et al., 1998), Paraná (Mikich and Bérnils, 2004) and Rio Grande do Sul (Indrusiak and Eizirik, 2003).

In Brazil, most of the studies on *L. longicaudis* were focused on feeding habits (Passamani and Camargo, 1995; Helder-José and De Andrade, 1997; Pardini, 1998; Colares and Waldemarin, 2000; Quadros and Monteiro-Filho, 2001; Kasper et al., 2004; 2008; Alarcon and Simões-Lopes, 2004; Quintela et al., 2008; Carvalho-Junior et al., 2010) and use of latrines and shelters (Soldateli and Blacher, 1996; Pardini and Trajano, 1999; Waldemarin and Colares, 2000; Quadros and Monteiro-Filho, 2002; Alarcon and Simões-Lopes, 2003; Kasper et al., 2004, 2008; Carvalho-Junior, 2007; Quintela et al., 2011), while data on mortality causes are scarce. Thus, herein we present data on mortality of *L. longicaudis* in Southeastern and Southern Brazil, aiming to contribute to the species' conservation.

This study was conducted in the States of Minas Gerais and Rio Grande do Sul, Southeastern and Southern Brazil respectively. In Minas Gerais the study area contains rivers and streams of the Paraíba do Sul basin and associated reservoirs, between the counties of Muriaé (21°10'S, 42°22'W) and São João Nepomuceno (21°31'S, 42°54'W), Atlantic Forest biome (Fig. 1). In Rio Grande do Sul, the study area comprises the Internal and External coastal plain geomorphological units, between the counties of Eldorado do Sul (30°01'S, 30°19'W) and Rio Grande (32°15'S, 52°27'W) (Fig. 1).

Data on *L. longicaudis* mortality were obtained from March 2008 to August 2011 through field observation and reports from three locals and two collaborating researchers. Well preserved individuals were collected and deposited in mammalian collections of Museu de Ciências Naturais of Universidade Luterana do Brasil, Canoas, Rio Grande do Sul and Museu de Zoologia João Moojen, Viçosa, Minas Gerais.

A total of 26 otter deaths were recorded in the study period, 12 in Minas Gerais and 14 in Rio Grande do Sul. In Minas Gerais the highest number of deaths comprised entanglement and drowning in fishing nets (n=5; 42%), followed by road kill (n=3; 25%) (Fig. 2), dog attack (n=2; 17%), hunting and undetermined cause (n=1; 8% each). In Rio Grande do Sul, the highest number of deaths comprised road kill (n=10; 72%) (Fig. 3), followed by hunting (n=2; 14%), dog attack and undetermined cause (n=1; 7% each) (Table 1).

The habitats associated with the highest number of deaths in Minas Gerais were reservoirs (n=8, 67%), followed by rivers (n=3, 25%) and streams (n=1, 8%). In Rio Grande do Sul the highest number of deaths were associated with pluvial channels (n=7, 50%), followed by coastal streams (n=4; 29%), marshes (n=2; 14%) and estuary (n=1; 7%) (Table 1).

Despite the small sample size, we observed differences in major causes of death between the two investigated areas. While roadkill represented the major cause of otter death in Rio Grande do Sul, most of the mortality records in Minas Gerais were related to entanglement and drowning in fishing gear. Absence of records of deaths by accidental captures in fishing nets in Rio Grande do Sul may be related to low density of otters in Patos Lagoon estuary, the system where most of the fishery activity is concentrated in the region.

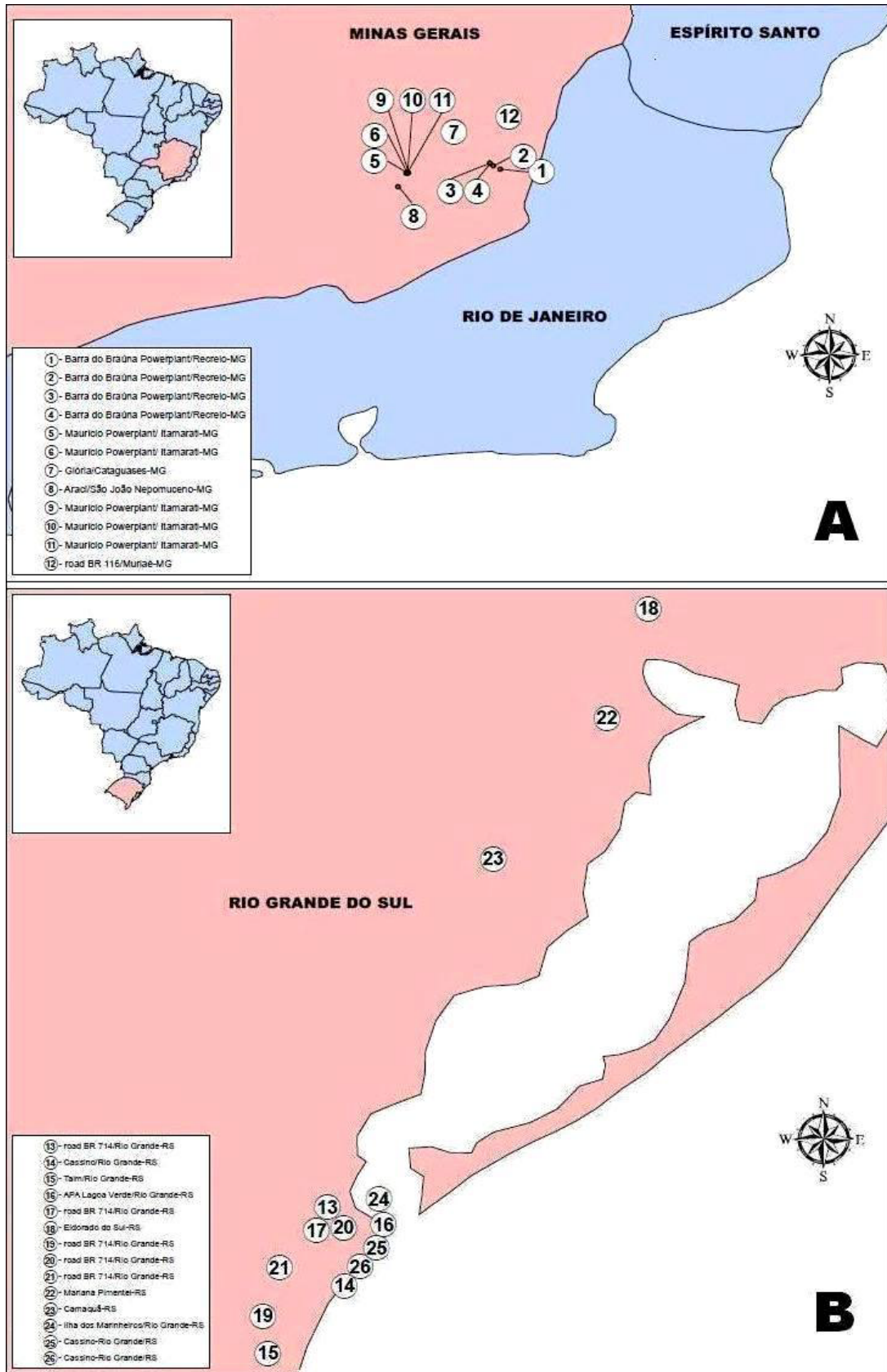


Figure 1. Study area: A) Minas Gerais, B) Rio Grande do Sul. Numbers correspond to deaths shown in Table 1.

In coastal streams environments, where otters are more commonly observed, gillnet and fyke net fishery is impractical. On the other hand, gillnet and fyke net

fishery activities in Minas Gerais sampled areas are conducted mainly in reservoirs, where otters are commonly observed. Carvalho (2007) considers man to be the otter's main competitor for food; they have the same preferences for fish species, which results in direct conflict with fishermen as well as deaths by entanglement. Death by entanglement in fishing gear is also documented for *Lutra lutra* (van Moll, 1988; Foster-Turley et al., 1990; Lodé, 1993; Poole et al., 2007; Hauer et al., 2002; Georgiev, 2007) and *Lontra felina* (Pizarro Neyra 2008). In western France, Lodé (1993) considered accidental drowning in fyke nets to be the major cause of *L. lutra* deaths.

Lontra longicaudis roadkill have been observed in the states of São Paulo (Freitas et al., 2009), Mato Grosso do Sul (Cáceres et al., 2010), Santa Catarina (Cherem et al., 2007) and Rio Grande do Sul (Hengemühle and Cadermatori, 2008; Bager and Rosa, 2010) and represent the only documented mortality data on the species in Brazil. In Rio Grande do Sul Coastal Plain most federal and state highways and even local roads are bordered by pluvial channels, which are suitable habitats for otter occurrence. The movement of otters between pluvial channels by crossing highways and roads is the main cause of otter road kill. Hauer et al. (2002) found traffic accidents to be the major cause of mortality of *L. lutra* in eastern Germany. Philcox et al. (1999) also observed that 91% of 673 *L. lutra* roadkills occurred at points where roads cross watercourses.

Hunting and dog attacks represented minor causes of death in the present study. *Lontra longicaudis* was hunted excessively for the pelt trade in the period 1950-1970 and illegal hunting is still practiced (Waldemarin and Alvarez, 2008). It is important to note that hunting in the studied areas is related to fishery conflicts, with the justification that they are competitors for fish and damage fishing gear. The meat was not consumed from any of the three killed individuals while the pelt was removed from only one. Domestic and feral dogs are a potential threat to wild mammals, especially when organized in packs (Galetti and Sazima, 2006). Deaths by dog attacks were also reported in low proportions for *L. lutra* in Central Finland (Skarén, 1992) and southern Bulgaria (Georgiev, 2007) and for *Lontra felina* in southern Peru (Pizarro Neyra, 2008).

In the present study we did not detect and investigate deaths caused by diseases, intoxication or poisoning. In our informal interviews with local people no one admitted to using poisoned carcasses aimed at killing otters. However, incidental otter deaths may occur due to poisoning campaigns targeting pests of crops or livestock, such as rodents, canids and felids, and these should also be investigated. Lodé (1993) found that reduction in *L. lutra* distribution in western France coincided with poisoning campaigns against muskrats and coypus.

Organochlorine compounds have often been found in *L. lutra* (Mason et al., 1986; 1992), *Lontra canadensis* (Stansley et al., 2010) and *Enhydra lutris* samples (Nakata et al., 1998; Bacon et al., 1999). In southern Rio Grande do Sul there are extensive rice crops adjacent to swamps, shallow lakes, pluvial channels and other otter habitats. Rice crops receive large pesticide applications, and bioaccumulation in adjacent otter habitats represents a poisoning risk (Pastor et al. 2004).

Table 1. Deaths of *Lontra longicaudis* in Rio Grande do Sul and Minas Gerais states, Brazil

Locality/County	Coordinates	Associated habitat	Data	Cause of Death
Barra do Braúna Powerplant/Recreio-MG	21°27'27"S, 42°24'31"W	reservoir	July-2008	Roadkill
Barra do Braúna Powerplant/Recreio-MG	21°26'24"S, 42°26'30"W	reservoir	November-2008	entangled in fishnet
Barra do Braúna Powerplant/Recreio-MG	21°25'36"S, 42°27'33"W	reservoir	March-2009	entangled in fishnet
Barra do Braúna Powerplant/Recreio-MG	21°25'36"S, 42°27'33"W	reservoir	March-2009	entangled in fishnet
Maurício Powerplant/ Itamarati-MG	21°28'37"S, 42°52'11"W	reservoir	August-2009	killed by dog
Maurício Powerplant/ Itamarati-MG	21°28'37"S, 42°52'11"W	reservoir	August-2009	killed by dog
Glória/Cataguases-MG	21°16'15"S, 42°38'41"W	stream	October-2009	Roadkill
Araci/São João Nepomuceno-MG	21°32'56"S, 42°54'56"W	river	November-2009	entangled in fishnet
Maurício Powerplant/ Itamarati-MG	21°28'37"S, 42°52'11"W	river	November-2009	undetermined
Maurício Powerplant/ Itamarati-MG	21°28'35"S, 42°51'54"W	reservoir	February-2010	entangled in fishnet
Maurício Powerplant/ Itamarati-MG	21°28'40"S, 42°52'34"W	reservoir	July-2010	Hunted
road BR 116/Muriaé-MG	21°10'56"S, 42°22'15"W	river	September-2010	Roadkill
road BR 714/Rio Grande-RS	32°06'29"S, 52°20'38"W	pluvial channel	March-2008	Roadkill

Cassino/Rio Grande-RS	32°17'30"S, 52°16'15"W	coastal stream	July-2008	undetermined
Taim/Rio Grande-RS	32°33'03"S, 52°32'49"W	marsh	December-2008	Roadkill
APA Lagoa Verde/Rio Grande-RS	32°07'10"S, 52°10'17"W	coastal stream	August-2009	Roadkill
road BR 714/Rio Grande-RS	32°07'59"S, 52°22'22"W	pluvial channel	September-2009	Roadkill
Eldorado do Sul-RS	30°01'09"S, 51°19'09"W	pluvial channel	June-2011	Roadkill
road BR 714/Rio Grande-RS	32°25'27"S, 52°33'50"W	pluvial channel	June-2011	Roadkill
road BR 714/Rio Grande-RS	32°06'32"S, 52°20'41"W	pluvial channel	September-2011	Roadkill
road BR 714/Rio Grande-RS	32°15'42"S, 52°30'32"W	pluvial channel	September-2011	Roadkill
Mariana Pimentel-RS	30°24'19"S, 51°27'19"W	marsh	September-2011	Roadkill
Camaquã-RS	30°52'44"S, 51°49'14"W	pluvial channel	September-2011	Roadkill
Ilha dos Marinheiros/Rio Grande-RS	32°01'40"S, 52°10'80"W	estuary	undetermined	Hunted
Cassino-Rio Grande/RS	32°12'24"S, 52°10'50"W	coastal stream	undetermined	killed by dog
Cassino-Rio Grande/RS	32°13'24"S, 52°11'50"W	coastal stream	undetermined	Hunted



Figure 2. Roadkilled otter in Cataguases Minas Gerais, Southeastern Brazil.



Figure 3. Roadkilled otter in Eldorado do Sul, Rio Grande do Sul, Southern Brazil.

The present study contributes to knowledge on *L. longicaudis* mortality in South and Southeastern Brazil. Considering the observed results, we recommend: assessment of locations where multiple otter road kill have occurred and evaluation of possible mitigation measures (i.e. underground passages); implementation of environmental education activities emphasizing the ecological importance of otter and modifications to fishing gears to prevent accidental deaths; control of domestic and feral dogs in otter habitats. It is also recommended that ecotoxicological studies of aquatic systems adjacent to intensive rice farming be conducted.

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RÉSUMÉ

DONNEES DE MORTALITE SUR *Lontra longicaudis* (CARNIVORE: MUSTELIDES) DANS LE SUD-EST ET LE SUD DU BRESIL

Ici, nous présentons des données sur la mortalité de *Lontra longicaudis* dans l'état fédéral de Minas Gerais (n=12) et de Rio Grande do Sul (n=14) respectivement au sud-est et sud du Brésil. Dans l'état de Minas Gerais, la plupart des décès ont été causés par la prise accidentelle et la noyade dans les filets (n=5; 42%), suivis par les collisions routières (n=3; 25%), les attaques de chiens (n=2; 17%), la chasse et les causes indéterminées (n=1, 8% chacun). Dans le Rio Grande do Sul, la cause majeure de décès a été Roadkill (n=10; 72%), suivie par la chasse (n=2; 14%), attaque de chien et de cause indéterminée (n = 1 chacun, 7%). Les habitats associés au plus grand nombre de décès sont les retenues d'eau dans l'état de Minas Gerais (n=8, 67%) et les canaux pluviaux dans l'état du Rio Grande do Sul (n=7, 50%).

RESUMEN

DADOS SOBRE MORTALIDADE DE *Lontra longicaudis* (CARNIVORA: MUSTELIDAE) NO SUDESTE E SUL DO BRASIL

Apresentamos dados sobre a mortalidade de *Lontra longicaudis* nos estados de Minas Gerais (n=12) e Rio Grande do Sul (n=14), Sudeste e Sul do Brasil, respectivamente. Em Minas Gerais a maioria das mortes foi causada por enredamento e afogamento em redes de pesca (n=5; 42%), seguido por atropelamento (n=3; 25%), ataque de cães (n=2; 17%), caça e causa indeterminada (n=1; 8% each). No Rio Grande do Sul, a maior causa de morte foi atropelamento (n=10; 72%), seguido por caça (n=2; 14%), ataque de cães e causa indeterminada (n=1; 7% each). Os habitats associados ao maior número de mortes foram reservatórios em Minas Gerais (n=8, 67%) e canais pluviais no Rio Grande do Sul (n=7, 50%).