IUCN

OTTER SPECIALIST GROUP BULLETIN

Volume 20 (2) October 2003





National Environmental Research Institute, Denmark

CONTENT Note from the Editor.... IUCN/SSC OSG GROUP From the Chairman's Desk..... REPORTS Natural deaths of giant otters (Pteronura brasiliensis) in Balbina Recent records for the neotropical river otter (*Lontra longicaudis*) in Guerrero, Mexico..... Camera trap use for studying giant otters (Pteronura brasiliensis) in the Eurasian otters (*Lutra lutra*) in Crete?!.... More on predation of fish eating birds by Eurasian otter Literature.....





IUCN OTTER SPECIALIST GROUP BULLETIN

The IUCN Otter Specialist Group Bulletin appears biannually. Articles, reports, symposium announcements and information on recent publications are welcome. All submissions should be typed double-spaced. The submission of an electronic manuscript on diskette or by e-mail is strongly recommended. Reports should not exceed 2000 words in length, i.e. not to exceed four printed pages, including diagrams and tables. Articles may be longer. Diagrams, maps and tables should be included as a photocopy ready for reprint. A short abstract for translation into Spanish and French has to be included.

Articles will be fully reviewed. Authors are requested to add a notice as to whether they submit an article or a report.

Submit material for publication and requests for copies to: Arno C. Gutleb Institute for Environmental Studies IVM De Boelelaan 1087 NL-1081 HV Amsterdam The Netherlands

Fax.: ++31-84-8823459 e-mail: arno.gutleb@ivm.vu.nl

Editor: Arno C. Gutleb

Reader: Kevin Roche, Alvaro Soutullo, Lionel Lafontaine, Eduardo Carillo-Rubio

Coordinator-NL: Hans van den Berg

Printer: Van Gils, Wageningen, The Netherlands

The IUCN Otter Specialist Group Bulletin is indexed on the following databases: BIOSIS, Zoological Record.

Front page: Lontra canadensis- © Claus Reuther

Bank account:

Austria: Bank Austria (20151), Vienna 750 333 981 The Netherlands: Rabobank Oosterbeek IBAN NL 61 Rabo 0355 0360 29 BIC RABONL2U

_

NOTE FROM THE EDITOR

Thanks to the efforts of Aksel Bo Madsen and the generous sponsorship of NERI the printing of this issue of the IUCN Otter Specialist Group Bulletin was made possible. For the rest, there was almost no reaction at all in response to my complaint about the inactivity of approximately 90% of those receiving the Bulletin in the last issue. No – I am not going to be cynical about that! In addition, Christoph Schenk of the Frankfurt Zoological Society took over the extra costs for the inclusion of the Giant Otter bibliography that was mentioned some time ago. In this issue we finally had the space to insert it. My sincere thanks to both Aksel and Christoph!

In addition I really want to thank Kevin Roche (Czech Republic) for correcting all those contributions that have not been reviewed by at least one native English speaker. Unfortunately we were not able to provide translations into Spanish and French. I will try to include the missing summaries in the next issue. I also have to thank Hans van den Berg (Ede), who has assisted me over many years with the transport of the boxes ("thanks for all the kilometres you have driven at your own cost"), and Els Hoogsteede-Veens and Erwin Hellegering of GRAFISCH SERVICE CENTRUM VAN GILS (Wageningen) who are always open to suggestions, deciding on colours of title pages by themselves ("I like your choice"), and for having spotted several layout mistakes that I overlooked.

Finally, many thanks go to Giuseppe Carpaneto, Paul Chanin, Josef Lanszki, Aksel Bo Madsen, and Dénes Nagy, all of who provided information on recent publications.

IUCN/SSC OSG GROUP

FROM THE CHAIRMAN'S DESK- December 2003

My final report for the second half of 2003 will focus mainly on South America, as I received no updated information from the other continents. The 'Giant otter people' were quite busy in 2003 and, from my point of view; there has been remarkable progress in improving the foundations for conservation of this species. The final draft of the Standardised Giant Otter Field Methodology is now under revision by Jessica Groenendijk and should be published in 2004. Due to the efforts of Jessica, Frank Hajek and Miriam Marmontel, and with the support of the Fundacao Brasileira para o Desenvolvimento Sustentavel, the Wildlife Conservation Society, and the Sociedade Civil Mamiraua, a workshop on the Standard Range-Wide Distribution Survey Strategy for the Giant Otter was held in the Brazilian Pantanal. More than a dozen Giant otter specialists from five South American countries joined this workshop and I had the pleasure of presenting the experience from ISOS, the Information System for Otter Surveys. A standardised range-wide distribution survey methodology is a vital tool for the documentation of the past, present and future distribution of the Giant otter, for the understanding of its conservation status (degree of reduction in its range), for priority setting, and for planning conservation programmes. It will also improve cross-border cooperation and coordination of research and conservation activities. It is planned to publish these guidelines in 2004 and to use them as a basis for fundraising activities to establish systematic distribution surveys.

The Frankfurt Zoological Society has just announced another concrete contribution to Giant otter conservation. Their children's colouring book on Giant otters 'Pepe, el lobo de rio' has now been printed and distributed in Brazil. Six years after it was first produced it has now been re-printed several times in five countries, always being adapted to local needs. More than 15,000 colouring books have been distributed so far. This really is a success story and it is hoped that many more children will be stimulated to share in the fascination on the Giant otters and the tropical rainforest of South America.

An import step forward has also been taken for the captive Giant otter population. In July 2003, the World Association of Zoos and Aquariums (WAZA) officially approved the International Studbook for *Pteronura brasiliensis*. Dortmund Zoo (Germany) and Brasilia Zoo (Brazil) jointly hold the studbook and Sheila Sykes-Gatz (Dortmund Zoo) and Marcelo Lima Reis (Brasilia Zoo) have been appointed as the international studbook keepers. Improvements in management of the captive Giant otter population will contribute greatly to the conservation of the wild population of this species, through reduction of the threat caused by the taking of wild animals for exhibition purposes. By early 2004, the second edition of the husbandry and management recommendations for Giant otters, and the 1st edition of the Giant otter studbook SPARKS data set, will be available to everyone interested.

The increased interest in South American otters is also reflected in a report from Helen Waldemarin. On June 26th-29th 2003, the 2nd Brazilian Congress of Mastozoology took place in Belo Horizonte, Minas Gerais State. During this congress 13 posters on the Neotropical otter and four posters on the Giant otter were presented. These numbers document the increase in the number of research projects on these species in Brazil, considering that, at the last Mastozoology Congress, there was only one poster on *P. brasiliensis* and two on *L. longicaudis*.

For the latter species, Helen Waldemarin reports on several ongoing or new research projects. For example, the Projeto Mustelideos do Brasil worked on an evaluation of the attitudes of local people in the region of Ouro Preto in the Minas Gerais State toward the Neotropical otter, and also started awareness and education activities with the publication of a leaflet explaining the importance of aquatic habitats and of otters. A cooperation project was started between the Projeto Ecolontras (coordinated by Helen in Rio de Janeiro State); Projeto Mustelideos do Brasil (Minas Gerais State) and the researcher Carlos Benhur Kasper (Rio Grande do Sul state), to test possible methodologies for a standardisation of the distribution survey methodology for the Neotropical otter. They are undertaking surveys on rivers in these three Brazilian states and are trying to find the minimum distance that has to be surveyed to find evidence of otters, and if checking of one bank side is sufficient. In Colombia, Diego Andrés Arcila is carrying out a study on habitat use by the Neotropical otter and, in Mexico, Juan Pablo Gallo is studying the diet and distribution of this species in the Reserva de la Biosfera Montañas de Álamos and on the Cuchujaqui River.

I am especially happy about the efforts to standardise the survey methods for more otter species, as the German Association for Otter Conservation (Aktion Fischotterschutz) is also working on improvements to the Information System for Otter Surveys (ISOS). This now includes a digital worldwide UTM grid of 50x50km and 100x100km squares as a basis for homogenous and comparable

IUCN Otter Spec. Group Bull. 20(2) 2003

distribution maps. We are also preparing GIS layers with topographic information that can be combined with these grids. The next step will be the development of a specific software tool to enable the transfer of distribution data via the Internet and to present the maps on the worldwide web. A first test version will probably be presented at the International Otter Colloquium in 2004.

This event will be the highlight of our activities in 2004. I really would be pleased to meet as many otter people as possible in Frostburg USA. Tom Serfass and his team are working hard to arrange a successful meeting. Those who have not yet registered should hurry up and visit the website http://otter.frostburg.edu for further information. There are several important topics to be discussed at the Otter Colloquium and the attendant meeting of the Otter Specialist Group. The preliminary agenda for the latter covers aspects such as the evaluation of the outcome of the 2001 recommendations, the revision of the OSG Manifesto, the Otter Action Plan, the OSG Bulletin, standards for survey methods, research priorities, guidelines for otter reintroductions, studbooks, and breeding programmes and husbandry guidelines. We will also have to look for a venue for (or more importantly, a person/organisation able to organise it) the X. International Otter Colloquium. Following from the colloqui in Göttingen, DE (1979), Norwich, GB (1981), Strasbourg, FR (1983), Santa Cruz, US (1985), Hankensbüttel, DE (1989), Pietermaritzburg, ZA (1993), Trebon, CZ (1999), Valdivia, CL (2001), and Frostburg, US (2004), we are still missing a colloquium in Asia. Interest from this direction would be very welcome. At the OSG meeting in Frostburg, we have also to discuss the membership structure of the Otter Specialist Group and, in particular, the nomination of the Continental Coordinators for the next IUCN triennium, which will be inaugurated at the World Conservation Congress to be held from the 17th to the 25th of November 2004 in Bangkok, Thailand. I would be pleased if the national members and representatives of the OSG could agree on their recommendations for the nomination of their Continental Coordinators before Frostburg and let me know their suggestions as soon as possible. The keyword IUCN reminds me that we will have to face another important task in 2004. Recently, the Species Survival Commission (SSC) released the Data Entry Module for the new Species Information System (SIS). The SIS aims to become a worldwide species information resource containing interlinked databases of species-related information managed by the SSC's network of Specialist Groups. For further information, please visit the website

<u>http://www.iucn.org/themes/ssc/programs/sisindex.htm</u>. It will be our task to revise and complete the comprehensive data collection for all otter species. As a first important step, we will have to evaluate the Red List status for all otter species by March 2004.

As should now be clear, we are facing some great challenges in 2004 – and a lot of work for all OSG members. It is my hope that as many members (or more) of the OSG will assist in this, as was the case in 2003. At the end of this year I want to express my gratitude to all those who contributed to the work of the OSG and to the conservation of otters. For 2004 I wish all of you health, success and satisfaction.

Hankensbüttel, December 2003

Claus Reuther, Chairman IUCN/SSC Otter Specialist Group Aktion Fischotterschutz e.V., OTTER-ZENTRUM, D-29386 Hankensbüttel, Germany

Phone: +49/5832/98080 Fax: +49/5832/980851

e-mail: <u>c.reuther@otterzentrum.de</u>

REPORT

NATURAL DEATHS OF GIANT OTTERS (Pteronura brasiliensis) IN BALBINA HYDROELECTRIC LAKE, AMAZONAS, BRAZIL

Fernando César WEBER ROSAS, Gália Ely DE MATTOS

Instituto Nacional de Pesquisas da Amazônia (INPA), Laboratório de Mamíferos Aquáticos, Caixa Postal 478, Manaus – AM, 69011-970, Brazil. E-mail: frosas@inpa.gov.br

(received 29th September 2003, accepted 17th November 2003)

In 1987 the Brazilian Northern Electric Company (ELETRONORTE) finished damming the Uatumã River that formed the 3,246 km² lake (containing 3,299 islands) of the Balbina hydroelectric power station. In 2001, through a project entitled "Social organization, behavior and diet of the giant otter (*Pteronura brasiliensis*) in the influenced area of Balbina hydroelectric power station, Amazonas, Brazil", the authors started to study giant otters in the reservoir (de MATTOS et al., 2002; ZUANON et al., 2002). Despite being an enormous area, we managed to record two dead otters in the lake. One of them was found in February 2002 at the entrance of one of the giant otters' dens (01°35'21.3"S; 59°40'15.6"W). Judging from the general condition of the carcass, the animal, a 150 cm long female weighing 11 kg, had died about 2 days before it was found. This individual didn't have any visible injury on its body and the fur, which was intact, fell off when handled. The internal organs were emaciated and most of them in an advanced stage of decomposition due to the high temperature, characteristic of this tropical region. Based on the total length, it seemed to be a young adult female, which probably died a natural death. The low weight of this otter (only 11 kg) seems to corroborate this hypothesis. According to our data of captive giant otters in Amazonia, a 150 cm animal should weigh on average 19.0 ± 2.9 kg (n = 4) (F. Rosas, pers. obs.).

The second dead giant otter was recorded in July 2003. This animal was found and reported to us by the rangers of the Uatumã Biological Reserve (ReBio Uatumã/IBAMA). According to the rangers, a moribund otter was found in the water at 9:50 a.m., surrounded by a group of 6-8 other giant otters. The animal was still breathing when it was found. The rangers removed it from the water and pulled it to the margin. At that moment, they could observe that it had been seriously wounded (Fig. 1).



Figure 1. Moribund giant otter in the water (a), and the wounds of the animal observed after its death (b, c and d). Balbina Lake, Amazonas. Brazil. Photos: H. M. de Magalhães.

The otter died at 10:25 a.m. and the rangers threw the body back into the water. Three weeks later, during our next field trip to Balbina Lake, we tried to recover the carcass but it wasn't found. It is interesting to note that this otter had been severely bitten on its snout and genital areas (Fig. 1c and 1d). Our data on captive giant otters have already revealed that the genital area is one of the regions of the body where animals tend to concentrate their attacks while fighting. Other severe wounds were observed near the forelimbs. According to the rangers, even though the animal was bleeding, there were no "piranhas" around it. A careful examination of the wounds shown in the pictures suggests that other giant otters had attacked the animal. This is supported by the presence of other otters around it, which, despite not fighting at the moment the rangers arrived, could be the ones responsible for the deadly wounds caused to the animal. This opinion is also shared by Dr. Duplaix, who has reported terrible fights among giant otters both in captivity and in the wild in Guyana (N. Duplaix, pers. comm.). The area where the moribund giant otter was found is very interesting since it seems to represent an overlap in the territory of at least two giant otter groups. During our observations, we managed to see different groups passing or fishing in that specific area, however, we never recorded the encounter of any groups. Although we cannot confirm that the giant otter died due to a fight with other otters,

all the evidence points in this direction. Antagonistic behavior among giant otters has already been documented in the literature. According to SCHWEIZER (1992) an encounter of two different groups resulted in serious injuries to one adult otter and the death of a giant otter calf. MOURÃO and CARVALHO (2001) recorded an adult male giant otter killing and eating (cannibalism) a young cub from a different group in the Brazilian Pantanal.

The apparently "natural deaths" of giant otters reported here may have a significant role in the dynamics of the species. Even though Balbina is an artificial lake, it doesn't seem to have any spatial or feeding limitation (F. Rosas, pers. obs.), factors that usually lead to a high rate of natural mortality in a species. Despite the lake's huge size, which makes it harder to find carcasses, we have recorded in a two-year period two dead animals that seemed to have died natural deaths. These data suggest that natural mortality may have an important role in the biology of giant otters in Balbina Lake and should be taken into account in future management plans for the species.

The apparently "natural deaths" of giant otters reported here may have a significant role in the dynamics of the species. Even though Balbina is an artificial lake, it doesn't seem to have any spatial or feeding limitation (F. Rosas, pers. obs.), factors that usually lead to a high rate of natural mortality in a species. Despite the lake's huge size, which makes it harder to find carcasses, we have recorded in a two-year period two dead animals that seemed to have died natural deaths. These data suggest that natural mortality may have an important role in the biology of giant otters in Balbina Lake and should be taken into account in future management plans for the species.

Acknowledgements - We thank Centro de Preservação e Pesquisa de Mamíferos Aquáticos (CPPMA)/ Manaus Energia S.A. and ReBio Uatumã/IBAMA, who provided logistical support in the field. We also thank Kesä K. Lehti and two anonymous reviewers for valuable comments and the English review made on earlier drafts of this manuscript. We are grateful to Fundação O Boticário de Proteção à Natureza (project nº 053220021) for the financial support given to our study.

REFERENCES

- MATTOS, G.E. de; ROSAS, F.C.W., PICANÇO, M.C.L., LAZZARINI, S.M. 2002. Utilização do lago da Hidrelétrica de Balbina (Amazonas, Brasil) por *Pteronura brasiliensis*. In: Abstracts X Reunión de Trabajo de Especialistas en Mamíferos Acuáticos de América del Sur. Valdivia, Chile, pp. 74-75.
- MOURÃO, G., CARVALHO, L. 2001. Cannibalism among giant otters (*Pteronura brasiliensis*). Mammalia **65**, 225-227.
- **SCHWEIZER, J.** 1992. Ariranhas no Pantanal: Ecologia e comportamento da *Pteronura brasiliensis*. Edibran-Editora Brasil Natureza Ltda. Curitiba, Brasil, 202 pp.
- **ZUANON, J.A., de MATTOS, G.E. de, ROSAS, F.C.W.** 2002. Hábitos alimentares de *Pteronura brasiliensis* no lago da Hidrelétrica de Balbina, Amazônia Central, Brasil. In: Abstracts X Reunión de Trabajo de Especialistas en Mamíferos Acuáticos de América del Sur. Valdivia, Chile, p. 119.

REPORT

RECENT RECORDS FOR THE NEOTROPICAL RIVER OTTER (Lontra longicaudis) IN GUERRERO, MEXICO

Jiménez R. E. MALDONADO ¹, C. A. LÓPEZ GONZÁLEZ²

¹Unidad Académica de Ecología Marina. Universidad Autónoma de Guerrero, Mexico e-mail: Cats4mex@aol.com ²Escuela de Biología, Facultad de Ciencias Naturales, Universidad Autónoma de Querétaro, Mexico

Neotropical river otters (*Lontra longicaudis*) have an historical distribution from northern Mexico down to South America (LARIVIERE, 1999). This species has been recorded as associated with many vegetation types, and has been located at elevations between 300 to 1500 m (LARIVIERE, 1999). The quality of such habitats is characterized by sites with large amounts of riparian vegetation, which favors the abundance of den sites. The neotropical river otter has a low tolerance to environmental change, tending to occupy areas where water flow is constant and extensive, with low amounts of chemical and organic pollutants (LARIVIERE, 1999). The species is currently threatened along its distribution area, the main causes of population extinction being habitat fragmentation and poaching for fur (NOWAK, 1999). In Mexico, industrial waste spills into rivers have increased the amount of heavy metals, with a consequent increase in deaths of neotropical river otters (GALLO-REYNOSO, 1997).

New neotropical otter records were obtained opportunistically whilst carrying out a field survey between August 2002 and April 2003. The study area was located in the southwestern portion of the Mexican State of Guerrero, encompasses an area of 11,594 km², and includes the municipalities (local government entities) of Coyuca de Benítez, Atoyac de Álvarez, San Jerónimo de Juárez, Tecpan, Petatlán, Zihuatanejo and La Unión. These municipalities constitute the region known as Costa Grande, located between 17°00'-17°58' N latitude and 100°00'-101°45' W longitude (Fig. 1). The presence of neotropical otters was confirmed through interviews with ranchers, hunters and tanneries (LÓPEZ-

GONZÁLEZ and BROWN, 2002; McNAB and POLISAR, 2002). Physical records (skins, skulls, and captive individuals) were documented through photographs. The records were plotted on a 1:250,000 map using ArcView 3.2a (ESRI 1999), creating a geographic information system that included vegetation (PALACIO-PRIETO et al., 2000), elevation and human settlement layers (CONABIO, 2003).

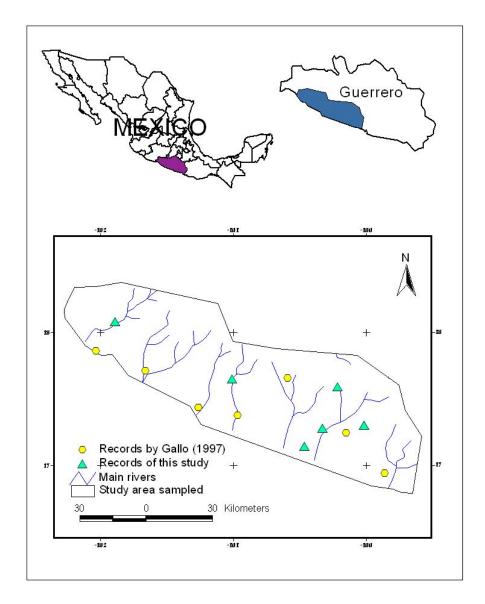


Figure 1. Geographic location of Mexico, the study area (shaded) within the State of Guerrero and sites of Neotropical river otter records for this study and those of GALLO (1997).

We obtained a total of 12 new records for neotropical river otters in the study area. These records represent the period from 2001-2003 (Table 1). Although neotropical river otters have been protected by the Mexican government since at least 1965 (SAG, 1965) the capture of five individuals for sale reflects an extant poaching problem within the region. Tanneries obtain a \$40 dollar profit per skin processed, which usually means a 10-fold profit for the merchant (pers. obs.). Of the records, four were female, three male, and the rest were classified as unknown given that we were not able to verify either sex due to the poor condition of the specimen or lack of sufficient data provided by the informant. The records represented otters from four of the six municipalities surveyed, six for Atoyac, three for Zihuatanejo, two for San Jerónimo and one for Tecpan (Table 1). All records presented here are new localities when compared to the results of GALLO-REYNOSO (1997), reflecting possible range extension. Neotropical river otters were associated with six different vegetation types, from

wetlands (popal-tular) to pine forest (Table 1), two records were detected in human influenced grasslands, probably reflecting transient individuals. Using GIS, we determined that otters were present in areas with $50.48 \pm 116.62 \text{ humans/km}^2$, and a settlement density of $0.14 \pm 0.03 \text{ towns/km}^2$. The average distance between records is $52.17 \pm 39.87 \text{ km}$, the average distance from our records to Gallo-Reynoso is $22.09 \pm 7.02 \text{ km}$. These measurements probably reflect the presence of several distinct populations within the study area. The sites around the town of Atoyac and La Zuzuca (San Jeronimo), however, probably represent a single subpopulation as they are 14.1 km apart, a linear distance that is easy to travel for otters.

Table 1. Neotreopical river otters records from the Costa Grande region, Guerrero, between 2001-2003. a. Male (M), female (f), unknown (U). b. Vegetation type taken from PALACIO-PRIETO et al. (2000)

_ Althou	Vegetation type ^b	Elevation	Locality/Municipality	Sex ^a	Record	Year
gh	Grasslands	100	Atoyac	M	Skin	2003
neotropical	Grasslands	100	Atoyac	F	Skin	2003
river otters	Cloud forest	1000	El paraíso/Atoyac	F	Skin	2002
remain a	Cloud forest	1500	Sto. Domingo/Atoyac	M	Skin	2001
protected	Pine forest	1000	El paraíso/Atoyac	U	Observed	2003
species in	Pine forest	1000	El paraíso/Atoyac	U	Observed	2002
Mexico, their	Oak forest	500	La sombra/Tecpan	F	Skin	2001
poaching and	Wetland	0	La zuzuca/San Jerónimo	M	Observed/ fisherman	2003
commercial	Wetland	0	La zuzuca/San Jerónimo	U	Observed/ fisherman	2003
continuous to	Tropical dry forest	400	El Higo/Zihuatanejo	U	Observed/ fisherman	2003
be	Tropical dry forest	400	El Higo/Zihuatanejo	U	Observed/ rancher	2003
detrimental for the extant	Tropical dry forest	400	El Higo/Zihuatanejo	F	Observed/ rancher	2003

populations. A special effort should be carried out to create a protected area in the Atoyac-San Jeronimo area that would shelter otters from further prosecution.

REFERENCES

CONABIO 2003. Geoinformación. < www.conabio.gob.mx > Accesed 12/09/2003.

ESRI 1999. *Arcview* GIS, versión 3.2. Enviromental Systems Research Institute, Inc, Redlands, California.

GALLO REYNOSO, J.P. 1997. Situación y distrubicion de las nutrias en Mexico, con énfasis en *Lontra longicaudis annectens* Major 1897. Revista Mexicana de Mastozoologia **2**, 10-32.

LARIVIERE, S. 1999. Lontra longicaudis. Mammalian Species 609, 1-5.

LOPEZ-GONZALEZ, C.A., BROWN, D.E. 2002. Distribución y estado actual del jaguar (*Panthera onca*) en el noroeste de México. In: MEDELLIN, A.R., EQIHUA, CH., CHETKIEWICZ, L.B., CRAWSHAW, P.G. JR., RABINOWITZ, A., REDFORD, K.H., ROBINSON, J.G., SANDERSON, E.W., TABER, A.B. (eds.). El jaguar en el nuevo milenio: una evaluación de su condición actual, historia natural y prioridades para su conservación. Fondo de Cultura Económica-Wildlife Conservation Society-UNAM. México, D. F.

McNAB B.R., POLISAR J. 2002. Una metodología participativa para una estimación rápida de la distribución del jaguar en Guatemala. In: MEDELLIN, A.R., EQIHUA, CH., CHETKIEWICZ, L.B., CRAWSHAW, P.G. JR., RABINOWITZ, A., REDFORD, K.H., ROBINSON, J.G., SANDERSON, E.W., TABER, A.B. (eds.). El jaguar en el nuevo milenio: una evaluación de su condición actual, historia natural y prioridades para su conservación. Fondo de Cultura Económica-Wildlife Conservation Society-UNAM. México, D. F.

NOWAK, M.R. 1999. Walter's Mammals of the World Vol I. Sixth edition. John Hopkins University Press. Baltimore and London.

PALACIO-PRIETO, J.L., BOCCO, G., VELÁZQUEZ, A., MAS, J.F., TAKAKI, F., VICTORIA, A., LUNA GONZÁLES, L., GÓMEZ RODRÍGUEZ, G., LÓPEZ GARCÍA, J., PALMA, M., TREJO VÁZQUEZ, I., PERALTA, A., PRADO MOLINA, J., RODRIGUES AGUILAR, A., MAYORGA SAUCEDO, R., GONZÁLEZ MEDRANO, F. 2000. La condición actual de los recursos forestales en México: resultados del Inventario Nacional Forestal 2000. Investigaciones Geográficas, Boletín del Instituto de Geografía UNAM 43, 183-203.

SAG 1965. Calendario de Caza 1965-1966. Secretaria de Agricultura y Ganaderia.

REPORT

CAMERA TRAP USE FOR STUDYING GIANT OTTERS (Pteronura brasiliensis) IN THE YASUNÍ BIOSPHERE RESERVE, ECUADORIAN AMAZON

Víctor UTRERAS¹, Luis PINOS²

¹Wildlife Conservation Society – Ecuador Program. P.O. Box 17–21–168, Quito – Ecuador e-mail: vmub@wcsecuador.org

²Escuela de Biología y Química, Universidad Central del Ecuador. Quito – Ecuador

Since January 2003, during field surveys of giant otters (*Pteronura brasiliensis*) carried out in the Yasuní Biosphere Reserve (north-eastern Ecuadorian Amazon), we have been testing the use of camera traps as a supplementary technique for studying this species. Camera traps are used for population monitoring of several medium to large size wildlife species. This technique can also provide information about home range size, habitat use, and behavioural activities such as daily and seasonal movements and activity periods. In addition, it is possible to identify many individuals through distinctive features using camera traps activated by the individuals themselves.

We have tested the CamTrakker equipment, which combines a fully automatic 35 mm camera with a passive infrared heat-in-motion detector. When something that moves and gives off heat passes by, a silent electronic switch engages the camera that takes the photograph. Time selector switches allow the field researcher to select one of six time-delays and three modes of operation. These features allow day and night operation and reduce the chance of too many photos of the same individual. During fieldwork, four camera traps were located near dens and latrines (marking areas) of three giant otter groups in the study area. We recommend setting the time selector switch to a range of 20-90 seconds, as visit times are usually very short, and to use ISO 200 36 frame colour print film. When installing the camera in the field, we also advise setting it up 50 cm above the ground, taking into account potential changes in water level that might damage the equipment.

A preliminary analysis of the utilisation of this technique with giant otters shows that camera traps provide useful information about movement patterns in the activity area of each group, frequency of visits to specific locations, such as campsites, daily activity periods in dens and latrines, identification and monitoring of specific individuals based on distinctive features such as spot patterns, presence of offspring, sex determination (especially adult females), and pregnancy (Figures 1, 2, 3).

Acknowledgements – The research on giant otters in the Yasuní Biosphere Reserve is part of the Living Landscape Program of the Wildlife Conservation Society – Ecuador Program, with the support of USAID.



Figure 1. Giant otter at a latrine located on the shore of an oxbow lake by the Tiputini River.



Figure 2. Giant otters from the Añangucocha region of the Napo River. The individual above is an adult female, and the individual below is marking in the latrine.



Figure 3. Giant otter at Añangucocha on the Napo River. The adult female is carrying a cub in her mouth.

SHORT NOTICE

EURASIAN OTTERS (Lutra lutra) IN CRETE?!

Koen de SMET, Petros LYMBERAKIS

Nature Division, Albert II laan 20, Bus 8, 1000 Brussel, Belgium. e-mail: koen.desmet@lin.vlaanderen.be

In July 2003 I explored the south coast of Crete and visited the Natura 2000 site of Kourtaliotiko Farangi and Preveli Beach. Water runs down from the central Cretan mountains on a permanent base and very deep-water ponds have been eroded in the canyon. There is a well-developed riverine forest (*Platanus*) and thickets and scrubs (*Nerium*) are present all along the riverbank. In the lower part, near the endemic Cretan *Phoenix theophastica* palms, there are reed beds and *Potamogeton* in the water. There are many amphibians and reptiles and fish are very abundant. In other words, this is prime Mediterranean otter habitat.

I found otter spraints in the higher part of the canyon and deposited on larger rocks near the sea and palm forest. Though amphibian bones and a jelly like substance were found, no fish spines were observed. One of the spraints was fresh enough to confirm the typical otter perfume.

I had not realised that the otter had never been reported as living in Crete and, therefore, did not collect or photograph the spraints. Mr. Lymberakis (lyberis@hhmc.uoc.gr) from the Cretan Natural History Museum later confirmed that the otter was not known from this locality, or from elsewhere on Crete. Other Palaearctic mammal species, such as badger and stone marten, however, do occur on the island and others have become extinct in historical times.

As these findings are very important from a zoogeographical point of view, as well as for nature protection on Crete, I would like to make an appeal to other European otter specialists to check the locality again for otter whenever they visit the island, either professionally or on holiday. Of course spraints should be collected on that occasion.

SHORT NOTICE

MORE ON PREDATION OF FISH EATING BIRDS BY EURASIAN OTTERS (LUTRA) IN CAPTIVITY

Jordi RUIZ-OLMO, Rosa MARSOL and Victoria ASENSIO

Servei de Protecció i Gestió de la Fauna, Direcció general del Patrimoni Natural i del Medi Físic, Dr. Roux 80, 08017 Barcelona, Spain. e-mail: ajruiol@correu.gencat.es

In a previous issue of the IUCN OSG Bulletin (no.19/1 2002), we presented a report on evidence of predation on fish eating birds by the Eurasian otter (*Lutra lutra*) in northeast Spain. However, whilst this work was still in press we collected new interesting data. A further four adult grey herons (*Ardea cinerea*) were captured and killed by the captive otters living in the enclosures of the Pont de Suert Otter Centre (Pyrenean mountains, Spain). A female otter (6 kg and 5 years old) killed two of the herons on April 10th and 12th of 2003; and a second female (7 kg and 7 years old), with one sub-adult cub (14 to 21 months old), killed one heron on April 16th 2003 and another on January 20th 2004. First three episodes occurred during a six-day period, coinciding with a cold week when minimum air temperatures ranged between -0.6 to 7.2 °C and minimum water temperatures between 5 and 8 °C. The fourth episode also occurred during a cold week: minimum air temperature at -5.2 °C, and water temperature at 4 °C.

There is a trout (*Salmo trutta*) fish farm close to the otter enclosures, where herons and other birds regularly go to scavenge fish (as they also do at the otter centre); however, since the existence of the centre (1995), there have been no reports of these captive otters catching herons at this facility. The practically simultaneous capture of first three herons could be due to a special situation, such as low temperatures (as happened again in 2004) or food shortages in the River Noguera Ribagorçana and the Escales reservoir; though the heron's body condition was not bad, the cold weather may have forced them to take greater risks than normal in an effort to gain food. Only in 2004 the heron was consumed by otters. Herons have shown wounds to the skull and the neck (between wings), the later being fractured in three of the four cases.

All these cases at the Pont de Suert Otter Centre involved captive otters with wild herons, as we have found in the wild for 1990 (see the previous report). However, as regards wild otters, heron and otter "concentrations" can occur, particularly when environmental conditions are bad (e.g. at reservoir tails, fish farms, holes in ice cover, ponds during droughts, etc.) and such interactions could occur more frequently than presently recognised.

LITERATURE

- CHANIN, P. 2003. Ecology of the European otter *Lutra lutra*. Conserving Natura 2000 Rivers Ecology Series No 10. Peterborough, English Nature. (The author wants to state that he was not consulted about the title of the final version. It can be ordered or downloaded via: www.riverlife.org.uk).
- CARBÓ, G. 2003. Densidas de lobito de rio (*Lontra longicaudis*) en las lagunas Galarza y Luna, pp. 343-347. In: ALVAREZ, B.B. (eds.). Fauna del Iberá, Mastofauna, EUDENE, Corrientes, 384pp.
- GORI, M., CARPANETO, G.M., OTTINO, P. 2003. Spatial distribution and diet of the Neotropical otter *Lontra longicaudis* in the Ibera Lake (northern Argentina). Acta Theriol. 48, 495-504. (Dipartimento di Biologia, University degli Studi "Roma Tre", Viale Marconi 446, I-00146 Romas, Italy).
- JANSMAN, H.A.H., DEKKER, J., HATTUM, B. VAN, LEONARDS, P.E.G., BROEKHUIZEN, S. 2003. Using molecular markers and PCB analysis to infer the origin of the otter (*Lutra lutra*) found on the Knardijk, The Netherlands, in 1998. Lutra 46, 3-12. (Alterra, Centre for Ecosystems, POB 47, N-6700 AA Wageningen, The Netherlands).
- LAMMERTSMA, D.F., NIEWOLD, F.J.J., JANSMAM, H.A.H., KUITERS, A.T. 2003. Otters opsporen: ervaringen in het eerste jaar van uitzetten. Zoogdier, 14(4), 13-17. [in Dutch]. (adress see above).
- LANSKI, J., KÖRMENDI, S., HANCZ, C., MARTIN, T.G. 2001. Examination of some factors affecting selection of fish prey by otters (*Lutra lutra*) living by eutrophic fish ponds. J. Zool., Lond. 255, 97-103. (University of Kaposvár, POB 16, H-7401 Kaposvár, Hungary).
- LANSKI, J., MOLNÁR, T. 2003. Diet of otters living in three different habitats in Hungary. Folia Zool. 52, 376-388. (address see above).
- NAGY, D. 2002. Data on the feeding biology of otters (*Lutra lutra* L.) in the lakes Balaton and Kis-Balaton in Hungary. Opusc. Zool. Budapest 34, 59-66. (Dept. Systematic Zoology, Eötvös Loránd University, 1117 Budapest, Pázmány Péter sétány 1/C, Hungary).
- RANDI, E., DAVOLI, F., PIERPAOLI, M., PERTOLDI, C., MADSEN, A.B., LOESCHKE, V. 2003. Genetic structure in otter (*Lutra lutra*) populations in Europe: implications for conservation. Animal Cons. 6, 1-10. (Istituto Nazionale per la Fauna Selvetica, Via Ca Fornacetta 9, I-40064, Ozzano Emilia, Italy).
- SIDOROVICH, V., JANUTA, G., POLOZOV, A., SOLOVEJ, I., GRIFFITHS, J. 2003. Prey supply of otters (*Lutra lutra*) in small rivers in north-eastern Belarus: census method used and preliminary data obtained. Lutra 46, 13-26. (Vertebrate Predation Research Group, Institute of Zoology, National Academy of Sciences, Akademycheskaya Street 27, Minsk-220072, Belarus).

Proceedings VIIth Otter Colloquium

Dear Colleagues!

The Proceedings of the VIIth Otter Colloquium (1998 - Trebon) are published. The book contains 400 pages and is sold for the price of 20 Euro plus postage (Europe 5 € Overseas 8 €). Those of you who prefer to receive a CD with pdf files instead may order it for 10 Euro plus postage (Europe 2 € Overseas 2.25 €).

Sincerely yours,

Arno Gutleb - on behalf of the editors

(Robert Dulfer, Jan Nel, Jim Conroy, Arno Gutleb)

For requests: IVM, De Boelelaan 1087, 1081 HV Amsterdam, The Netherlands

Fax: ++31-84-8823459; e-mail: arno.gutleb@ivm.vu.nl

CONGRESS ANNOUNCEMENTS

CALL FOR PAPERS

IX International Otter Colloquium

Otters: Ambassadors for Aquatic Conservation

IUCN Otter Spec. Group Bull. 20(2) 2003

4th – 6th June 2004, USA

We recently have been receiving numerous requests for extensions in submitting abstracts for the IX International Otter Colloquium. Please be aware that the December 15, 2003 date was intended as a suggestion for participants to submit abstracts early and not the final deadline. The final deadline was February 2, 2004. However, our web page (http://otter.frostburg.edu) soon will be reflecting March 1, 2004 as the deadline. This extension is being made to accommodate requests from the international community. We thank the numerous researchers that made early submissions of abstracts for papers and posters. To help make our planning more efficient, we encourage others to make early submissions and not wait until the final deadline. Please monitor the web page for conference costs (to be posted by mid-January) and on-line registration information (we will begin accepting registrations at the end of January). We're looking forward to seeing you in June. Sincerely,

Tom Serfass, Lisa Serfass, and Sadie Steven
Colloquium Organizers
for further information please contact:
Thomas L. Serfass, Department of Biology, Frostburg State University, Frostburg, MD 21532, 301-687-4171
TSERFASS@mail.frostburg.edu

4th International Martes Symposium

Martes in Carnivore Communities 20.-24. July 2004, University of Lisboa, Portugal

The symposium will cover aspects of the biology, management and conservation of members of the genus Martes.

For more information please contact:

Margarida Santos Reis, e-mail: mmreis@fc.ul.pt

11th Workshop of Latin America Aquatic Mammals Specialists

12.-17. September, 2004 Quito, Ecuador

From the 12th to the 17th of September, 2004, in Quito, Ecuador, the 11th Workshop of Latin America Aquatic Mammals Specialists (11th RT) will be hosted. This event takes place every two years and for the first time will be hosted in Ecuador. The 11th RT is organized by the Latin American Society of Aquatic Mammals Specialists (SOLAMAC) and the Biology Department of Pontificia Universidad Católica del Ecuador (PUCE).

The 11th RT will be a time for professionals, researchers and students interested in the knowledge of aquatic mammals to share their work, perspectives and experiences to one another. We hope it will become a success and invite you to participate. Fore more information please contact: RTEcuador|@puce.edu.ec

Santiago F. Burneo Sección Mastozoología - Museo de Zoología Pontificia Universidad Católica del Ecuador Quito - Ecuador (593-2) 299 1700 Ext. 1815 (593-9) 833 1628 http://www.puce.edu.ec/zoologia/vertebra.htm

9th International Congress of Mammalogy

2005, Sapporo/Japan http://cse.ffpri.affrc.go.jp/hiroh/ICOM9Japan.html Dear Mammalogists,

It is a great pleasure to inform you that the Congress Committee for MAMMAL 2005 (the 9th International Mammalogical Congress; formerly the International Theriological Congress: ITC) has been launched. The Congress Committee will periodically inform you about the preparation of MAMMAL 2005 through e-mail and the web page (www.hokkaido-ies.go.jp/mammal2005/), which is now under construction. Though we are now managing e-mail addresses based on delegate lists of the 7th and 8th ITC, we would like to renew the list of addresses for MAMMAL 2005 with your permission. Are you interested in MAMMAL 2005? Please reply to us (MAMMAL2005@hokkaido-ies.go.jp) to get the periodical information about MAMMAL 2005.

Koichi Kaji and Takashi Saitoh (Secretary General) Tomoko Takahashi (Secretary)

CALL FOR INFORMATION

Prof. Padma. K. Silva (Coordinator, Otter Specialist Group, Asian region) asked me to contact you. Please allow me to introduce my self. I am working on different aspect of wildlife of Bangladesh during the last one decade. In the last few years I am working on otters of Bangladesh with the fund from OSG and Colombo Zoo, USA. I surveyed the Sundarbans and other areas for otters. You might know that the fishermen in the Sundarbans use otters for fishing. In south Asia, this is the only area where the ethnic fishermen group uses otters for fishing. We studied socio-economic condition of these ethnic fishermen, the fishing techniques with otters and biology of otters in captivity. This century old traditional practice is now under severe threat because of poor economic condition of the fishermen, lack of education and awareness.

I am interested to do some joint research on different aspects of otter and otter fishing in the Sundarbans. I will be very glad if you would kindly be involved to save this century old traditional practice.

Look forward for hearing from you. Thank you! Sincerely yours,

Dr. Mohammed Mostafa Feeroz Associate Professor, Department of Zoology Jahangirnagar University Savar, Dhaka, Bangladesh Phone: 0172047115 or 88-011832965

Filone. 01/204/113 01 86-01183230.

Fax: 88-02-7708069

Dear all,

I am a vet and I prepare a thesis (PhD) on otters (relationship between pollution and survival of otter populations in the S.E of France). For that, we are writing a questionnaire intented for the fishermen to know what they know about and what they think of otters (predation, pollution, reintroduction...). Did you already carry out this type of survey in people (fishermen, inhabitants,...) of your own country? Would you have references to advise me?

Thank you in advance for your help! Best regards

Alexandra MAZET

Docteur veterinaire, Doctorante, Pharmacie - Toxicologie Ecole Nationale Veterinaire de Lyon, BP 83, F-69280 Marcy l'toile

Tel 33 (0)4 78 87 26 39; Fax : 33 (0)4 78 87 80 12 e-mail.: a.mazet@vet-lyon.fr or alexmazet@yahoo.fr

GIANT OTTER BIBLIOGRAPHY

ASSEMBLED BY NICOLE Duplaix, JESSICA Groenendijk, CHRISTOF Schenck, ELKE Staib AND SHEILA Sykes-Gatz

NOTE: This list of references is not meant to be exhaustive or complete but to be working tool for persons who are interested in Giant otters but who do not have access to a large university library. We welcome any additions or corrections: NDParis@aol.com, fzsgop@terra.com.pe

Early Descriptions, Explorers' Reports (1777-1952)

Allen, J. A. (1910). Mammals from the Caura district of Venezuela. Bull. Am. Mus. Nat. Hist., 28: 146.

André, E., (1904). A Naturalist in the Guianas. London: Smith, Elder & Co.

Azara, F. de (1802) Apuntamientos para la Historia Natural des los Quadrupedos de Paraguay. 304-309. Madrid. La Viuda de Ibarra.

Beebe, W., G.I. Hartley & P.G. Howes (1917) Tropical Wildlife in British Guiana. New York: N. Y. Zoological Society.

Brown, C.B. (1876) Canoe and Camp Life in Bristish Guiana. London: E. Stanford.

Desmarest, A. G. (1817) Nouveau Dictionnaire d'Histoire Naturelle. 18: 208-219

Desmarest, A. G. (1820) Mammalogie. 1. Paris

Gmelin, CJ. F. ed. (1788) Linné, C. Systema Naturae 1: 93 (13th ed.). Brussels: Lemaire.

Gray, J.E. (1868) Observations on the Margin-tailed Otter *Pteronura sandbachii*. Proc. Zool. Soc. London 1868; 60-66.

Gray, J.E. (1869) Catalogue of Carnivorous Mammalia.: 80-81, 100-119. London: British Museum.

Nehring, A. (1887) Uber die Gray'schen Fischotter-gattungen *Lutronectes, Lontra* und *Pteronura*. Sber. Ges. Naturf. Freude Berlin. 1899:21-25

Nehring, A. (1901) Einige Notizen ueber die *Lutra (Pteronura) paranensis* des hiesigen Zoologischen Gartens. Sber. Ges. Naturf. Freude Berlin, 1901: 133-135.

Pohle, H. (1920) Die Unterfamilie der Lutrinae. Arch. Naturgesch, 85 Ab. H. Helft 9: 1-247.

Ouelch, J. J. (1910) Animal Life in British Guiana. Georgetown: Argosy.

Rengger, J.R. (1830) Naturgeschichte der Säugetiere von Paraguay: 128-138. Basel: Schweighausersche.

Sanderson, I.T. (1950) A brief review pf the mammals of Suriname, based upon a collection made in 1938. Proc. Zool. Soc. London, 119: 755-789.

Vieira, C. O. da C. (1952) Notas sobre os mamiferos obtidos pela expedição do Instituto Butanta as Rio das Mortes e Serra do Roncador. Papeis Dept. Zool. S. Paulo 10:117.

Zimmermann, E. A. G. (1777) Specimen Zoologiae Geographicae, Quadrupedum: 303-304, 485. Leyden.

Field Studies and other reports, by country

• Argentina

Chehebar, C. (1991). Searching for the giant otter in northeastern Argentina. IUCN Otter Spec. Group Bull. **6**, 17-18

Beccaceci, M.D. & Waller, T. (2000). Presence of the Giant Otter, *Pteronura brasiliensis*, in the Corrientes Province, Argentina. IUCN Otter Spec. Group Bull. 17, 31-33

Parera, A.F. (1992). Present Knowledge on the Giant Otter in Argentina. IUCN Otter Spec. Group Bull. 7, 19-21

• Bolivia

Anderson, S. (1997). Mammals of Bolivia, Taxonomy and Distribution. Bull. Am. Mus. Nat. Hist., No. **231**; pp. 343 – 344

Dunstone, N. (1987). Quest for the River Wolf - Report 1987. Durham University Expedition to Bolivia; 77 pp.

Ergueta, P. & Morales, C. de [eds.] (1996). Libro rojo de los vertebrados de Bolivia. CDC - Bolivia; pp. 171-172

Gonzales, E.R. (1997). Ecoetología de la londra (*Pteronura brasiliensis*), en la Reserva de Producción del Bajo Paraguá. Tesis de Grado, Universidad Autonoma "Gabriel René Moreno", Santa Cruz de la Sierra, Bolivia; 118 pp.

• Brazil

Carter, S.K. & Rosas, F.C.W. (1997). Biology and conservation of the Giant Otter *Pteronura brasiliensis*. Mammal Rev. 1997, Vol. 27, No.1, pp. 1-26

Schweizer, J. (1986). Ocorrencia e alguns dados biologicos de ariranha (*Pteronura brasiliensis*) no Rio Negro. In Reuniao de trabalho de especialistas en mamiferos aquaticos da America do Sul. 20. Resumos. p. 48.

• Colombia

Defler, T.R. (). A Census of *Pteronura brasiliensis* in El Tuparro National Park and Environs, Colombia. Presented to National Parks System of Colombia INDERENA; 20 pp.

Defler, T.R. (1986). The giant river otter in El Tuparro National Park, Colombia. Oryx Vol 20 No 2/April; pp. 87-88

Donadio, A. (1978). Some Comments on Otter Trade and Legislation in Colombia. In: Proceedings First Working Meeting of the IUCN Otter Specialist Group, Paramaribo, Suriname, March 1977, N. Duplaix (ed.); pp. 34-42

Gómez, J.R. & Jorgenson, J. (1999). An Overview to the Giant Otter – Fisherman Problem in the Orinoco Basin of Colombia. IUCN Otter Spec. Group Bull. 16(2)1999; pp. 90-96

Gómez, J.R. (1999). Ecología alimentaria de la Nutria Gigante (Pteronura brasiliensis) en el bajo Río Bita (Vichada, Colombia). Tesis, Universidad Javeriana, Santafé de Bogotá, Colombia.

• Ecuador

Fersen, L. von (1997). The Giant Otter in Ecuador. IUCN Otter Spec. Group Bull. **14** (1) April 1997; pp. 20-23

Melendres, A.P. (1978). Notas sobre las nutrias de río del Ecuador. In: Proceedings First Working Meetting of the Otter Specialist Group, Paramaribo, Suriname, 1977, N. Duplaix (ed.); pp. 56-66

Tirira, D. (Ed.) (2001). Libro rojo de los mamíferos del Ecuador. SIMBIOE/EcoCiencia/Ministerio del Ambiente/UICN. Serie Libros Rojos del Ecuador, Tomo 1. Publicación Especial sobre los Mamíferos del Ecuador4. Quito; 236 pp.

Utreras, V. & Jorgensen, J. (in press). Aspectos sobre la cacería y la distribución actual e histórica de la nutria gigante (*Pteronura brasiliensis*) en la Amazonía Ecuatoriana. To be published in the Proceedings of the Congreso Internacional de Manejo de Fauna Silvestre en Amazonía y Latinoamérica, Cartagena de Indias, Colombia, 10-14 September 2001.

• French Guiana

Jacques, H., Pelsy, C., de Thoisy, B. (2000) La loutre géante en Guyane Française : Rapport de mission sur le Litani

Jacques, H., Pelsy, C (2000) La loutre géante en Guyane Française : Rapport de mission sur l'Arataï

Guyana

Barnett, A., Shapley, R., Lehman, S., Henry, E. & Benjamin, P. (2000). Records of the Giant Otter, *Pteronura brasiliensis*, from Guyana (Final version). IUCN Otter Spec. Group Bull. 17(2) 2000; pp. 65-74.

Laidler, E. (1982). A Study of the Giant Otter *Pteronura brasiliensis* - Movement Patterns, Territoriality, Development and Ecology in Guyana. Otters, Journal Otter Trust, 1982 Vol. **I**(6); pp. 13-21

Laidler, **P.E.** (1984). The behavioural ecology of the giant otter in Guyana. Doctoral Dissertation, Univ. of Cambridge 1984; 319 pp. (13581, D58408-85)

Shackley, M. (1998). Designating a Protected Area at Karanambu Ranch, Rupununi Savannah, Guyana: Resource Management and Indigenous Communities. Ambio Vol. 27 No. 3, May 1998; pp. 207-210

Shackley, M. (1996). Giant Otters at Karanambu. Unpublished; 13 pp.

Shackley, M. (1996). Feasibility Study for a Protected Area at Karanambu Ranch, Guyana; 88 pp.

Peru

Brack Egg, A. (1977). Situacion Actual de las Nutrias (Lutrinae, Mustelidae) en el Peru. In: Proceedings First Working Meeting of the Otter Specialist Group, Paramaribo, Suriname, 1977, N. Duplaix (ed.); pp. 76-84

Brecht-Munn, M. (1985). Lobo grande de río. Reporte Manu. Centro de Datos para la conservacion, Univ. Nacional Agraria, Lima, Peru; 6 pp.

Frank K. (2000). Análisis de un modelo para el manejo del Lobo de Río en el Parque Nacional del Manú. In: Lobo de Río, Resumen del Simposio 1998. P. 10-20. Inrena150141-2000-0127. Lima, Peru.

Grimwood, I. (1969). Giant Otter (*Pteronura brasiliensis*). In *Endangered Mammals in Peru*. Oryx Vol. IX; pp. 416

Groenendijk, J. (1998). De Reus van Zuid-Amerika. Ecologie en Ontwikkeling, Jaargang 6, No 1, 1998; pp. 15 – 17. Nieuwsbrief van het Nederlands Comité voor IUCN

Groenendijk, J. & Hajek, F. (2001). Project Report 2000 - Internal Report of the Frankfurt Zoological Society Giant Otter Conservation Project

Groenendijk, J. & Hajek, F. (2000). Project Report 1999 – Internal Report of the Frankfurt Zoological Society Giant Otter Conservation Project

Groenendijk, J. & Hajek, F. (1997). Las Piedras '96: an expedition to the Las Piedras river, southeastern Peru. Produced by the Netherlands Committee for IUCN; pp. 44

Groenendijk, J., Hajek, F., Isola, S. & Schenck, C. (in press). Giant Otter Project in Peru: Field Trip and Activity Report, 2000. Presented for publication in the IUCN Otter Specialist Group Bulletin

Groenendijk, J., Hajek, F., Isola, S. & Schenck, C. (2000). Giant Otter Project in Peru: Field Trip and Activity Report, 1999. IUCN Otter Spec. Group Bull. 17(1)2000; pp. 34 - 45

Groenendijk, J., Hajek, F., Schenck, C. & Staib, E. (2001). Monitoreo del Lobo de Río (*Pteronura brasiliensis*) en la Reserva de Biosfera del Manu: metodologias y resultados. In: El Manu y Otras Experiencias de Investigacion y Manejo de Bosques Tropicales, Symposium Internacional, Puerto Maldonado, Peru, 4-7 June 2001

Groenendijk, J., Hajek, F., Schenck, C. & Staib, E. (in prep.). A Decade of Giant Otter (*Pteronura brasiliensis*) Population Dynamics in the Manu Biosphere Reserve, Peru. Paper presented at the VIII International Otter Colloquium, Valdivia, Chile, 19-27 January, 2001

Hajek, F. & Groenendijk, J. (in prep.). Propuesta para un Plan de Manejo de Habitats Acuáticos de la Reserva de Biosfera del Manu en base a monitoreo de especies indicadores; 37 pp.

Hajek, F. & Groenendijk, J. (2001). Informe Annual 2000 – Proyecto Lobo de Río. Report of the Frankfurt Zoological Society Giant Otter Conservation Project, presented to the Instituto Nacional de Recursos Naturales (INRENA)

Hajek, F. & Groenendijk, J. (2000). Informe Annual 1999 – Proyecto Lobo de Río. Report of the Frankfurt Zoological Society Giant Otter Conservation Project, presented to the Instituto Nacional de Recursos Naturales (INRENA)

Hajek, F., Groenendijk, J., Schenck, C. & Staib, E. (2001). El Turismo de Naturaleza y Manejo de Habitat de Lobo de Río (*Pteronura brasiliensis*) en el Sureste del Perú. In: El Manu y Otras Experiencias de Investigacion y Manejo de Bosques Tropicales, Symposium Internacional, Puerto Maldonado, Peru, 4-7 June 2001

Isola S. (1999). Evaluación del estado de conservación de tres especies de mamiferos dulce aquicolas sudamericanos: Lobo de rio (*Pteronura brasiliensis*), delfín rosado (*Inia geoffrensis*) y Manatí (*Trichechus inunguis*). Report WWF: 103.

Isola, S. (2000). Determinacion de la distribucion y abundancia de Lobo de Rio (*Pteronura brasiliensis*) en la Reserva Nacional Pacaya Samiria. Tesis para optar el Grado de Ingeniero Forestal, Univ. Nac. Agraria la Molina, 80 pp.

Isola, S. & Benavides, J. (2001). El Lobo de Rio: una especie bandera para la Reserva Comunal Tamshiyacu Tahuayo. Internal Report.

Khanmoradi, H. (1994). Untersuchungen zur Nahrungsökologie der Riesenotter (*Pteronura brasiliensis*) in Peru. Diplom-Arbeit, Uni. München; 121 pp.

Llosa T. (1997). Lobos del Rio en el Rio Candamo, Puno, Peru. Internal Report Conservation International: 20

Schenck, C. (1999). "Lobo de Río (*Pteronura brasiliensis*) – Presencia, uso del hábitat y protección en el Perú. Spanish translation of German PhD dissertation: Vorkommen, Habitatnutzung und Schutz des Riesenotters (*Pteronura brasiliensis*) in Peru (1996), Munich

Schenck, C. (1996). Vorkommen, Habitatnutzung und Schutz des Riesenotters (*Pteronura brasiliensis*) in Peru. Diss. Univ. Munchen, ISBN 3-8265-3126-4; 180 pp.

Schenck, C. (1995). Status, Habitat Use and Conservation of Giant Otters (*Pteronura brasiliensis*) in Peru. Habitat 11 - Proceedings VI International Otter Colloquium, Pietermaritzburg 1993. Reuther, C. & Rowe-Rowe, D. (eds.); pp. 69-71

Schenck, C. & Staib, E. (1995). The Giant Otter Project in Peru 1995. IUCN Otter Spec. Group Bull. 12 / October 1995; pp. 25-30

Schenck, C. & Staib, E. (1995). News from the Giant Otter Project in Peru. IUCN Otter Spec. Group Bull. 11 / April 1995; pp. 5-8

Schenck, C. & Staib, E. (1993). Giant Otter Study in Peru Completed. IUCN Otter Spec. Group Bull. 8/1993; pp. 44

Schenck, C. & Staib, E. (1992). Giant Otters in Peru. IUCN Otter Spec. Group Bull. 7/1992; pp. 24-26 Schenck, C., Estremadoyro, F. & Staib, E. Primeras evaluaciones para determinar la existencia de lobo de rio (*Pteronura brasiliensis*) en el ambito de la Reserva Nacional Pacaya-Samiria en el Peru. Unpublished; 11 pp.

Schenck, C., Groenendijk, J. & Hajek, F. (1999). Giant Otter Project in Peru – Field Trip and Activity Report, 1998. IUCN Otter Spec. Group Bull. 16(1)1999; pp. 33-43

Schenck, C., Staib, E. & Storch, I. (1997). 1996 News from the Giant Otter Project in Peru. IUCN Otter Spec. Group Bull. 14 (1) April 1997; pp. 13-19

Schweizer J. (1986). Ocorrencia e alguns dados biológicos de ariranha (*Pteronura brasiliensis*, Mustelidae) no Rio Negro. 20 Reuniao de trabalho de especialistas en mamiferos aquaticos da America do Sul. Resumos: 48.

Staib, E. (1995). Social behavior and ecology of the giant otter (*Pteronura brasiliensis*) in Peru. In: Habitat Arbeitsberichte der Aktion Fischotterschutz e.V.. Proceedings VI. International Otter Colloquium Pietermaritzburg 1993 (C. Reuther and D. Rowe-Rowe, eds.). GN-Gruppe Naturschutz GmbH: Hankensbuttel.

Staib, E. (1993). Social Behaviour and Ecology of the Giant Otter (*Pteronura brasiliensis*) in Peru. Habitat 11 - Proceedings VI International Otter Colloquium, Pietermaritzburg. Reuther, C. & Rowe-Rowe, D. (eds.); pp. 72-74

Staib, E. (submitted 2001). Öko-Ethologie von Riesenottern (*Pteronura brasiliensis*) in Peru, PhD dissertation, Munich University, Germany.

TReeS (**Tambopata Reserve Society**) (**1994**). Report of the TReeS Tambopata-Candamo Expedition. A biological survey in the Tambopata-Candamo Reserved Zone South-East Peru (12.08.1992-20.09.1992). London, England. 171 pp.

Suriname

Duplaix, N. (1978). Synopsis of the status and ecology of the giant otter in Suriname. In: Proceedings First Working Meeting of the Otter Specialist Group, Paramaribo, Suriname, 1977, N. Duplaix (ed.); pp. 48-54

Duplaix, N. (1979) Giant otters in Suriname. Oryx. 14(4):439

Duplaix, N. (1980). Observations on the Ecology and Behaviour of the Giant River Otter (*Pteronura brasiliensis*) in Suriname. Rev. Ecol. (Terre Vie), vol. **34** (1980); pp. 496-620

Duplaix, N. (1982) Contribution a l'Ecologie at a l'Ethologie de Pteronura brasiliensis (Carnivora, Lutrinae): Implications Evolutives. Doctorat Thesis, Univ. of Paris-Sud, 352 pp.

Duplaix, N., M. Lingaard, & C. Sakimin (2001) A Survey of Kaburi Creek, West Suriname and its Conservation Implications 2001, Oceanic Society, Oceanic Society, 34 pp

• Venezuela

Mondolfi, E. & Trebbau, P. (1997). Distribution and Status of the Giant Otter (*Pteronura brasiliensis*) in Venezuela. Second report, Nov. 1997, unpublished; 6 pp.

Mondolfi, E. & Trebbau, P. (1978). Distribution and Status of the Giant Otter (*Pteronura brasiliensis*) in Venezuela. In: Proceedings First Working Meeting of the Otter Specialist Group, Paramaribo, Suriname, 1977, N. Duplaix (ed.); pp. 44-47

Ecology and Behavior

Carter, S.K. & Rosas, F.C.W. (1997). Biology and conservation of the Giant Otter *Pteronura brasiliensis*. Mammal Rev. 1997, Vol. 27, No.1, pp. 1-26

Duplaix, N. (1980). Observations on the Ecology and Behaviour of the Giant River Otter (*Pteronura brasiliensis*) in Suriname. Rev. Ecol. (Terre Vie), vol. 34 (1980); pp. 496-620

Duplaix, N. (1982) Contribution a l'Ecologie at a l'Ethologie de *Pteronura brasiliensis* (Carnivora, Lutrinae): Implications Evolutives. Doctorat Thesis, Univ. of Paris-Sud, 352 pp.

Gómez, J.R. (1999). Ecología alimentaria de la Nutria Gigante (*Pteronura brasiliensis*) en el bajo Río Bita (Vichada, Colombia). Tesis, Universidad Javeriana, Santafé de Bogotá, Colombia.

Laidler, E. (1982). A Study of the Giant Otter *Pteronura brasiliensis* - Movement Patterns, Territoriality, Development and Ecology in Guyana. Otters, Journal Otter Trust, 1982 Vol. **I**(6); pp. 13-21

Laidler, **P.E.** (1984). The behavioural ecology of the giant otter in Guyana. Doctoral Dissertation, Univ. of Cambridge 1984; 319 pp. (13581, D58408-85)

Mourao,G. & Carvalho,L. (2001) Cannibalism among Giant Otters (*Pteronura brasiliensis*) Mammalia 65, n°2, 2001 : 225-227

Rosas, F.C.W., Zuanon, J.A.S. & Carter, S.K. (1999). Feeding Ecology of the Giant Otter, *Pteronura brasiliensis*. BIOTROPICA 31(3); pp. 502-506

Schenck, C., Staib, E. & Yasseri, A.M. (1995). Unterwasserlaute bei Riesenottern (*Pteronura brasiliensis*). Z. Saugetierkunde 60; pp. 310-313

Schenck, C. (1997). Vorkommen, Habitatnutzung und Schutz des Riesenotters (*Pteronura brasiliensis*) in Peru. Shaker Verlag, München.

Staib, E. 1995. Social behavior and ecology of the giant otter (*Pteronura brasiliensis*) in Peru. In: Habitat Arbeitsberichte der Aktion Fischotterschutz e.V.. Proceedings VI. International Otter Colloquium Pietermaritzburg 1993 (C. Reuther and D. Rowe-Rowe, eds.). GN-Gruppe Naturschutz GmbH: Hankensbuttel.

Schroeter, W. (1982). Verhaltensbeobachtungen am Riesenotter (*Pteronura brasiliensis*, Gmelin, 1788) in Gefangenschaft. Saugetierkundliche Mitt. 30(3) 1982; pp. 216-220

Staib, E. (1993). Social Behaviour and Ecology of the Giant Otter (*Pteronura brasiliensis*) in Peru. Habitat 11 - Proceedings VI International Otter Colloquium, Pietermaritzburg. Reuther, C. & Rowe-Rowe, D. (eds.); pp. 72-74

Staib, E. (submitted 2001). Öko-Ethologie von Riesenottern (*Pteronura brasiliensis*) in Peru, PhD dissertation, Munich University, Germany.

Trebbau, P. (1978). Some observations on the Mating Behaviour of the Brazilian Giant Otter (*Pteronura brasiliensis*). Zool. Garten N. F., Jena **48** (1978) 2/3, S.; pp. 187-188

Status and Conservation

Carter, S.K. & Rosas, F.C.W. (1997). Biology and conservation of the Giant Otter *Pteronura brasiliensis*. Mammal Rev. 1997, Vol. 27, No.1, pp. 1-26

Barnett, A., Shapley, R., Lehman, S., Henry, E. & Benjamin, P. (2000). Records of the Giant Otter, *Pteronura brasiliensis*, from Guyana (Final version). IUCN Otter Spec. Group Bull. 17(2) 2000; pp. 65-74

Chehebar, C. (1989). The Status of Otters in Latin America. Habitat 6 - Proceedings V Internat. Otter Colloquium, Hankensbuttel 1989. Reuther, C. & Rochert, R. (eds.); pp. 9-14

Duplaix, N. (1980). Observations on the Ecology and Behaviour of the Giant River Otter (*Pteronura brasiliensis*) in Suriname. Rev. Ecol. (Terre Vie), vol. **34** (1980); pp. 496-620

Duplaix, N. (1980). Giant otters: "Big water dogs in peril". *National Geographic Magazine* 158(1) 1980; pp. 130-142

Duplaix, N. & J.A. Davis (1983) Otter, Identification Manual for Customs Officials. 30; Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. (CITES), Gland, Switzerland.

Ergueta, P. & Morales, C. de [eds.] (1996). Libro rojo de los vertebrados de Bolivia. CDC - Bolivia; pp. 171-172

Fonseca, G. & Rylands, A. & Costa, C. & Machado, R. & Leite, Y. (1994) Livro vermelho dos Mamiferos brasileiros ameaçados de extinção Belo Horizonte

Frank K. (2000). Análisis de un modelo para el manejo del Lobo de Río en el Parque Nacional del Manú. In: Lobo de Río, Resumen del Simposio 1998. P. 10-20. Inrena150141-2000-0127. Lima, Peru.

Groenendijk, J. (1998). A Review of the Distribution and Conservation Status of the Giant Otter (*Pteronura brasiliensis*), with Special Emphasis on the Guayana Shield Region. Commissioned by the International Fund for Animal Welfare, produced by the Netherlands Committee for IUCN, March 1998; 55pp.

Harris, C. J. A. (1968). Otters, A Study of the Recent Lutrinae. London: Weidenfeld and Nicholson. Hilton-Taylor C. (2000). 2000 IUCN Red List of Threatened Species. IUCN, Gland, Switzerland and Cambridge, UK.

Tirira, D. (Ed.) (2001). Libro rojo de los mamíferos del Ecuador. SIMBIOE/EcoCiencia/Ministerio del Ambiente/UICN. Serie Libros Rojos del Ecuador, Tomo 1. Publicación Especial sobre los Mamíferos del Ecuador4. Quito; 236 pp.

INRENA (1999). Resumen del Simposio Internacional Sobre Conservacion del Lobo de Rio (*Pteronura brasiliensis*), Lima, 10-11 setiembre 1998. Produced by the Instituto Nacional de Recursos Naturales, Peru

IUCN (1996). Red List of Threatened Animals. Compiled and edited by Jonathon Baillie and Brian Groombridge, World Conservation Monitoring Centre. Published by IUCN and Conservation International; 448 pp.

Olson, D.M., Isola, S.E., Cogliano, M., Thieme, M.L. & Mobley, M. (2001). Designing a representative network of protected areas for giant otters (*Pteronura brasiliensis*) and other Neotropical freshwater megafauna. WWF-US Report.

Schenck, C. and Staib, E. 1998. Status, habitat use and conservation of giant otters in Peru In: DUNSTONE N, GORMAN M.: Behaviour and Ecology of Riparian Mammals, Cambridge University Press, 359-370.

Staib, E. and Schenck, C. 1994. Giant Otter - A giant under even bigger pressure. Wildbiologische Gesellschaft, Munich and Frankfurt Zoological Society, Frankfurt.

Giant otters in Captivity

Autuori M.P. & Deutsch, L.A. (1997). Contribution to the Knowledge of the Giant Brazilian Otter, *Pteronura brasiliensis* (Gmelin 1788), *Carnivora, Mustelidae* - Rearing in Captivity. Zool. Garten N.F., **47** (1997) 1, S.; pp. 1-8

Bartmann, W. 1996. International census of the giant river otter (*P. brasiliensis*) in captivity (1996). Tierpark Dortmund, Dortmund, Germany. Unpublished report.

Duplaix-Hall, N. (1972). Notes on maintaining river otters in captivity. Inter. Zoo Yrbk. 12:178-181.

Duplaix - Hall, N. (1975). River otters in captivity: a review. In Martin, R.D. (ed.), *Breeding Endangered Species in Captivity*, Academic Press, London; pp. 315-327

Duplaix, N. (1982) Contribution a l'Ecologie at a l'Ethologie de *Pteronura brasiliensis* (Carnivora, Lutrinae): Implications Evolutives. Doctorat Thesis, Univ. of Paris-Sud, 352 pp.

Flügger, M. von (1997). Haltung, Zucht und Erkrankungen von Riesenottern (*Pteronura brasiliensis*) in Carl Hagenbecks Tierpark. Verh. ber. Erkrg. Zootiere (1997) 38; pp. 125-130

Foster-Turley, **P. 1990.** Otters in Captivity. In: Otters: An Action Plan for their Conservation (Foster-Turley, P., Macdonald, S. and Mason, C., eds.). International Union for Conservation of Nature.

"Genealogical Meeting on Giant Otters in Captivity in Brazil", lectures/workshop discussions, December 3-4, 1998. Jardim Zoologico de Brasília, Brasilia, Brazil. Daniel Louzada da Silva and Dr. Claudio Valladares-Padua, conference organizers.

Hagenbeck, C. and Wünnemann, K. 1992. Breeding the giant otter *Pteronura brasiliensis* at Carl Hagenbeck's Tierpark. Int. Zoo Yrbk. 31:240-245.

Gómez, J.R., Jorgenson, J. & Valbuena, R. (1999). Report on the Rehabilitation and Release of Two Giant River Otter (*Pteronura brasiliensis*) Pups in the Bita River (Vichada, Colombia). IUCN Otter Spec. Group Bull. 16(2)1999; pp. 86-89

Hagenbeck, C. & Wünnemann, K. (1992). Breeding the Giant Otter (*Pteronura brasiliensis*) at Carl Hagenbecks Tierpark. New Developments in the Zoo World, Internat. Zoo Yb. (1992) **31**; pp. 240-245 Kranz, K. (Oct. 1996). Suggested Design Criteria for Giant Otter Enclosures; 4 pp.

Nehring, A. (1901) Einige Notizen über die Lutra (*Pteronura paranensis*) des hiesigen Zoologischen Garten. Sber. Ges. Naturf. Freude Berlin, 1901: 133-135.

Salvo Souza, R. and Best, R. 1982. Unpublished Report. Contribuicao sobre o comportamento da ariranha (*Pteronura brasiliensis* Gmelin 1788) em cativeiro. Mamiferos Aquaticos INPA, Manus. AM. Contribuicao no. 34 da Divisao de Mamiferos Aquaticos, INPA Manaus.

Schenck, C., Staib, E. & Yasseri, A.M. (1995). Unterwasserlaute bei Riesenottern (*Pteronura brasiliensis*). Z. Saugetierkunde 60; pp. 310-313

Skeldon, P.C. (1961). Exhibiting Aquatic Mammals - Brazilian Giant Otters (*Pteronura brasiliensis*) at Toledo Zoo. Internat. Zoo Yb. Vol.3, 1961; pp. 30-31

Sykes, S. 1998. "Historical census, management, and rearing success of giant otters (*P. brasiliensis*) in zoos: Need for an international studbook." Lecture for "Genealogical Meeting on Giant Otters in Captivity in Brazil", Jardim Zoologico de Brasília, Brazil: Dec. 2-4,1998.

Sykes, S. 1997-1999. "South American Giant Otter (*Pteronura brasiliensis*) Husbandry, Management, and Historical Census Survey." Zoological Society of Philadelphia, PA, USA. Unpublished report.

Sykes-Gatz, S. 2000. "Giant otters (*P. brasiliensis*) in zoos: An overview and need for an international studbook." Lecture for "Symposium-Haltung und Zucht des Riesenotters (*P. brasiliensis*)", 17.06.00. Dortmund Zoo, Germany.

Sykes-Gatz, S. (2001). Husbandry and Management of the Giant Otter (*Pteronura brasiliensis*). Münster: Schüling, 2001, ISBN 3-930962-03-9; 30 pp.

Sykes-Gatz, S. (in press). *Pteronura brasiliensis* in Captivity/Studbook: An International Historical Overview and Management Recommendations. For: Otters: An Action Plan for their Conservation (2001). International Union for Conservation of Nature (IUCN), Otter Specialist Group, Otter in Captivity, Sub-chapter 2.6.11.

Symposium - Haltung und Zucht des Riesenotters (*Pteronura brasiliensis*), lectures/discussions, June 17, 2000. Dortmund Zoo, Dortmund, Germany. Dr. Wolf Bartmann, conference organizer.

Trebbau, P. 1972. Notes on the Brasilian giant otter (*P. brasiliensis*) in captivity. Zool. Garten 41:152-156.

Trebbau, P. (1978). Some observations on the Mating Behaviour of the Brazilian Giant Otter (*Pteronura brasiliensis*). Zool. Garten N. F., Jena **48** (1978) 2/3, S.; pp. 187-188

Wünnemann, K. 1995. Giant Otter Husbandry. Pp.181-184. In: Husbandry Handbook for Mustelids (J. Partridge, ed.). Association of British Wild Animal Keepers.

Wünnemann, K. (1995). Breeding Giant Otters (*Pteronura brasiliensis*) in Germany. Habitat 11 - Proceedings VI International Otter Colloquium, Pietermaritzburg. Reuther, C. & Rowe-Rowe, D. (eds.); pp. 75-77

Zeller, F. (1960). Notes on the Giant Otter (*Pteronura brasiliensis Zimm*) at Cologne Zoo. Internat. Zoo Yb. Vol.2, 1960; pp. 81

Useful Captive Husbandry Information

Baker, A.J.; Baker, A.M. and Thompson, K.V. 1996. Parental Care in Captive Mammals. Pp.497-512. In: Wild Mammals in Captivity - Principles and Techniques (D.G. Kleiman, M.E. Allen, K.V. Thompson and S. Lumpkin, eds.). University of Chicago Press: Chicago.

B.M.E.L.F. (Bundesministerium für Ernährung, Landwirtschaft und Forsten (Hrsg.) 1996. Mindestanforderungen an die Haltung von Säugetieren. Bonn, Deutschland.

Crissey, S.D. 1998. Handling Fish Fed to Fish-Eating Animals: A Manual of Standard Operating Procedures. U.S. Department of Agriculture, Agriculture Research Service, National Agricultural Library.

Hancocks, D. 1980. Bringing nature into the zoo: Inexpensive solutions for zoo environments. International Journal for the Study of Animal Problems 1:170-177.

International Species Information System; ISIS Mammal Abstracts & ISIS Specimen Reports 1995-1997. (Data base via computer network.)

Lewis, J. C.M., 1995. Veterinary Considerations. Pp.203-221. In: Husbandry Handbook for Mustelids (J. Partridge, ed.). Association of British Wild Animal Keepers.

Merck Veterinary Manual. Sixth Edition, 1986. A Handboook of Diagnosis, Therapy, and Disease Prevention and Control for the Veterinarian. Merck & Co., Inc. Rahway, N.J. (now exists as a CD)

Worley, K. E. and Hare, V. J. 1995. An overview of the 1995 Environmental Enrichment Conference. The Shape of Enrichment, vol. 4, No. 4, November.

Taxonomy, Anatomy and Phylogenetics

Anderson, S. (1997). Mammals of Bolivia, Taxonomy and Distribution. Bull. Am. Mus. Nat. Hist., No. **231**; pp. 343 – 344

Duplaix, N. (1982) Contribution a l'Ecologie at a l'Ethologie de *Pteronura brasiliensis* (Carnivora, Lutrinae): Implications Evolutives. Doctorat Thesis, Univ. of Paris-Sud, 352 pp.

Duplaix, N. & J.A. Davis (1983) Otter, Identification Manual for Customs Officials. 30; Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. (CITES), Gland, Switzerland.

Harris, C. J. A. (1968). Otters, A Study of the Recent Lutrinae. London: Weidenfeld and Nicholson.

Heran, I. (1984). Comments on the age-conditioned changes of skull proportions in some species of Mustelidae. Lynx (Prague) 22 1984; pp. 11-14

Koepfli, K-P. & Wayne, R.K. (1998). Phylogenetic relationships of otters (Carnivora: Mustelidae) based on mitochondrial cytochrome *b* sequences. *J. Zool., Lond.* (1998) **246**, pp. 401-416

Murmann, W. von & Hagenbeck, C. (1984). Steinbildungen in den Calices renales beim brasilianischen Riesenfischotter (*Pteronura brasiliensis*). Der Praktische Tierarzt, Sonderdruck 65. Jahrgang 1984, Heft 9, Seite 748

Pohle, H. (1920) Die Unterfamilie der Lutrinae. Arch. Naturgesch, 85 Ab. H. Heft 9: 1-247.

Radinsky, L. B. (1968). Evolution of somatic sensory specialisation in otter brains. J. Comp. Neurol., 134: 495-505

Radinsky, L. B. (1981) Evolution of skull shape in carnivores. 1. Representative modern carnivores. Biol. J. Linnean Soc. 15 (4): 369-388

Vieira, C. O. da C. (1952) Notas sobre os mamiferos obtidos pela expedição do Instituto Butanta as Rio das Mortes e Serra do Roncador. Papeis Dept. Zool. S. Paulo 10:117.

Physiology, Biochemistry and Genetics

Colares, E.P. & Best, R.C. (1991). Blood parameters of Amazon otters (*Lutra longicaudis*, *Pteronura brasiliensis*) Carnivora, Mustelidae. Comp. Biochem. Physiol. Vol. 99A, No. 4; pp. 513-515

Dunstone N. (1998). Adaptations to the semi-aquatic habit and habitat. In: Behaviour and Ecology of Riparian Mammals. Dunstone N. and Gorman M. (1998). Symposia of the Zoological Society of London 71. Cambridge University Press. pp. 391.

Gutleb, A.C., Schenck, C. & Staib, E. (1994). Giant Otter (*Pteronura brasiliensis*) at Risk? Total Mercury and Methylmercury Levels in Fish and Otter Scats, Peru. Ambio Vol. 26 No. 8, Dec. 1997; pp. 511 - 514

Gutleb, A.C., Schenck, C. & Staib, E. (1993). Total Mercury and Methylmercury Levels in Fish from the Department Madre de Dios, Peru. IUCN Otter Spec. Group Bull. 8/1993; pp. 16-18

Kleinschmidt, T., Braunitzer, G. & Scheill, H.-G. (1989). Carnivora: the primary structure of the giant otter (*Pteronura brasiliensis*, Mustelidae) hemoglobin. Biol. Chem. Hoppe-Seyler 370(4) 1989; pp. 303-308

Leonards, P.E. G (1997) PCBs in Mustelids - analysis, food chain transfer and critical levels. Academic thesis. Vrije Universiteit, Amsterdam; 210 pp.

Scheill, H.-G. & Gunther, A. (1984). Elektrophoretischer Vergleich einiger Erythrocyten-Enzyme der Otter *Lutra Lutra* (L. 1758), *Lutra canadensis* (Schreber 1776) und *Pteronura brasiliensis* (Gmelin, 1788). Saügetierkundliche Mitt. 32(1) 1984; pp. 63-66

Veterinary Problems and Diseases

Lewis, J. C.M., 1995. Veterinary Considerations. Pp.203-221. In: Husbandry Handbook for Mustelids (J. Partridge, ed.). Association of British Wild Animal Keepers.

Pimentel, T.L., Reis, M.L. & Passerino, A.S.M. Mustelidae – Biology, Management and Medicine. In: Biology, Management & Medicine of South American Wild Animals, Fowler, M.E. & Cubas, Z.S. (eds.).

Schenck, C. and Staib, E., Storch I. (1997). Domestic animal disease risks for Peruvian Giant Otters (*Pteronura brasiliensis*) IUCN Veterinary Specialist Group Newsletter, No. 14, p. 7-8.

Giant Otters and people, tourism, public education

Donadio, A. (1978). Some Comments on Otter Trade and Legislation in Colombia. In: Proceedings First Working Meeting of the IUCN Otter Specialist Group, Paramaribo, Suriname, March 1977, N. Duplaix (ed.); pp. 34-42

Duplaix, N. (1980). Giant otters: Big water dogs in peril. *National Geographic Magazine* 158(1) 1980; pp. 130-142

Gómez, J.R. & Jorgenson, J. (1999). An Overview to the Giant Otter – Fisherman Problem in the Orinoco Basin of Colombia. IUCN Otter Spec. Group Bull. 16(2)1999; pp. 90-96

Frankfurt Zoological Society Giant Otter Project (2000). Help Protect the Jungle Giant – Giant Otters, a Unique and Endangered Mammal. Leaflet for tourists, also produced in Spanish

Hajek, F., Groenendijk, J., Schenck, C. & Staib, E. (2001). Fundamento de un Plan de Manejo para el Lago Sandoval, con énfasis en el Lobo de Río (*Pteronura brasiliensis*). Version 1.4, presented to the Instituto Nacional de Recursos Naturales (INRENA); 7 pp.

Hajek, F., Groenendijk, J., Schenck, C. & Staib, E. (2001). El Turismo de Naturaleza y Manejo de Habitat de Lobo de Río (*Pteronura brasiliensis*) en el Sureste del Perú. In: El Manu y Otras

Experiencias de Investigacion y Manejo de Bosques Tropicales, Symposium Internacional, Puerto Maldonado, Peru, 4-7 June 2001

Hajek, F., Groenendijk, J., Schenck, C. & Staib, E. (in prep.). Nature Tourism and Giant Otter (*Pteronura brasiliensis*) Habitat Management in Southeastern Peru. Paper presented at the VIII International Otter Colloquium, Valdivia, Chile, 19-27 January, 2001.

Schenck, C. & Staib, E. (1992/93). Look at the Giant Otters (*Pteronura brasiliensis*) and give them a chance! (Leaflet aimed at tourists to encourage responsible behaviour in the presence of Giant Otters)

Schenck, C., Staib, E., Groenendijk, J. & Hajek, F. (2001). The 'Pepe, the Giant Otter' Colouring Book Activity and Drawing Competition as an Awareness-raising Tool for School Children. The Wetlands Ambassador: Education and Public Awareness Methodologies for Otter Conservation. Ando, M. & Sasaki, H. (eds.), Feb. 2001; pp. 46-47

Schenck, C., Staib, E., Groenendijk, J. & Hajek, F. (2001). Raising Awareness about, and Managing the Impact of Tourism in Giant Otter Habitats in South-eastern Peru. The Wetlands Ambassador: Education and Public Awareness Methodologies for Otter Conservation. Ando, M. & Sasaki, H. (eds.), Feb. 2001; pp. 44-46

Staib, E., Schenck, C. (1994). Giant Otters and Ecotourism in Peru. IUCN Otter Spec. Group Bull. 9 / March 1994; pp. 7-8

Staib, E., Schenck, C. (1994). Giant Otter... A giant under even bigger pressure. (Also Spanish version). Zoologische Gesellschaft Frankfurt / Wildbiologische Gesellschaft Munchen e.V.; 36 pp.

Staib E., Schenck C. (1996). Las Nutrias de la Selva - Quien sabe distinguirlas? - Faltblatt zu Fischottern in Peru, Ausgabe in Spanisch, Auflage 2000, Zoologische Gesellschaft Frankfurt, ProNaturaleza

Smith, N.J.H. (1981). Caimans, capaybaras, otters, manatees and man in Amazonia. Biol. Conserv. 19; pp. 177-187

IUCN Otter Specialist Group Publications and Giant Otter Bulletins

Foster-Turley, P., Macdonald, S. & Mason, C. (eds.) (1990). Otters - An Action Plan for their Conservation. IUCN / SSC Otter Spec. Group; 126 pp.

GROENENDIJK, J. (ED.) (2002). FRIENDS OF THE GIANT OTTER. BULLETIN NO.4 / JANUARY 2002

Groenendijk, J. (Ed.) (2001). Friends of the Giant Otter. Bulletin No.3 / June 2001

Groenendijk, J. (Ed.) (2000). Friends of the Giant Otter. Bulletin No.2 / December 2000

Groenendijk, J. (Ed.) (2000). Friends of the Giant Otter. Bulletin No.1 / July 2000

Popular articles and books

• General

Brown, D.O. (1996). Giant Otters. Nature Conservancy, Vol. 46, No.3, May/June; pp. 24-29 **Duplaix, N.** (1984). Otters. The Encyclopaedia of Mammals - Edited by Dr. David Macdonald. Unwin Hyman Ltd.; pp. 125-129

• Guyana

Laidler, L. (1986). Watching over the waterdogs. BBC Wildlife 4(4) 1986; pp. 168-171

Laidler, L. (1982). Bring back the giant. New Scientist 95 No. 1324, 1982; pp. 825-828

Laidler, K. & Laidler, L. (June 1995). Giant among Otters. Wildlife Conservation May / June 1995; pp. 42-47 & 75

Laidler, K. & Laidler, L. (1983). The River Wolf. Allen & Unwin, London 1983; 178 pp.

Laidler, K. & Laidler, L. (1981). The river wolf plays rough. International Wildlife 6(5) 1981; pp. 46-49

• Peru

Brecht-Munn, M. & Munn, C. (1988). The Amazon's Gregarious Giant Otters. Animal Kingdom Sept. / Oct. 1988; pp. 34-41

Schenck, C. & Staib, E. (1994). Die Wölfe der Flüsse - Riesenotter und ihr Lebensraum Regenwald. Knesebeck Verlag München, 1994, 203 Seiten

MacQuarrie, **K.** (1998). Peru's Amazonian Eden: Manu National Park and Biosphere Reserve. Published by Francis O. Patthey & Sons; 320 pp. Second edition.

MacQuarrie, K. & Bärtschi, A. (2001). Where the Andes meet the Amazon: Peru and Bolivia's Bahuaja-Sonene and Madidi National Parks. Publ. by Francis O. Patthey & Sons; 336 pp., ISBN 84-89119-14-7.

Schenck, C. (2000). Among the river wolves. BBC Wildlife Magazine, Nov. 2000; pp. 22-28 Staib E., Schenck C. (1994). Die Familien-Bande. BBC-Wildlife, Nr.12, S. 22-27

• Suriname

Duplaix, N. (1978). Synopsis of the status and ecology of the giant otter in Suriname. Otter Trust. *Otters* 1978; 8 pp.

Duplaix, N. (1980). Giant otters: "Big water dogs in peril". *National Geographic Magazine* 158(1) 1980; pp. 130-142

Duplaix, N. (1982). Im Kielwasser der scheuen Riesenotter. Das Tier Tierwelt 2: 4-9

Giant Otters and other animals

Best, R.C. (1984). The aquatic mammals and reptiles of the Amazon. Monographic Biol. 56 1984; pp. 371-412

Cabrera, A. & I. Yepes (1940) Mamferos sud-mericanos. Buenos Aires, Comp. Arg. Editores.

Defler. T.R. (1983). Associations of the giant river otter (*Pteronura brasiliensis*) with freshwater dolphins (*Inia geoffrensis*). Journal Mammal **64**(4) 1983; pp. 692

Emmons, L. (1997). Neotropical Rainforest Mammals. A Field Guide, Second Edition. Illustrations by F. Feer. The University of Chicago Press, Chicago and London

Husson, A.M. (1978). The Mammals of Suriname. Zoologische Monographieen van het Rijksmuseum van Natuurlijke Historie No. 2, published by E.J. Brill, Leiden; 569 pp.

Melquist, W.E. (1984). Status survey of otters (*Lutrinae*) and spotted cats (*Felidae*) in Latin America. Report to IUCN College of Forestry, Wildlife and Range Sciences, Univ. of Idaho

Nowak, R.M. (1999) Giant Otter. In Walker's Mammals of the World - 5th Edition Vol. II; pp. 1137-1138

Smith, N.J.H. (1981). Caimans, capybaras, otters, manatees and man in Amazonia. Biol. Conserv. 19; pp. 177-187

Neotropical and other otters

Cabello C.C. (1983). La nutria de mar en la Isla de Chiloe. Corporacion National Forestal, Bol. Tec. 6, 1-37

Davis, J.A. & Duplaix, N. (1976). Neotropical otters. Wildlife, Wld. Conserv. Yb. 1976; pp. 48-52

Estes J. A. (1989). Behavior, ecology and life history of new world otters. Proceedings of the V. International Otter Colloquium. - Habitat 6, Hankensbüttel, 1991.

Gallo J. P. (1989). Distribucion y estado actual de la nutria o perro de agua (*Lutra longicaudis annectens* Major, 1897) en la Sierra Madre del sur, Mexico.- M.Sc. Thesis. Universidad nacional Autonoma de México, México, D.F

Kruuk, H. (1995). Wild otters - predation and populations. Oxford Univ. Press; 290 pp.

Mason, C.F. & Macdonald, S.M. (1986). Otters - Ecology and Conservation. Cambridge University Press; 236 pp.

Melquist, W.E. (1984). Status survey of otters (*Lutrinae*) and spotted cats (*Felidae*) in Latin America. Report to IUCN College of Forestry, Wildlife and Range Sciences, Univ. of Idaho

Parera A. (1993). The neotropical river otter Lutra longicaudis in Iberia Lagoon, Argentina. IUCN Otter Specialist Group Bulletin, 8, pp. 13-16.

Van Zyll de Jong, C. G. (1972). A systematic review of the Nearctic and Neotropical riverine otters (genus Lutra, Mustelidae, Carnivora). Royal Ontario Museum, Life Sciences, Contribution, 80: 1-104.

TV films and videos

In Search of the Giant Otter (1978, 1984) N. Duplaix, Christopher Parsons, producer. BBC Bristol Natural History Unit 1978, and re-released and re-edited by WGBH-PBS Boston, USA. 50 min.

Im Reich der Riesenotter (1993), A. Hofer, SAT1, 45 min.

Die Riesenotter vom Madre de Dios (1994), C. Schenck, E. Staib, producers N3/ARD, 45 min **The River Wolves (1999),** P. Venn, producer. Partridge Films, 45 min

IUCN Otter Spec. Group Bull. 20(2) 2003

Waika der Otter (? 2000), F.R. de la Fuenta, BR, 45 min Die Wölfe des Rio Manu – Riesenotter in Peru. (2001) Felix Heidinger, producer, for 'Zuflucht Wildnis' BR/ARD, 45 min

Giant Otters – Wolves of the River (2001). Huw Cordey, producer, for, producer. BBC 'Wildlife on

Websites

www.giantotters.com