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ARTICLES

REPORTS

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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.
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NOTE FROM THE EDITOR

This is the issue that unfortunately sets a new record as, by the time it arrives, it will have been delayed by 6 months. I am very sorry for this but this time most manuscripts came very late and it took time before they were reviewed. I did not want to produce a thin issue as the costs would be similar to one of the usual size. Following from this, I would encourage everybody who is considering submitting a manuscript to do it now so that we may have the second issue around the usual time at the end of the year.

There were two conferences on otters in Europe over recent months, namely "The Return of the Otter - Where and How" (30th June - 5th My 2003, Isle of Skye) and the Workshop at the 4th European Congress of Mammalogy, held on July 27 - August 1, 2003 in Brno, Czech Republic. The first I attended personally, and we had a lot of good contributions and discussions in Scotland. I have received similar information on the meeting in Brno. Hopefully Proceedings will be available soon.

My sincere thanks go to Amt der Oberösterreichischen Landesregierung in Austria, who contributed to the printing costs of this issue.

How many of the 300 persons that received the last issue responded by sending back the leaflet or contributed? Who wants to guess? This is always a very big question for me when I send out the leaflet every year, but this time it was an absolute negative record. Up to now 39 people have responded, of which 28 were willing to contribute! This inevitably leads to the question - do we need a Bulletin? For whom am I producing the issue twice a year? I think it is absolutely unacceptable for the reviewers, the persons translating the abstracts and all the others helping, that almost 90% of people do not respond at all. Actually this is also a crucial point as regards financing of the Bulletin as if only 100 people would pay the 16 Euro once a year the whole Bulletin would be financed. I have to admit that the question of the Bulletin is something that should have a very high priority at the next Otter Colloquium! After this issue is printed there is hardly any money left for the second issue in 2003.

Finally, once again many thanks go to Leo Backbier, Paul Chanin, Andrew Crawford, Lee Harding, Ján Kadlecík, Chris Mason, Matt Murphy, Claus Reuther, and Jordi Ruiz-Olmo, all of whom provided information on recent publications. Kevin Roche (Czech Republic) again functions as a reader for those contributions that have not been reviewed by at least one native English speaker, whilst Eduardo Carillo-Rubio (USA) and Lional Lafontaine (France) translated the abstracts into Spanish and French. I also have to thank the 'Otter Bulletin Team' for their continuing help, namely Hans van den Berg (Ede), and Els Hoogsteede-Veens and Erwin Hellegering of GRAFISCH SERVICE CENTRUM VAN GILS (Wageningen).

IUCN/SSC OSG GROUP

FROM THE CHAIRMAN'S DESK

Once again, many initiatives and activities have been started or achieved during the first half of this year. Upon a recommendation of the IUCN Red List Program we discussed the necessity and the scientific background of a revision of the number of otter species and of the nomenclature for the Lutrinae. One of the questions was if we should add the Japanese otter, which is probably extinct, as the 14th species (*Lutra nippori*) to the list of otters. Another topic was the suggestion to transfer the Spotted-necked otter (*Lutra maculicollis*) from the *Lutra* group to the *Hydrictis* group. In the end, we followed the advice of Klaus-Peter Koepfli, who has been working on the taxonomy of the Lutrinae for a long time, and decided to leave things unchanged until we have more detailed (genetic) data. However, based upon the results of genetic analysis, Klaus-Peter Koepfli suggested combining the Asian Small-clawed otter and the two African clawless otters in one genus, i.e. *Aonyx*. He contacted the executive director of the International Commission on Zoological Nomenclature to ask his opinion as to whether any changes should be made at this tune. Depending on his advice we will continue this discussion.

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.

Regarding the activities in Latin America, it seems that the International Otter Colloquium held in Chile 2001 really provided a push for otter work in this part of the world. To my great pleasure, my recommendation made in Valdivia to focus on the development of standardised survey methods especially seems to have fallen on fertile ground. Jessica Groenendijk reports that the second Giant Otter Field Methodology Standardisation Workshop was recently organised in south-eastern Peru, as a follow up to the first course which was held in November 2002. Eight Giant otter specialists from Venezuela, Suriname, Guyana, Brazil and Ecuador, joined Jessica Groenendijk and Frank Hajek of the Frankfurt Zoological Society Giant Otter Project for a total of 10 days in June 2003. The main objective of the course/workshop was to share experiences from different Giant otter habitats and to critically comment on the draft paper "Towards Standard Survey Methodologies for the Giant otter (*Pteronura brasiliensis)"* so that the latter reflects survey conditions and habitat realities throughout South America as completely as possible. Eventually, it is hoped that the same survey and monitoring methodology will be used in all the different countries, thereby allowing useful comparison of data. A second key objective of the workshop was to brainstorm a possible strategy for conducting Giant otter distribution surveys on a range-wide scale. Finally, the course focused on how human activities can be managed in key Giant otter habitats within the context of protected areas and nature tourism.

The Frankfurt Zoological Society Giant Otter Project is also proud to announce the inauguration of the Sandoval Interpretation and Control Centre on the 21st of July. Since its construction (financed by FZS, WWF and GELM, a Peruvian NGO), the Centre has significantly increased revenues for the Tambopata National Reserve. The interpretation content, based on the theme "The World of Water"', highlights the importance of Lake Sandoval to the local communities, to tourism and to the resident family of Giant otters. It is hoped that the Interpretation Centre increases understanding and acceptance of the need for protected areas, and for visitor management.

Helen Waldemarin also reports important steps forward. For the first time the remarkable number of 16 'otter people' attended the 10* Meeting of Latin American Specialists of Aquatic Mammals, which took place in October 2002 in Chile. In Brazil, two new long-term projects have been started in the Pantanal, where both the Giant otter and the Neotropical otter (*Lontra longicaudis*) occur. This work is done in

close cooperation with the Giant otter project in the Bolivian Pantanal, initiated and coordinated by Paul van Damme. As I can confirm, on the basis of 1-2 applications for assistance from Latin America arriving in my e-mail box each week, the number of people interested in working with otters, especially the Neotropical otter, is increasing.

This prompts me to ask all 'otter people' to use the 'Otter Project Databank (OPD)', which is part of the OSG website (www.otterspecialistgroup.org -> For Scientists -> OPD). All people involved in otter projects (not only members of the OSG) can provide information on their projects via this databank and also find information on projects focussing on the same species, located in the same region, or using the same or similar methods. Therefore, this databank not only offers contact addresses for people just planning or starting an otter project, it also can support cooperation of projects working on similar topics. However, this information and contact tool can only work optimally if as many people as possible will add their project descriptions. The website contains a form to add new projects and it will take less than 10 minutes per project to fill in the form.

From Asia, Padma de Silva reports that Budsabong Kanchanasaka is continuing her efforts to study the Hairy-nosed otter (*Lutra sumatrana*). Unfortunately, of the three otters she trapped so far, two escaped and one died. She is now testing other methods to study this species in southern Thailand. Also, Drs Dang and Anh are still trying to increase our knowledge on this relatively unknown species. They have now confirmed its presence in both the U Minh Hai and Vo Doi Nature Reserves in southern Vietnam as a result of the intensive survey carried out in the years 2000 and 2002.

The Columbus Zoo donated a small grant to Padma de Silva to prepare teaching materials for small children of age 5 to 10 yrs. In this project, a storybook was written incorporating the otter and the message it gives to the children is to conserve otters. The second book was prepared for coloring and it gives the pictures of some popular wetland animals, including the otter. The book also provides a description of the animal in English and the native language, Sinhalese. In addition, she has prepared jigsaw puzzles of five wetland animals, including the otter, for distribution among children. These materials will be distributed free, mostly among the under privileged children in rural areas of Sri Lanka.

The initiative to increase our knowledge on the distribution of African otters, which I started together with Jan Nel and Helene Jacques last year, produces more and more exciting results. Just recently, I was able to confirm the presence of the Spotted-necked otter in Guinea-Bissau where, to date, the Cape clawless otter was believed to be the only otter species occurring. This also results in an enlargement of the distribution range of this species to the northwest and leads us to wonder whether this species also occurs in the neighbouring northern countries of Senegal and The Gambia.

The European 'otter people' were busy preparing two meetings, which unfortunately took place less than one month apart. A conference on the Eurasian otter, organised by the IOSF on the Isle of Skye, took place in early July, and - following a decision of the European section of the OSG agreed at the last meeting in 1999 in Finland - a workshop on *Lutra lutra*, combined with a meeting of the European section of the OSG, again formed part of the 4th European Congress of Mammalogy in Brno, Czech Republic, at the end of July.

The conference preparation activities of our North American colleagues are also increasing. In less than a year, they will host the XIth International Otter Colloquium at Frostburg University, Maryland, USA. Tom Serfass, who chairs the organisation committee, has set up the first pages of a website (http://otter.frostburg.edu) which will be completed soon. I am very glad to see that fundraising activities have already started, to ensure that as many 'otter people' as possible (especially those from the poorer countries) will have a chance to attend this colloquium.

Hankensbüttel, July 2003
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A R T I C L E

PRESERVED VERSUS DEGRADED COASTAL ENVIRONMENTS: A CASE STUDY OF THE NEOTROPICAL OTTER IN THE ENVIRONMENTAL PROTECTION AREA OF ANHATOMIRIM, SOUTHERN BRAZIL

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Abstract: In Brazil, the data available on the ecology of the Neotropical otter in marine-coastal areas are scarce. The relationship between their spraint and environmental quality has been little studied. The Environmental Protection Area (APA) of Anhatomirim extends over about 12 km of the North Bay of Florianopolis. In this area two studies were carried out, one in May/August 2000 and the other from January 2001 to January 2002. In the first stage, otter signs and environmental characteristics were registered; the spraints were collected and the rivers and sign sites were georeferenced. In the second stage, a preserved and a non-preserved strip with high anthropological influence were inspected periodically. The methodological procedure was the same as that used in the first stage. Along preserved rivers (13%), footprints, excavations and burrows were all found, whilst at rivers with a low degree of degradation (41%), both footprints and excavations were found but not burrows. Of the 474 spraints collected, 60% were from the preserved area. In the degraded area, 37% of the spraints were located in a strip between 100 and 150m from an urban nucleus. In the coastal area of this APA, the Neotropical otter is very flexible with a high capacity to survive impacts, since these don't directly affect the trophic chain and impede the making of burrows.

INTRODUCTION

The Neotropical otter *Lontra longicaudis* (OLFERS, 1808) is the Lutrinae species with the largest distribution in Latin America, occurring from Mexico to northern Argentina (MASON, 1990). Over most of its distribution area, and especially in the Amazon and Pantanal, it cohabits with the giant otter, *Pteronura brasiliensis* (CHEHEBAR, 1990).

In Brazil, studies on this species are usually related to diet and habitat use in fluvial environments. A relationship between the distribution of otters spraints and environmental factors has been reported in some studies (BLACKER and SOLDATELI, 1996; PARDINI, 1996), although none of these has compared the use of preserved and degraded areas as habitats, nor have they studied this species in marine-coastal environments.
A correlation between the presence of *Lutra lutra* signs and a good state of conservation of forested areas has been reported by MACDONALD and MASON (1985) in Greece and by NORES et al. (1990) in Spain, although the latter authors also verified the presence of otters signs in waters with a low index of contamination. The use of spraints as a factor of species abundance in a population is still under debate and clearly needs more research (KRUUK et al., 1986). Among the main problems of using spraints as indicators of a population's status is the variation in the number of spraints through the year (CONROY and FRENCH, 1987). MACDONALD and MASON (1987) affirm that seasonal fluctuation in the number of spraints can interfere in the interpretation of field data, however, they suggest that there is a relationship between the marking level and the success of a population, with fragmented populations leaving less spraints than healthy populations. Among the main threats to Southern American otters are aquatic pollution, deforestation along riverbanks and drainage of rivers for agriculture and pasture (CHEHEBAR, 1990). Human disturbances caused by the use of motorboats have also been mentioned as threats to the populations of otters in Brazil (OLIMPIO, 1992; PARDINI, 1996).

According to the International Union for the Conservation of Nature (IUCN, 2000), the status of the Neotropical otter is unclassified due to 'insufficient data'; whilst in Brazil, it is considered as 'threatened with extinction' The present study intends to supply information on the ecology of Neotropical otters in coastal habitats, as well as evaluate the anthropogenic influence and threats to their natural habitats.

STUDY SITE

The Environmental Protection Area (APA) of Anhatomirim is located in the district of Governador Celso Ramos, Santa Catarina, Brazil. It has a total area of 4,750 hectares, divided into terrestrial and marine habitats (Fig. 1). The coastal zone comprises 11,950m of rocky coasts, 10 sandy beaches and 22 streams. The presence of marine aquaculture close to urbanized areas is common. The terrestrial zone has a mountainous relief, with altitudes up to 445 m.a.s.l. The dominant vegetation is Atlantic Rain Forest and a great part of it has already suffered some type of human intervention, although the secondary advanced stage is still dominant. In the plains, increases in urbanization and agriculture are causing the degradation of mangroves and increasing water pollution.

The climate in the area is humid with temperatures varying between 12-14 °C in the winter and 24-26 °C in the summer. The rains are abundant and well distributed through the year, with a more humid period in the summer and a drier period in the winter. The average annual rainfall is 1,467 mm.

The preserved area, monitored in the present study, comprises 2.85 km of rocky coast with a small beach 20 m long. The Atlantic Forest reaches the sea through its entire extent. There is only one small stream and two constructions along the coast.

The degraded area extends for 3.0 km, with five urbanized beaches. Many constructions occupy the coastal zone and 80% of the streams are altered.

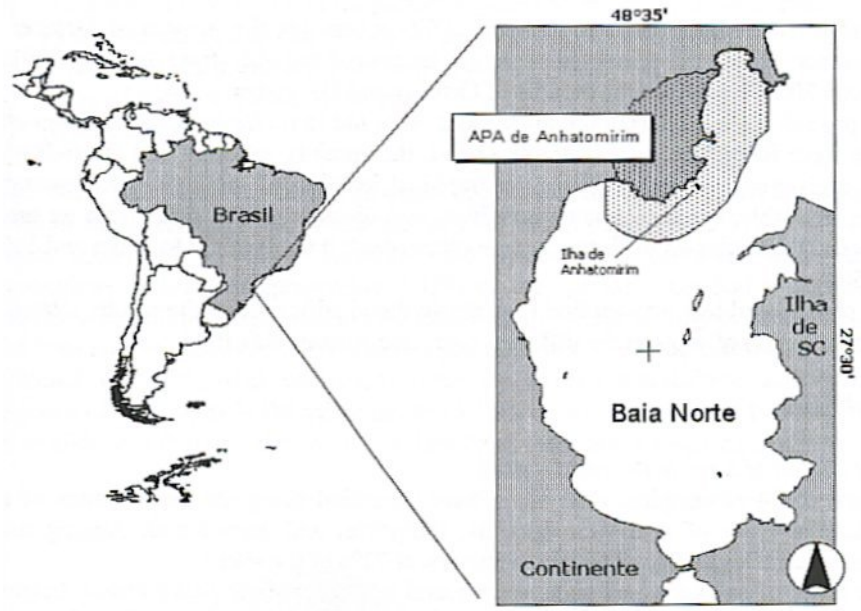

Figure 1. Geographical localization of the APA of Anhatomirim, Southern Brazil

METHODOLOGY

Distribution of otter signs along the coastal zone
From May to August 2000, meticulous searches were carried out on foot along the coastal zone of the APA. When an otter sign was found, the following data were taken: description of the sign, geographical location (global positioning system-GPS) and environmental characterisation of the sign site. The spraint sites identified were classified as natural shelters (burrows) or rocky areas as only these two categories were found in these habitats.

The streams were classified into three categories: *Preserved stream* - characterised by the presence of clean water with conserved forest along the stream banks; *Low degradation stream* - water seemingly not polluted, natural or altered stream path, altered stream bank forest, presence of trash; *High degradation stream* - water polluted, presence of trash, stream bank forest and the natural course of the

stream altered. The adopted criteria were visual analysesof the water quality, without biochemical analysis, along with an assessment of the potential for inputs upstream.

Monitoring of signs in preserved and degraded areas
After identifying the sites with occurrence of otter signs along the coastal zone of the APA, two areas with distinct characteristics were selected for monitoring. The area under the influence of human activity, evaluated as a degraded area, was monitored monthly from March 2001 to January 2002, except for the months of October to
December; whilst the preserved area was monitored monthly from January 2001 to January 2002, except for the months of October and December.

The procedures used during the inspections were the same for both areas. When otter signs were found, the signs were described, the spraints collected and the following data registered: substratum type; geographical location of the sign site; vegetation cover available; types of human activities; and distance of the signs from an urban nucleus. Three classes of distance were established: 0 to 50 m, 50 to 100m and 100m to 150m.

The chi-squared test was applied to evaluate the significance of the results related to the distribution of signs in the different areas and streams classified.

RESULTS

Distribution of signs in the coastal area
A total of 50 Neotropical otter signs were identified along the coastal zone of the APA. The types of sign were spraints, footprints, and excavations. Among these signs, spraints were more frequent, occurring at 72% of the sites.

Four types of habitat where signs were found were identified: rocky coasts, burrows (natural shelters among the rocks), sandy beaches and stream banks. The footprints and excavations accounted for 28% of the signs and were present on the beaches, stream banks and, less often, in burrows (Fig. 2). Among the spraint sites, 58%
occurred on rocky coasts and 42% in burrows.

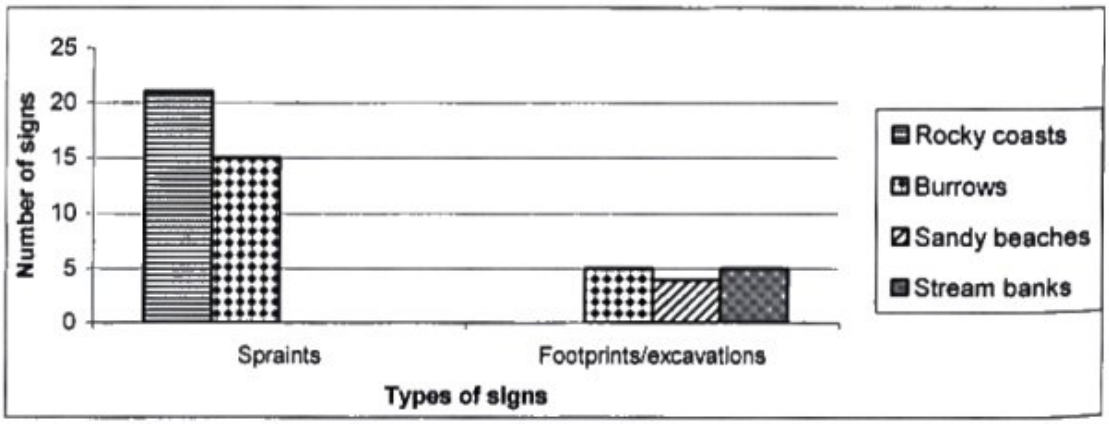

Figure 2. Types of coastal habitat at Neotropical otter sign sites

Characterization of macro-habitats

The types of habitat identified along the coastal zone were:

a. areas with a high degree of urbanization (urban nucleus): characterized by a high density of constructions, degraded streams and trash
b. areas with a low degree of urbanization (areas of urban expansion): characterized by the presence of few constructions and less degraded streams

c. areas under marine aquaculture influence
d. areas with preserved forest covering
e. pasture areas

The areas with preserved forest, representing 39% of the coastal zone, accounted for 44% of the otter sign sites, whilst the areas of urban expansion (31% of the coastal zone) accounted for 27%. However, the preserved forest areas under marine aquaculture influence (representing 2.47% of the coastal zone) had a significantly high concentration of sign sites (13%) according to the availability of these habitats in the total area of study ($P<0.05$). These signs occurred where the coastal zone was not polluted with discarded equipment from the marine aquaculture activities. The absence of otter signs in the urban nuclei (5.75% of the coastal zone) had a high level of confidence ($P<0.05$), due to the availability of these areas along the coast.

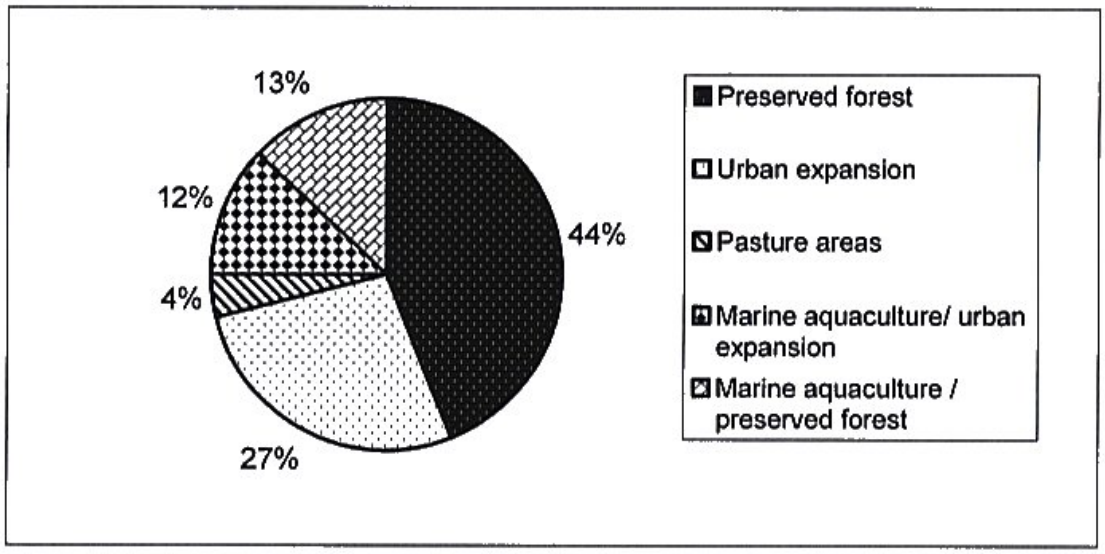

Figure 3. Distribution of otter sign sites in the different types of area

Characterization of the streams

Twenty-two streams along the coastal zone of the APA were found. Among these, 13.6% are considered as preserved, and were characterized by the presence of footprints and burrows. In the streams with a low degree of degradation (41%), burrows were not observed, although footprints and isolated spraints were found. The footprints appeared at 44% of these streams, in a wide area of urban expansion, whilst spraints were found in 22% of streams.

The presence of the otter in a stream with good water quality, but diverted by drainage channels was mentioned, however, by two fishermen, who reported seeing an otter frequently leaving the concrete piping towards the sea early in the mornings.

The absence of otter signs in the streams with a high degree of degradation was highly significant ($P<0.002$). These streams represented 45.4% of all streams found in the coastal zone of the APA.

Monitoring of otter signs in the preserved and degraded areas
The types of signs found differed for each of the studied areas. In the preserved area the most frequent signs were burrows (n=13), and spraints (n=22) and footprints (n=7) in areas of rocky coasts. Eighty six percent of footprints were found on a deserted sandy beach. The footprints in 50% of the cases were along the whole beach, and twice there were footprints from two individuals walking side by side. These footprints led to the ocean or to one small lagoon that has been modified by drainage work. The presence of otters in the lagoon was reported by the only resident of the area. On one occasion the footprints along the beach led also to spraint sites, although these weren't included in the research

results as they were out of the study area. Less frequent signs appeared as isolated mucus on rocks (n=4) and trails amongst vegetation (n=2). Footprints of otter cubs were found at the entrance of a trail in July. Among the 13 burrows identified in the preserved area, just one was within the strip 0-50m from an urban nucleus. A second burrow and 2 spraints in rocky coastal areas occurred 50-100m from isolated houses. All the other signs were found at a greater distance from the urban nucleus and isolated houses.

In the degraded area, the most frequent signs were burrows (n=6) and spraints in rocky coastal areas (n=17). Footprints were only found during two field surveys, whilst isolated mucus on rocks and trails among the vegetation were absent. The largest number of spraints (n=7) was concentrated in areas with forest covering, present within a strip 100 to 150m from the urban nuclei. In the strip at 0-50m, 2 spraints were found in rocky coastal areas while 5 spraints were found in rocky coastal areas outside the zone, 100-150m from urban nuclei.

Frequency of use of burrows and rocky coastal areas as spraint sites
The pattern of burrow use variation differs for the two study areas, except in April and August when there is a simultaneous fall in the number of burrows used in both areas (Fig. 4).

The frequency of burrow use in the preserved area was higher, with an average of 4.8 and a maximum of 8.0 burrows used per month. On the other hand, in the degraded area, the number of burrows used was lower with little variation through the year, varying between 1 and 3 burrows used per month with an average of 2.5.

The use of rocky coastal areas had a more accentuated variation, reaching a maximum number of 12 sites in July and August in the preserved area, and 10 in June and July in the degraded area.

The maximum number of burrows/km was 5 in the preserved area and 2 in the degraded area; however, the respective number of rocky coastal areas used was higher, 7.8 and 5.6 respectively (Table 1).

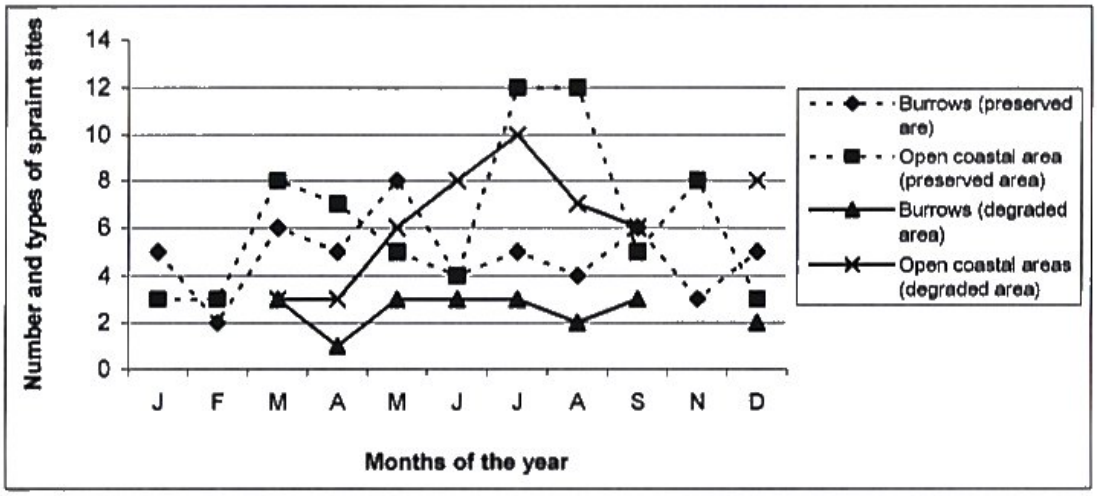

Figure 4. Frequency of use of burrows and rocky coastal areas

Table 1. Total number of burrows and rocky coastal areas used as spraint sites

	preserved area	degraded area
N° of burrows	13	6
N° of burrows/km	5	2
N° of rocky coastal areas	22	17
N° of rocky coastal areas/km	7.8	5.6

Variation in the number of spraints through the year

A total of 474 spraints were collected from the two study areas, 60% of them were located in the preserved area. The burrows presented an average of 2.6 spraints/month in the preserved area and 4.2 spraints/month in the degraded area. In the rocky coastal areas, the average number of spraints was low, with 1.9 and 1.8 in the preserved and degraded areas respectively. The maximum number of spraints found in the burrows and rocky coastal areas in the preserved area was 11 and 14 respectively, in the degraded area, the maximum number of spraints in burrows (10) was greater than that in the rocky coastal areas (8).

The index of spraints per km showed high variation, with a minimum of 1.78 spraints/km in February and 27.5 spraints/km in July (preserved area). For the degraded area, the months of the minimum and maximum variations of the spraints/km index coincided with those of the preserved area, although the values were smaller, with 1.3 for February and 15.6 for July.

DISCUSSION

Spraints, which are used as odoriferous markers, were the main type of otter sign found and, with the footprints, they represent more than 90% of the signs identified in the coastal area of the APA. Spraints are the main tool for the ecological study of several otter species and they have been widely used. Further, footprints, excavations, trails and rest places are frequently mentioned as complementary data (e.g. KRUUK et al., 1986; BLACKER and SOLDATELI, 1996).

In fluvial habitats, excavations and trails among the vegetation have previously been reported for the Neotropical otter (BLACKER and SOLDATELI, 1996; PARDINI, 1996), for *Lutra lutra* (JENKINS, 1981) and for *Lontra provocax* (CHEHEBAR et al., 1986). According to ERLINGE (1968), excavations are always associated with the deposition of spraints or mucus. OLIMPIO (1992) found the same behaviour for the Neotropical otter in a lagoon habitat in Southern Brazil, where 33% of the spraints were associated with excavations. According to KRUUK et al. (1986), in marine-coastal habitats of Scotland, excavations were absent and spraints, footprints and trails among vegetation were the signs used to study populations of *L. lutra*. In Anhatomirim, excavations were always associated with footprints. Some authors consider trails as serving only to access spraint deposition areas (ERLINGE, 1968) or for resting places (PARDINI, 1996). The trails found in the APA probably serve as such access routes to resting places and reproduction sites as the absence of fragments of terrestrial animals in the spraints indicates that they appear not to use that habitat to feed. The presence of cub footprints leading to one trail could also indicate that the females use the trails with their cubs.

In coastal habitats, the rocks constitute the main substratum type used for spraint sites. *Lontra felina* uses natural shelters in the rocky coasts to defecate and to rest (CONAF, 1983) and, in Scotland, *L. lutra* spraint sites are also found on rocky substrate, a great part of these being associated with pools of fresh water (KRUUK et al., 1986, 1989). The use of abandoned houses and boats as spraint sites has also been reported (MACDONALD and MASON, 1980). In the APA, spraint sites were preferentially

found on rocks in rocky coastal areas or in natural shelters (62%). The use of abandoned structures was not observed with the exception of the presence of spraints found on a piece of wood.

MACDONALD and MASON (1980), KRUUK et al. (1986, 1989), and PARDINI (1996) all attribute the proximity of spraint sites and burrows to fresh water pools to the necessity of fresh water sources for coastal otters to clean salt from the fur. This pattern was also found for the Neotropical otter in Anhatomirim where, though fresh water pools were practically absent, 32% of streams in the hydrographic basin were regularly used. In this sense, fresh water constitutes an important resource for coastal riving otters in the area and its degradation could compromise the success of the species.

In Anhatomirim, otter signs were widely distributed along the coastal zone. According to the chi-squared test, in spite of its minor representation, the preserved forest/marine aquaculture area had the highest concentration of otter signs per km. On the other hand, areas of urban expansion were also used, accounting for 39% of the signs. Many studies have been carried out in an attempt to evaluate the relationship between the presence of otter signs and the quality of the habitat and level of human disturbance (e.g. MACDONALD and MASON, 1980; GREEN et al., 1984). MACDONALD and MASON (op. cit.) found otter spraints very close to urbanized areas in Scotland. The same authors, researching populations of *L. lutra* in Greece, found no relationship between the number of spraint sites and the areas with preserved forest covering (MACDONALD and MASON, 1985). CHEHEBAR et al., (1986) and PERRIN and CARUGATI (2000) reported contrary patterns for *L. provocax* and *L. maculicolis*, where they found a direct correlation between the presence of spraints and the conservation state of the forest areas. For the Neotropical otter, there are few studies relating to the presence of spraints and the conservation state of a certain area, in southern Brazil, *L. longicaudis* uses deforested passages along rivers and areas with human disturbances, although this behaviour has been attributed to the proximity of human influence to the protected areas (PARDINI, 1996). In Anhatomirim, the occurrence of spraint sites in areas with little forest covering was 13%, located within the 0-50m strip from urban nuclei, but 56% were still located in a strip between 100-150m from urban nuclei.

The different patterns of otter presence in areas under human influence can be related to the type of urbanization and to the availability of suitable sites. In Anhatomirim, as well as in lagoon habitats (OLIMPIO, 1992; BLACKER and SOLDATELI, 1996), otters use areas that have a certain degree of urban disturbance. It is difficult to confirm which factors determine the use of disturbed areas but two possible factors include availability of suitable habitat within a disturbed area and the degree of continuous human presence. Suitable sites could be determined by the availability of burrows and other sites that can be used for sign deposition, while the degree of human presence is related to the frequency and type of activity in certain areas. The use of streams modified by drainage work and the presence of burrows in areas close to the urban nucleus in the coastal zone are examples of such cases. However, more intensive study of the characteristics of otter sites in urban or semi-urbanized areas is necessary to clarify these findings.

Marine aquaculture does not adversely affect the pattern of otter presence; in fact, it can provide a more effective feeding site. Indeed, three fishermen have confirmed that otters in the APA feed on the molluscs from the marine aquaculture.

The Neotropical otter on the coastal zone of Anhatomirim has a high flexibility in terms of habitat use. The use of areas under human influence is common when burrows and other sites are available and when urban sites do not have direct and constant use by humans. However, pollution of streams and unorganised urbanization could become serious threats to Neotropical otter populations in the coastal zones in the future.

The use of the number of otter signs to evaluate population density is still under debate. However, according to MACDONALD AND MASON (1986), the number of signs left by otters in a certain area can be used to evaluate the population status, the patterns of activities and habitat preferences. In Anhatomirim, the number of burrows/km was higher in the preserved area (5 burrows/km) when compared to the degraded area (2 burrows/km). The values found in the preserved area resemble those reported by KRUUK et al., (1989) for a population of *L. lutra* in a sea habitat with little human interference, where the authors identified an average of 3.8 burrows/km. The same authors demonstrated that there is a relation between the number of refuges in use and the number of resident

otters in an area, affirming that the number of burrows in use is a much more trustworthy index of the otter numbers than the number of spraints. MACDONALD and MASON (1980, 1983, 1985) used the number of spraint sites/km in the evaluation of the conservation state of *L. lutra* in different countries in Europe, although their data refer to otters in fluvial habitats. During their studies carried out in Scotland they found an index of 0.37 burrows/km and 5.2 spraints/km (MACDONALD and MASON, 1980). These values are low when compared to other studies carried out by the same authors. In Portugal, where the populations of otters were considered quite healthy due to the low use of pesticides, the burrows/km index was 17 and spraints/km, 34.5. In Anhatomirim, the spraints/km index was higher than the burrows/km index, and both presented higher values during the winter months. The average spraints/km index was 9.3 in the preserved area and 7.9 in the degraded area. The seasonal pattern of *L. longicaudis* spraint deposition in the APA was similar to that found by BLACHER and SOLDATELI (1996) in the Conceição and Peri Lagoons, where the number of burrows/km was 3 and 2.8 and the number of spraints/km was 16 and 14, respectively. PARDINI (1996) found an index of 16 burrows/km with the largest number of burrows being used in the winter months. PARDINI (*op.cit.*) affirmed that the number of burrows is a good indicator of the size of the otter population, since this doesn't present much variation through the year, unlike the spraints, with a large seasonal variation, in comparison with these studies, the number of burrows and spraints/km of Neotropical otter populations in coastal habits is not well known, and the comparison between these indices and others from different areas needs to be clarified. The number of burrows used can be influenced by many environmental variables, such as the availability and distribution of suitable sites, weather conditions and other aspects not yet known. In this sense, the use of the number of burrows as indicative of the population status, as suggested by KRUUK et al. (1989) and PARDINI (1996) still needs more research, as along the coastal area of the APA, the numbers of burrows used through the year presented quite high variations. The seasonal variation in the number of spraints has been discussed in many works for L. lutra (e.g ERLINGE, 1968; CONROY and FRENCH, 1987; KRUUK and CONROY, 1987) but less intensively for the Neotropical otter (OLIMPIO, 1992; BLACHER and SOLDATELI, 1996). These authors verified an increase in the number of spraints during the winter, but the explanations are various. MASON and MACDONALD (1980) showed that spraint numbers varied seasonally for *L. lutra*, whilst CONROY and FRENCH (1987), MASON and MACDONALD (1987) and others associate these fluctuations to the changes in behaviour generated by the reproductive cycle. For the Neotropical otter, OLIMPIO (1992) and PARDINI (1996) suggest that the seasonal variations can be related to oscillations in the presence of prey species and, according to OLIMPIO (*op. cit*), to variations in the population density of otters. BLACHER and SOLDATELI (1996) suggested winter as the main season for cub births. In the coastal area of the APA, it was possible to observe a variation in the number of spraints in burrows and rocky coastal areas through the year. The rocky coastal areas, in both study areas, were more used during the months of winter (12 and 10 spraint sites for the preserved and degraded area, respectively). Spraint deposition at burrows was practically homogeneous in the degraded area, while the preserved area presented higher numbers and greater variation. The homogeneity in the use of the burrows in the degraded area could be associated with the low availability of burrows, although a deeper analysis is needed. The increase in spraint sites in the rocky coastal areas during the winter in both study areas could be related to a more effective strategy for intra-specific communication, if winter is considered as the period of yearling cub dispersion, as indicated by BLACHER and SOLDATELI (1996). Nevertheless, data on Neotropical otter reproduction and cub dispersion is scarce and the data found by BLACHER and SOLDATELI (*op. cit*), as in the present study, is very limited. It is also necessary to evaluate the seasonal fluctuations of the spraints with the levels of rainfall, as winter is characterized as a dry season in Brazil. However, meteorological conditions varied greatly in 2001, differing from the normal pattern.

Our data appears to indicate that the Neotropical otter is an adaptable species, capable of making use of all types of habitat, with varying degrees of disturbance, within the Anhatomirim APA. However, there appears to be a clear preference of undegraded forest and river sites with low disturbance and modification, though sites of aquaculture appear to be favoured feeding sites. Not only is there a potential threat of future conflict with fishermen, any future degradation or increase in disturbance of undegraded habitats could become a threat to Neotropical otter survival in the future.

REFERENCES

Blacher, C., Soldateli, M. 1996. Considerações preliminares sobre o número e distribuição espaço/temporal de sinais de *Lutra longicaudis* nas Lagoas da Conceição e do Peri, Ilha de Santa Catarina, Brasil. *Biotemas* **9**,38-64.
Chehebar, C.E., Gallur, A., Giannico, G., Gottelli, M., Yorio, P. 1986. A survey of the southern river otter *Lutra provocax* in Lanin, Puelo and Los Alerces National Parks, Argentina, and evaluation of its conservation status. *Biological Conservation* **38**, 293-304.
Chehebar, C. 1990. Otters: An Action plan for Latin American Otters. In: Otters: An Action Plan for their Conservation. IUCN/SCC Otter Specialist Group, 126pp.
CONAF- Corporación National Florestal 1983. La nutria del mar en la isla de Chiloe. *Boletim Técnico* **6** 37pp.
Conroy, J.W., French, E.D.D. 1987. The use of spraints to monitor populations of otters (*Lutra lutra*). *Symposium of the Zoological Society of London* **58** ,247-262.
Erlinge, S. 1968. Territoriality of the otter *Lutra lutra L. Oikos* **19**, 81-98.
Green, J., Green, R., Jefferies, D.J. 1984. A radio tracking survey of otters *Lutra lutra* on a Perthshire river system. *Lutra* **27**,145pp.
IUCN 2000. Lista Vermelha das Espécies Ameaçadas de Extinção. http://www.iucn.org Acessado em março de 2002.
Jenkins, D. 1981. Ecology of otters in Northern Scotland. VI. A model scheme for otter *Lutra lutra L.* conservation in a freshwater system in Aberdeenshires. *Biological Conservation* **20**,123-132.
Kruuk, H., Conroy, J.W.H., Glimmerveen, U., Ouwerkerk, E.J. 1986. The use of spraints to survey populations of otters *Lutra lutra*. *Biological Conservation* **35**,187-194.
Kruuk, H., Conroy, J.W.H. 1987. Surveying otter *Lutra lutra* populations: A discussion of problems with spraints. *Biological Conservation* **41**,179-183.
Kruuk, H., Moot-house, A., Conroy, J.W.H, Dnrbin, L., Frears, S. 1989. An estimate of numbers and habitat preferences of otters *Lutra lutra* in Shetland, UK. *Biological Conservation* **49**, 241 -254.
Macdonald, S. M., Mason, C.F. 1980. Observations on marking behavior of a coastal populations of otters. *Acta Theriologica* **25**, 245-253.
Macdonald, S.M., Mason, C.F. 1983. The otter *Lutra lutra* in Southern Italy. *Biological Conservation* **25**, 95-101.
Macdonald, S.M., Mason, C.F. 1985. Otters, their habitat and conservation in Northeast Greece. *Biological Conservation* **31**, 191-210.
Macdonald, S.M., Mason, C.F. 1986. Observations on an otter population decline. *Acta Theriologica* **33**, 415-434.
Mason, C.F & Macdonald, S.M. 1987. The use of spraints for surveying otter *Lutra lutra* populations: an evaluation. *Biological Conservation* **41**, 167-177.
Mason, C. 1990. Otters: an action plan for their conservation. IUCN/SCC Otter Specialist Group, 126pp.
Nores, C., Hernandez-Palacios, O., Garcia-Gaona, J.F., Naves, J. 1990. Distribution de senales de nutria en el medio ribereno cantabrico en la relacion com los fatores ambientales. *Revista de Biologia de la Universidad de Oviedo* **8**, 107-117.
Olimpio, J. 1992. Considerações preliminares sobre os hábitos alimentares de *Lutra longicaudis* (Olfers, 1818) (Camivora: Mustelidae) na Lagoa do Perí, Ilha de Santa Catarina p36-42. Anais da III R.T de Esp. Mamiferos Aquáticos da América do Sul. Univ. Austral de Chile, Valdivia.
Pardini, R. 1996. Estudo sobre a ecologia da lontra *Lontra longicaudis* no vale do Alto Rio Ribeira, Iporanga, SP (Camivora: Mustelidae). Dissertação de Mestrado, Universidade de São Paulo.
Perrin, M.R., Carugatl, C. 2000. Habitat use by the clawless otter and the spotted-necked otter in the KwaZulu-Natal Drakensberg, South Africa. *S. Afr. J. Wildl. Res*. **30**, 103-111.

RÉSUMÉ

ENVIRONNEMENT CÔTIER PRÉSERVÉ OU PERTURBÉ : UNE ÉTUDE DE CAS CONCERNANT LA LOUTRE NÉOTROPICALE SUD-AMÉRICAINE SUR LA RÉSERVE D'ANHATOMIRIM AU SUD DU BRÉSIL

Au Brésil, les connaissances relatives à l'écologie de la loutre néotropicale en zone côtière sont fragmentaires. La réserve (APA) d'Anhatomirim s'étend sur plus de 12km de long au nord de la Baie de Florianopolis. Dans ce secteur deux études y ont été engagées : durant la première période (mai à aôut 2000), les indices de loutres et les caractéristiques environnementales du site ont été relevés, les épreintes collectées et les sites géoréférencés; durant la seconde période (janvier 2001 à janvier 2002), deux sites particuliers, l'un préservé et l'autre subissant des perturbations d'origine anthropique, ont été prospectés périodiquement, suivant une méthodologie similaire à celle employée durant la la première période. Traces de loutres et excavations sont trouvés à la fois sur des sites non (13%) ou peu (41%) perturbés, mais les gîtes n'existent que dans le premier cas. Sur 474 épreintes collectées, 60% proviennent de la zone protegée. Dans la zone perturbée, 37% des épreintes se situent dans une bande distante de 100 à 150m d'un espace urbanisé. Sur la partie côtière de cette réserve, la loutre semble très souple pour s'adapter à de multiples impacts, dès lors que ces derniers n'ont pas d'effet sur la chaîne trophique et sur 1'aménagement des gîtes.

RESUMEN: AMBIENTES COSTEROS PRESERVADOS VS. DEGRADADOS: ESTUDIO DE UN CASO DE LA NUTRIA NEOTROPICAL EN EL ÁREA DE PROTECCÍON AMBIENTAL ANHATOMIRIM, EN EL SUR DE BRASIL

Las nutrias neotropicales en las áreas costeras son escasas. La relacion entre las heces y la calidad ambiental ha sido poco estudiada. El Área de Protectión Ambiental (APA) Anhatomirim abarca mas de 12 km del norte de la bahía de Florianópolis. En esta área dos estudios fueron llevados a cabo, uno en Mayo-Agosto de 2000 y el otro de Enero 2001 a Enero 2002. En la primera etapa los rastros de nutria y las características ambientales fueron registrados, las heces colectadas, y la ubicatión de los ríos y las heces fueron geográficamente referenciadas. En la segunda etapa, un área preservada y un área sin protección que se encuentra bajo una gran influencia antropogénica fueron inspeccionados periódicamente. La metodologia empleada fue la misma en ambas etapas. En los ríos que se encuentran dentro del área preservada (13%) se encontraron huellas, excavaciones, y madrigueras; mientras que los ríos con un nivel bajo de degradación (41%) presentaron huellas y excavaciones, mas no se encontró ninguna madriguera. De las 474 heces colectadas, 60% se encontraron en el área preservada. En el área degradada, 37% de las heces fueron encontradas dentro la franja ubicada a 100-150 m del núcleo de una zona urbana. En el área costera de esta APA la nutria neotropical es muy flexible puesto que presenta una gran capacidad para sobrevivir a los impactos antropogénicos, ya que estos no afectan directamente la cadena trófica o impiden la construcción de madrigueras.

REPORT

NEW FINDINGS ON OTTERS IN GUINEA-BISSAU

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Abstract: To date, only Cape clawless otter (*Aonyx capensis*) presence has been reported for Guinea-Bissau. The western border of the distribution range for another sub-Saharan otter species, the spotted-necked otter (*Lutra maculicollis*), seemed to be formed by the southeastern neighbouring country of Guinea. The accidental catch of a specimen of *L. maculicollis*, and the results of an initial field survey, provide evidence that this species also occurs in Guinea-Bissau. Recommendations are given on how to improve knowledge on the distribution of the two otter species in this region, and how to improve the protection of otters in Guinea-Bissau.

INTRODUCTION

Knowledge on African otters and their distribution is still limited (REUTHER et al., 2002). Information collected by the coordinators of the IUCN/SSC Otter Specialist Group for Africa, Jan Nel and Hélène Jacques, for the revision of the Otter Action Plan for Africa indicated that the northwestern border of the distribution range of the spotted-necked otter (*Lutra maculicollis*) was located in Guinea. For the northwestern neighbouring Guinea-Bissau, they received information that only the Cape clawless otter (*Aonyx capensis*) occurred in this country (FÉRON et al., 1997). N.G. Bias (in litt. 1998 to J. Nel) described the distribution status of this latter otter species as "rare to common; widespread in freshwater systems as well as offshore in the Bijagos archipelago", and he listed as threats "hunted for skins, some locally kept in captivity". The legal status was described as "not protected, hunting forbidden". On April 18th 2003, M. Schuhmann received a live mammal that had been caught in a fishing net by a local fisherman (Figure 3). This mammal was identified as an otter, however, it was clear that it was not the Cape clawless otter. Mrs G. Yoxon of the International Otter Survival fund was contacted for advice, who then passed on the request to J. Nel. Finally C. Reuther, as head of the IUCN Otter Specialist Group (OSG), was contacted and asked for support in identifying this species.

Guinea-Bissau is located on the west coast of Africa at around 12° latitude north of the equator, bordered in the west by the Atlantic Ocean, in the north by Senegal and in the east and south by Guinea. The country covers an area of 36,125 km^2 and hosts a population of 1.3 million people (36 inhabitants per km^2). The coastal areas are flat, with estuaries, mangrove swamps and patches of forest. Inlets indent the coast and high tides periodically submerge the lowest areas, sometimes covering up to a third of the land surface. Inland, the landscape remains flat, with the highest ground, near the Guinean border, just topping 300m above sea level. Numerous meandering rivers cross the country from east to west and form wide estuaries near their mouths. Off the coast is the Arquipélago dos Bijagos, consisting of 18 main islands (FITZPATRICK et al., 2002). The climate is tropical, generally hot and humid. The annual average temperature is around 25°C. The rainy season is from June to November. Annual precipitation is around 2,100mm on average.

The few remaining deciduous forests host, among other species, obeche (*Triplochiton scleroxylon*) and mahagony ssp. (*Khaya* and *Entandrophragma* spp). The natural vegetation of most inland areas is lightly wooded savanna, but much of it is under cultivation (rice fields, plantations of cashew nut trees, maize and other crops). In the low-lying coastal zone, with its large creeks, mangroves are the dominant vegetation. On the islands of the Arquipélago dos Bijagos a combination of light woodland and mangroves is dominant.

One hundred and twenty eight species of freshwater fishes and 585 species of marine/brackish water fish species are listed for Guinea-Bissau (FROESE and PAULY, 2003). The estuaries of Guinea-Bissau's rivers have an above average species richness (BARAN, 2000).

Guinea-Bissau's environment suffers serious degradation, especially from deforestation, soil erosion, overgrazing, and overfishing. Deforestation rate is estimated at up to 48,000 hectares per year, primarily as the result of itinerant agriculture (associated with land clearing and burning). The country's mangroves -some of the most important in Africa - have been destroyed at a rapid pace due to the expansion of rice production (SDIS, 1989).

METHODS

To identify the animal caught on April 18th 2003, hair (including the root cells) were plucked from the skin and sent to Germany where analysis of DNA was carried out at the Institute for Zoo and Wildlife Research in Berlin. DNA was extracted using the All-tissue DNA kit of GEN-IAL, Germany. A 283 bp fragment of the mitochondrial cytochrome b (cyt b) was amplified using the primers Gludgl and CB2H (KOCHER et al., 1989). Sequences were analysed on an ABI 300 automated sequencer (ABI Biosystems, Germany) and compared with the gene-bank (http://www.ncbi.nlm.nih.gov/).

To collect more information on otters in Guinea-Bissau, C. Reuther and M. Ehlers visited the country for an initial field survey from June 26th until July 2 2003. Different types of rivers and wetlands were visited and their banks were investigated for signs of otters. By walking along the banks, footprints and faeces of animals were identified. The location of the survey sites was identified using a Garmin eTrex GPS receiver (GARMIN Inc., USA). The GPS data were processed by the Geographic Information System software ArcView (ESRI, USA) and stored at the 'Information System for Otter Surveys (ISOS)' of Aktion Fischotterschutz (REUTHER et al., 2000).

Parallel to the search for field signs, fishermen were interviewed at the different survey sites. For this, the Portuguese translation of the leaflet on African otters (REUTHER et al., 2002) was used. Although many of the fishermen could not read, the photographs hi this leaflet, showing four different otter species, allowed differentiation of the species and an evaluation of the knowledge of the interviewed person.

RESULTS

The comparison of the DNA analysis of the hairs of the otter caught on April 18 2003 with the gene-bank data yielded a 100% homology to the cyt b sequence of *Lutra maculicollis*.

When C. Reuther and M. Ehlers visited Guinea-Bissau, this otter was kept in an enclosure at the River Zoo Farm, which is located close to the town of Bambadinca (Figure 1). A personal inspection of the otter, and photographs taken by C. Reuther on June 27th 2003, confirmed the species identification. The shape of the head and the white and yellow marks on the throat are identical with those were found on specimens in East Africa.

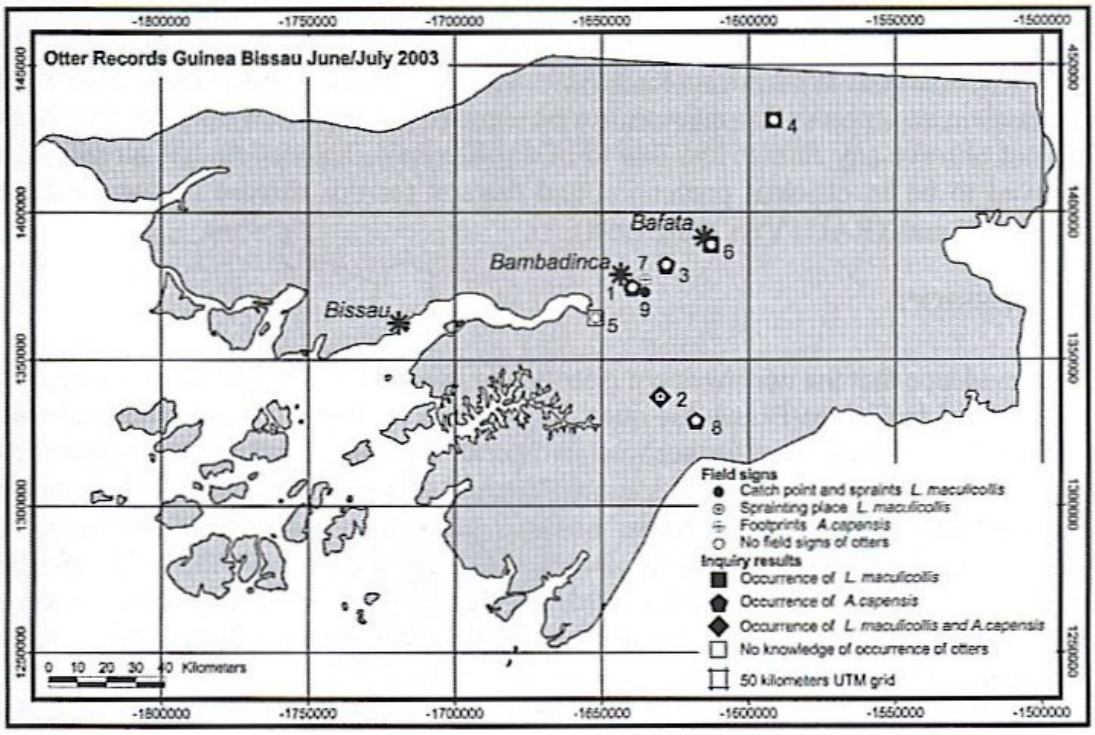

Figure 1: Locations at which Otters were found

The otter was sexed by M. Schuhmann and found to be a female. Unfortunately, it was not possible to weigh the animal, however, it was estimated to weigh 3-4kg. Together with the phenotype, this indicates that it was a sub-adult animal. Because the rainy season had started unusually early and it rained heavily, access to many rivers and wetlands was limited or impossible. The field survey had to be restricted, therefore, to the central parts of Guinea-Bissau. The heavy rain also limited the possibilities of finding footprints and spraints. Altogether, nine survey sites were investigated, including the site where the otter was caught. At this place, on the Rio Udunduma, fresh spraints of *L. maculicollis* were found on June 30th 2003, ten weeks after the female otter was caught, indicating that this was not a solitary or migrating individual. Finding typical signs for intensively used dens and rolling sites, found in the root systems of two trees, strengthened this finding. Two other intensively used sprainting sites were found on the Rio Corubal, near the village of Cussilindra in the southern part of Guinea-Bissau, 30km north of the border with Guinea. The spraints, of different ages, were typical *L maculicollis* spraints (i.e. very similar to *L. lutra* spraints, being sausage or heap shaped with visible contents (containing fish-scales, bones of fish and amphibians, bird feathers, and crustacean remains); glossy black to dark brown (sometimes greenish) in colour when fresh (reddish if mainly composed of crustaceans); becoming grey to white and breaking up with age; and always with a typical fishy smell. The location of the sprainting sites was very similar to sprainting sites found by C. Reuther in Malawi and in Uganda, being deposited on a rocky island at a prominent place. This island was part of a rocky riverbank and was located between two areas of rapids, more than 100m wide at this site, and showed a reduced velocity of flow between two fast flowing sectors.

Field signs of *Aonyx capensis* were found at only one survey site. This was in the harbour area of the town of Bambadinca on the Rio Geba. The river here was more than 50m wide and extensively influenced by the tide of the nearby estuary. At low water level footprints of one individual of *A. capensis* were found on the wide muddy riverbank.

In most cases, the consultation of local fishermen seemed to produce reliable results when asked to identify the otter species they had observed using photographs. However, a few of them identified *Lutra lutra* as a species they believed to be occurring in their region. Though such inquiry results have to be used with great care, they indicate that both species, *L. maculicollis* and *A. capensis*, have been observed on the Rio Corubal as well as on the Rio Geba. From his own observations, and on the basis of previous reports from local people, M. Schumann assumes that *A. capensis* is widespread over most

of the country, even on the islands of the Bijagos archipelago. M. Schuhmann, who was responsible for the government zoo in Bissau from 1993 until 1998, contributed additional historic information. During this period, several otter cubs were brought to the zoo and were successfully handraised. Those cubs, which were documented by photographs, could be clearly identified by C. Reuther as *A. capensis*.

From his experience with raising cubs of *A. capensis* M. Schuhmann could report that several of them died because of a heartworm infection (dirofilariosis). This disease is caused by a nematode worm and transmitted by mosquitoes. Its occurrence is also known for parts of West Africa (SCHREY and TRAUTVETTER, 1998). After using Ivermeticin as a preventive measure for newly arriving orphaned cubs M. Schumann did not observe any further loss due to of dirofilariosis. Ivermeticin has already been prooved to be an efficient prevention and therapy for this disease in dogs and cats (SCHREY and TRAUTVETTER, 1998).

DISCUSSION

With evidence that the northwestern distribution range of *L. maculicollis* now needs to be extended to Guinea-Bissau the question arises as to whether its distribution border might not be located more further west and north. The next northern river systems are those of the Casamance River in southern Senegal, the Gambia River in The Gambia, and the Senegal River on the border between Senegal and Mauritania and Mali. For these rivers, the occurrence of only *A. capensis* is reported (DUPUIS, 1972, GRUBB et al., 1998, SILLERO-ZUBIRI and MARINO, 1997). More detailed field surveys need to be carried out to evaluate this information and to try to find evidence of the occurrence of *L. maculicollis*.

For Guinea-Bissau, it will not be enough to add this species to the list of native mammal species. The distribution status of both otter species will need a complete revision. As a first step, an inquiry among the local fishermen might give initial information. One problem connected with this method is that the local people do not have different terms for the two otter species; in the different languages in use in Guinea-Bissau there is only one word for otter. In Crioulo this is 'lontri', in Fula 'djira uluru', in Balanta 'nam.nine', and in Mandinga 'dji.ulo'. Therefore, the use of photographs of different species is unavoidable. However, as is well known and could be proved again during this survey, even information based on photographs needs to be handled with great care. For instance, doubts are advisable if fishermen declare that they have observed otters exclusively by night, but allege that they can identify the species, something that is difficult even for specialists in otters. Another example of the low reliability of information from local people arose during this visit to Guinea-Bissau, when a skin of a mammal was presented as being *A. capensis*. Through the DNA analysis of a hair sample of this fur the species could be identified as a carnivore, probably a honey badger (*Mellivora capensis*). A more specific identification was not possible, because of the missing reference samples in the gene bank. However, there was no evidence that this skin originated from *A. capensis* or even from *L. maculicollis*. Therefore, field surveys using direct observations, footprints and spraints as evidence for the species identification will be unavoidable if the distribution status is to be investigated. An important aspect of such surveys should be the question of whether there is a difference in habitat structure or food-niche that could form the basis for a differentiation of distribution range. The results of the current survey seem to indicate that *A. capensis* might be found mainly in the tidal areas of the coasts, estuaries and rivers, where crustaceans are abundant, or in wetlands with ponds that are rich in amphibians, whereas *L. maculicollis* is mainly found in fast flowing and/or clear rivers where fish are the dominant prey. This would confirm similar findings found in the KwaZulu-Natal Drakensberg area in South Africa (PERRIN and CARUGATI, 2000a,b). However, data from this survey are too limited to enable more than a hypothesis.

Figure 2: Proposed New Distribution Range for *Lutra maculicollis*

Information on the distribution range of the two otter species is also needed as a basis to define the conservation needs for otters in Guinea-Bissau. As was reported by several fishermen, it is not unusual that otters are drowned in fishnets. Improving knowledge of the circumstances of such accidents (kind and position of the nets, structures of habitats, species, sex and age of the otters, etc.) could contribute to a development of protection measures, if such would be accepted by the fishermen. The problem seems to be that otters in Guinea-Bissau are not hunted for skins, as was reported by N.G. Bias (in litt. 1998) to J. Nel and H. Jacques, but for their meat. M. Schuhmann has evidence that otters are eaten and, in a local community visited during this survey, remains of an otter's fur were shown which which had been buried as as it was considered useless, as well as another of which only small pieces had been used for a belt that was used to keep away an evil spirit. Officially, hunting of otters is not allowed in Guinea-Bissau but it seems that nobody cares. Specific protection of otters is only recommended by the administration, but not legally fixed by the government (F. Djedjo, pers. cornm.). Because the status of otters in Guinea-Bissau is not clarified, such legal protection seems to be necessary immediately, especially if Guinea-Bissau forms the north-western border of the distribution range of *L maculicollis*.

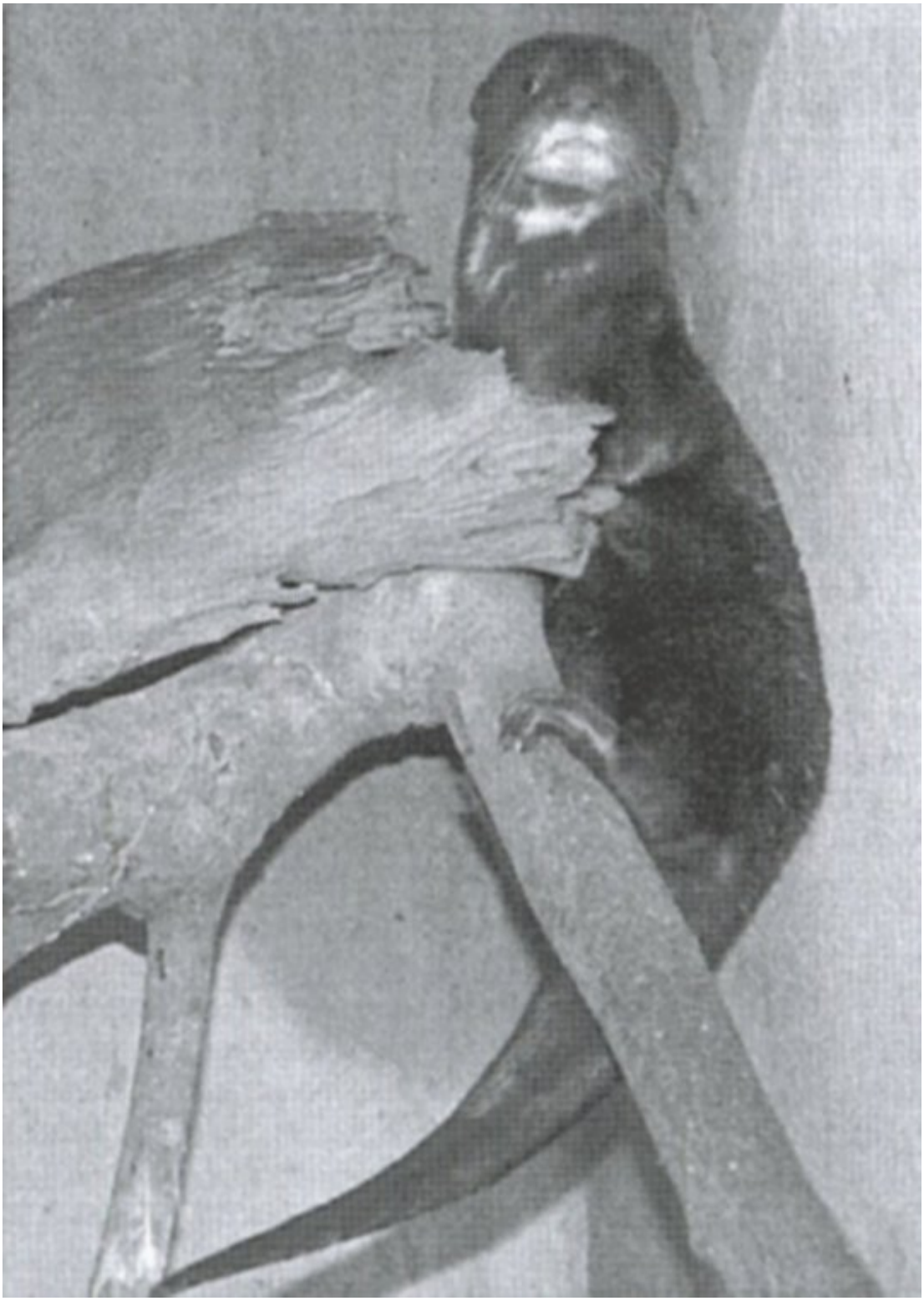

Figure 3: The female *Lutra maculicollis* caught on April 18th 2003 at the Udunduma River in Guinea-Bissau

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REFERENCES

Baran, E. 2000. Biodiversity of Estuarine Fish Faunas in West Africa. *Naga. The ICLARM Quarterly* **23**/4, 4-9.
Dupuis, A.R. 1972. Les Parcs nationaux de la République du Sénégal. G.I.A., Dakar, 194 pp.
Féron, E., Graham, S., Tons, P., Correia, F. 1997. Les animaux protégés en Guinée-Bissau. IUCN Guinea-Bissau
Fitzpatrick, M., Burke, A, Campbell, G., Carmichael, B., Fletcher, M., Gordon, F.L., Ham, A., Karafin, A., Wildman, K., Young, I. 2002. West Africa. Lonely Planet Publications, Melbourne, 896 pp.
Froese, R., Pauly, D. (eds.) 2003. FishBase. World Wide Web electronic publication, www.fishbase.org, version 16th June 2003
Grubb, P., Jones, T.S., Davies, A.G., Edberg, E., Starin, E.D., Hill, J.E. 1998. Mammals of Ghana, Sierra Leone and The Gambia. Trendrine Press, St. Ives, 265 pp.
Kocher, T.D., Thomas, W.K., Meyer, A., Edwards, S.V., Paabo, S., Villablanca, F.X., Wilson, A.C. 1989. Dynamics of mitochondrial DNA evolution in animals: amplification and sequencing with conserved primers. *Proc. Natl. Acad. Sci.* USA **16**,196-200.
Perrin, M.R., Carugati, C. 2000a. Food habits of coexisting Cape clawless otter and spotted-necked otter in the KwaZulu-Natal Drakensberg, South Africa. *S. Aft. J. Wildl. Res*. **30**, 85-92.
Perrin, M.R., Carugati, C. 2000b. Habitat use by the Cape clawless otter and spotted-necked otter in the KwaZulu-Natal Drakensberg, *South Africa. S. Afi. J. Wildl. Res*. **30**,103-113.
Reuther, C., Dolch, D., Green, R., Jahrl, J., Jefferies, D., Krekemeyer, A., Kucerova, M., Madsen, A.B., Romanowski, J., Roche, K., Ruiz-Olmo, J., Teubner, J., Trindade, A. 2000. Surveying and Monitoring Distribution and Population Trends of the Eurasian Otter (*Lutra lutra*) - Guidelines and Evaluation of the Standard Method for Surveys as recommended by the European Section of the IUCN/SSC Otter Specialist Group. *Habitat* **12**,148 pp.
Reuther, C., Nel, J., Rowe-Rowe, D. 2002. Information wanted on African Otters. Leaflet IUCN/SSC Otter Specialist Group, 4 pp.
Schrey, F., Trautvetter, E. 1998. Canine and feline heartworm disease - diagnosis and therapy. Waltham Focus 8/2,23-30.
SDIS - Sustainable Development Information Service. 1989. Guinea-Bissau: censervaco da diversidade biologica. World Directory of Country Environmental Studies. 16pp.
Sillero-Zubiri, C., Marino, J. 1997. The status of small carnivore species in Niokolo-Koba National Park, Senegal. *Small Carnivore Conservation* **17**,15-19.

Résumé : Nouvelles Données sur les Loutres en Guinée-Bissau
Jusqu'a présent, seule la présence de la loutre à joues blanches (*Aonyx capensis*) était avérée en Guinée-Bissau. La limite occidentale de 1'aire de répartition d'une autre espèce sub-saharienne, la loutre à cou tacheté (*Lutra maculicollis*), semblait se situer au sud-est, au niveau d'un pays limitrophe, la Guinée. La capture accidentelle d'un specimen de loutre à cou tacheté et les résultats d'une étude préaliminaire de terrain ont permis de montrer que cette autre espèce de loutre est également présente en Guinée-Bissau. Des conseils sont prodigués pour accroître les connaissances sur la répartition des deux espèces dans cette région d'Afrique, et leur préservation en Guinée-Bissau.

Resumen: Nuevos Hallazgos de Nutrias en Guinea-Bissau
Hasta la fecha, solo la nutria de El Cabo (*Aonyx capensis*) ha sido reportada en Guinea-Bissau. El limite occidental de la distributión de otra especie de nutria del sub-Sahara, la nutria de cuello moteado (*Lutra maculicollis*), parecía estar delimitado por el país de Guinea, ubicado hacia el sureste. La captura accidental de un espécimen de nutria de cuello moteado y los resultados de un estudio preliminar proporcionan evidencia de que esta especie también ocurre en Guinea-Bissau. Se hacen recomendationes para incrementar el conocimiento de la distributión de ambas especies de nutrias en esta región, y la manera de mejorar la protección de las nutrias en Guinea-Bissau.

REPORT

ASSESSING THE WELFARE OF CAPTIVE ASIAN SMALL-CLAWED OTTERS (*AMBLONYX CINEREUS*): CAN INDUCTIVE METHODS PLAY A PART?

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Abstract: A large number of factors need to be taken into account when assessing an animal's welfare under field conditions. Grounded Theory, an inductive method, might be of use in correlating these factors with the results of scientific studies to produce a freely available IT tool that could be used by relatively untrained persons to assess the welfare of animals. This ongoing work is intended to establish whether inductive techniques can contribute to welfare assessment of captive Asian Small-Clawed Otters (Amblonyx cinereus).

INTRODUCTION

Whatever the ethics of keeping animals, it is a fact that they are kept. Asian Small-Clawed Otters (*Amblonyx cinereus*) are the otter species most commonly kept in captivity in the United Kingdom, with the number of collections exceeding forty and increasing every year. Public collections are required to abide by the Zoo Licensing Act, and private collections by the Dangerous Wild Animals Act (DWA); both are legally and socially expected to ensure the good welfare of the animals. The criteria used, however, vary widely. There are a number of published husbandry manuals, such as that of the AZA (LOMBARDI and O'CONNOR, 1998), but most collection owners appear to rely on advice from members of an elite: the Otter Trust, Battersea Children's Zoo, London Zoo, the German OtterZentrum, and others.

Two issues arise from this:

1. Does this advice form a single pool of consensus, or does it form several puddles, and if so, what degrees of overlap are there? Do these areas of agreement reflect the animal's needs and priorities?

2. The person performing the assessment is not necessarily conversant with the needs of the animal in question. In the experience of one private otter keeper, DWA inspections have been carried out by a variety of people including a dairy inspector, a local veterinary surgeon, a riding instructor and a fireman (Martin Neville, pers. comm.). Charitable organizations encourage welfare checks on zoos, which are carried out by members of the public who, whilst having the best of intentions, seldom have an awareness of the true needs and wants of the animal. For example, members of the public frequently assume that otters need a great deal of water, like seals.

Is the welfare of otters being compromised as a result?

ANIMAL WELFARE ASSESSMENT

The precise definition of good animal welfare depends on the ethical/philosophical position of the person making the definition. Three contrasting positions are given below:

- If an animal survives and reproduces, that is sufficient indication of good animal welfare.
- If an animal is not experiencing a mental state it finds unpleasant, that is good enough. Hence, would the creation of animals unable to perceive unpleasant stimuli 'solve' the welfare problem?
- Only optimum physical and mental health by comparison with an equivalent animal in the natural environment constitutes good animal welfare.

My position is that the gold standard of animal welfare is the optimum physical and mental well being of that animal by comparison with an equivalent animal in the natural environment, and that scientific investigation can indicate what needs to be done to achieve this.

Philosophical position also determines belief as to whether scientific investigation into welfare has any validity. This tends to be a binary situation, either a person "believes in science" or they do not, and both positions are a personal philosophy that is a summation of upbringing, education, experience, religious beliefs, emotional responses and many other factors.

Scientific investigation into animal welfare can be human-focussed or animal-focussed. Human-focussed investigations are concerned with the human view of an animal's welfare, and tend to apply a wide range of economic theories to the problem. Simple standard production theory considers that good welfare increases productivity; therefore, a more productive animal must de facto be in a better welfare situation than a less productive one. Gross welfare deficits may be detected by this method, but it is very simplistic. More complex analyses take into account social perceptions of animal welfare and its effect on product uptake, by assuaging guilt. In short, human-focussed methods are actually measuring human welfare changes caused by manipulating the conditions in which animals are kept (BENSON et al., 2000). There is, however, no guarantee that what the public perceive as better conditions actually benefits the animal - they may even be detrimental.

Animal-focussed methods seek to discover what effect a specific variable, or set of variables, has on an animal, or how strong a preference they have for one set of conditions over another. Scientific methods can be used to address these questions and there are a number of methodological approaches, some of which are listed here:

1. Physiological testing - For example, in MASON et al. (2001), urinary cortisol assay was used to assess stress levels in mink exposed to various situations;
2. Behavioural observation - For example, PELLIS (1984) examined play-fighting in captive Asian Small-Clawed Otters and showed that it was an important activity for them, allowing the inference to be made that depriving them of the opportunity to express this would have a negative impact on welfare.
3. Preference testing - For example, FRASER (1993) looked at which floor types are most often chosen by chickens;
4. Microeconomics - For example, the mink study by Mason et al. (2001), which looked at how hard mink were prepared to work to achieve access to different components of the environment such as a pool or new toys.

As well as the formal scientific measurement methods described above, there is a huge amount of other information about animals' needs, wants, preferences and idiosyncrasies in print (such as FYSON'S 1976 account of owning an Asian Small-Clawed Otter), as well as on television programmes, in magazine articles, etc. To date, this has gone largely untapped, as has the enormous reservoir of keeper experience, gained in day-to-day interactions with animals. These sources will be of varying quality in terms of accuracy. The natural history of A. cinereus must also be taken into account as this indicates the "norm" for which the animal evolved. Since "husbandry conditions" can be taken to consist of everything the animal perceives, there is potentially a vast amount of data available. How are we to make sense of it?

An analogy can be drawn with the situation of the Forensic Examiner, faced with a very large body of potential data at a crime scene. The results of experiments can be used to make sense of detail, and more experiments can be run to confirm specific findings, but the process is overall one of inducing the theory from the observed facts. A similar attitude is required of a Veterinary Surgeon called upon to diagnose what is wrong with an animal. Can we use this kind of approach in a formal, rigorous manner to help us in animal welfare assessment?

DEDUCTIVE AND INDUCTIVE ARGUMENT

Both "deduction" and "induction" can be defined in many ways, all with different (sometimes radically different) meanings depending on whether the author is a philosopher, mathematician, logician, or pragmatic user. Since I have a background in Information Technology, I use the logical definitions,

rather than the philosophical ones found in, for example POPPER (1959). The versions given here are from the Macmillan Encyclopaedia (ISAACS (ed) 2001):

- Deduction (logical): In logic, argument from general principles to particular conclusions. It is thus analytic and certain, in contrast to induction, the conclusions of which are never more than strong probabilities". For example, "All mammals give milk; otters are mammals therefore otters give milk".
- Induction (logical): The process of making an empirical generalization by observing particular instances of its operation. The conclusion goes beyond the facts, since not all possible instances can be examined. From induction predictions can be made but they are always liable to falsification." For example, "For the last five years, this otter has taken her ball into the pond to play every day; therefore she will probably take her ball into the pond to play today". If the otter has done this every day for ten years (adding more premises), the probability that the second statement is true becomes greater, so there is good reason to believe the conclusion is true, but this is not definitely established - today, the otter may, for some reason, abandon her ball.

Since hypotheses are developed by induction from observations of fact, and are tested by experiment (deduction), both approaches are complementary. In classical animal welfare research, the emphasis has been on experimental investigation of specific factors. In contrast, when called to a collection to assess the welfare of Asian Small-Clawed Otters, the examiner is faced with an entire situation composed of hundreds of potentially interacting factors, some of which may never have been deductively investigated. It is in this situation that I believe that induction, specifically Grounded Theory, may be of use, and am currently developing an approach that incorporates it into welfare assessment.

METHOD

The way in which the study is being done is that as much information as possible about Asian Small-Clawed Otters is being collected. This is then being analysed using Grounded Theory to produce rules (or theories) and data, which can be stored electronically and made accessible so that details of a husbandry regime can be input, and an assessment of that regime's likely welfare implications produced supported by evidence, and with suggestions for improvement, again supported by evidence. The method itself I have called KASBAH (Knowledge Analysis System Benefiting Animal Husbandry). KASBAH has three phases: knowledge acquisition, inductive analysis and tool synthesis. The end result will be a database (and knowledge base) accessed by a web interface. The process described below is currently being carried out for the Asian Small-Clawed Otter, and will then be repeated for the Horse (*Equus caballus*), two dissimilar species. A very large amount of data is available for the Horse, but less is known about the Otter - if the method gives reliable results for the Horse, it implies that the results for the Otter could also be relied on.

Grounded Theory, first formally described by GLASER (1998), is a process for making sense of large amounts of qualitative and quantitative data from disparate sources. It is widely used in IT, Nursing, Management Theory, Education Theory, Anthropology and Sociology. The method itself is a kind of iterative categorisation of information, allowing the structures and correlations implicit in the data to emerge. The first step is to collect data. "Data" is anything perceived by the animal (for example pen layout, bedding, food, heating, lighting, climate, social group size and composition), the animal's behaviour, anything written or experienced by people about the animal - a fundamental tenet of Grounded Theory is that "All is Data". Overall, about 80% of the total effort goes into data collection. In my study, as well as using scientific literature and printed anecdotes (the explicit data), I am attempting to capture the implicit and tacit data possessed by otter keepers. Implicit data is the information that is easily written down, but tacit information, the most valuable, are the facts and observations that a person doesn't realise they know. For example, a keeper may be subconsciously aware that the otters do not 'like' to be given then1 food in metal dishes but prefer to eat from the ground, so that keeper always tips their food out for them. The person may not even be aware that he is aware of this, or of how he has become aware of it, and have never given the matter conscious thought, yet this could be an important observation from a welfare point of view. This information is being collected by a process of semi-formal interviewing leading to free-form conversations. I am also carrying out behavioural observations at otter-keeping establishments, to correlate behaviour patterns with husbandry regimes.

Almost simultaneously, as data is collected, it is examined line by line to see what facts, rules or opinions it contains; these are then categorised ("*coded*") - the datum may fit an existing category, a category may be modified to contain it, or a new category may be needed. Rules and relationships begin to emerge, which are noted ("*memoed*") - this is where theory is captured. For example, the new piece of data may say that the otter's housing is made of concrete blocks. The operator looks at the current "housing" category, and finds it has sub-categories "dimensions", "heating", "lighting". The new piece of information does not fit an existing category, but it does not require a major reorganisation to do so, just the creation of a new category, "Material". The existing data that has already been processed must be briefly re-examined to see if any of it also fits this new sub-category, and if there appears to be any relationships or connections between existing data and the new piece that are not covered by existing memoed relationships. Because the process iterates with each new datum, the operator must be prepared to discard existing structure if the new fact requires it. For this reason, results cannot be discussed until the process is complete. Completion is the point at which all new data fits existing categories and no new rules or relationships are emerging. This point is called saturation, and requires skill to recognise as it is sometimes artificially induced by selecting kinds of data to process (*forcing the data*). If the data available has been exhausted before saturation is achieved, the analysis is incomplete and cannot be relied on.

Once saturation is reached, the *writing* stage can go forward. This is the point at which the analysis becomes useful, and the form of the writing stage will depend on the purpose of the investigation. In this study, I intend to use the analysis in two ways:

1. To produce hypotheses that can be tested in future studies by other workers;
2. To build a freely available web-interfaced database tool that can be used to assess the welfare of Asian Small-Clawed Otters, providing justifications for its conclusions and for any suggested improvements.

DISCUSSION

The strength of deductive methods is that they are very focussed, for example, there are many papers on urolithiasis in Asian Small-Clawed Otters. This is also their weakness: in the welfare situation; we must consider whole individual animals, not a collection of paws, alimentary systems or play-fights.

Induction attempts to integrate this focussed information to represent the whole situation. Inductive methods always produce probabilities rather than certainties, which is why a great deal of data from different sources is desirable. Many variables are involved, but a profile for a given husbandry regime can be derived, along with a behavioural profile for the animals under that regime. Correlation of these, referencing the structures found in the data, should allow predictions to be made, which is what will produce the recommendations for improvement. Decisions must be made about the accuracy and validity of the data. This will often be achieved by noting the number of sources that confirm a specific observation.

At first, induction seems a very subjective method, since the researcher chooses the initial data categories. The iterative nature of the analysis, however, gradually removes this as the "truth" in the data - the underlying structure - is approached. Reliable results obtained for both the otter and the horse would indicate that it could be extended to cover other species. The method should also demonstrate where there are gaps in knowledge that could be usefully investigated, and I expect theories to emerge from the data that can then be taken and examined deductively in future work to see if they are 'real' or artefacts of the method.

CONCLUSION

If the method works, and can be trusted, in that its predictions are considered valid for both disparate species, the benefits will be fourfold. Firstly, areas where more research is needed will be demonstrated, and new theories to investigate will appear. Secondly, welfare assessors will have a tool to help them judge situations objectively and in a standard way. Thirdly, animal keepers will be able to assess then1 own husbandry regimes and receive advice on improvements if needed. Fourthly, otters will be happier as their conditions more closely meet then- needs. If the method does not work, then the reasons why not can be examined and judgement made as to whether this is because of lack of data or a failure of the method itself.

The work I am doing will indicate whether Grounded Theory can make a useful contribution to animal welfare assessment.

APPEAL

If you would like to know more about this study, or help by providing anecdotes and observations, arranging a site visit, or in any other way, please contact me: Lesley Wright, 1.58, Rl, Rutherford Appleton Laboratory, Chilton, Didcot, Oxon, OX11 8SR, United Kingdom or e-mail L.C.Wright@rl.ac.uk.

REFERENCES

Benson, R., Henson, S., Harper, G., Blaney, R., Preibisch, K. 2000. Economic Evaluation of Farm Animal Welfare Policy: Baseline Study and Framework Development. Final Report to the Ministry of Agriculture, Fisheries and Food. Chapter 2.
Available from < http://statistics. defra.gov.uk/esg/evaluation/animwelf/> [Accessed 2nd June 2003]
Fraser, D. 1993. Assessing Animal Well-Being: Common Sense, Uncommon Science. In J.L. Albright (Ed.) Food Animal Well-Being, USDA and Purdue University, West Lafayette, Indiana, pp 37-54.
Available from < http://www.ansc.purdue.edu/wellbeing/FAWB1993/Fraser.pdf > [Accessed 3rd June 2003]
Fyson, M. 1976. Stinkerbelle, the Nark. USA, Taplinger Publishing Co. Ltd ISBN 0-8008-7421-8
Glaser, B.G. 1998. Doing Grounded Theory. ISBN: 1884156118. USA. Sociology Press.
Isaacs, A. (ed). 2001. The Macmillan Encyclopaedia 2001. ISBN 0333781767. London. Pan Macmillan.
Lombardi, D, O'Connor, J. 1998. Asian Small-Clawed Otter (*Amblonyx cinereus*) Husbandry Manual. American Zoo and Aquarium Association.
Available from <http://www.pic.cc.fl.us/sctag/SCOTTER/ASCOpage.htm> [Accessed 29th April 2003]
Mason, G.J., Cooper, J., Clarebrough, C. 2001. Frustrations of fur-farmed mink. *Nature* **410**, 35-36
Pellis, S.M. 1984. Two aspects of play-fighting in a captive group of oriental small-clawed otters *Amblonyx cinerea*. *Z. Tierpsychol* **65**, 77-83
Popper, K. 1959. The Logic of Scientific Discovery. ISBN 041507892X. New York. Harper

RÉSUMÉ
DES MÉTHODES "INCITATIVES" PEUVENT-ELLES CONTRIBUER À ÉVALUER LE BIEN-ÊTRE EN CAPTIVITÉ DE LA LOUTR NAINE CENDRÉE ASIATIQUE (*AMBLONYX CINEREUS*)?
Un nombre important de facteurs doit être pris en compte pour evaluer le bien-être d'un animal in situ. Théorie fondamentale et méthodes incitatives doivent être mise en jeu pour corréler ces divers facteurs, ces recherches aboutissant à produire un outil disponible qui puisse notamment être utilisé par des gens relativement peu expérimentés en la matière. La présente contribution vise à établir si ces techniques incitatives peuvent avoir un rôle pour l'évaluation du bien-être en captivité de la loutre naine cendrée asiatique (*Amblonyx cinereus*).

RESUMEN:
EVALUACIÓN DEL BIENESTAR DE LA NUTRIA DESGARRADA ASIÁTICA (*AMBLONYX CINEREUS*): ¿PUEDEN SERVIR DE ALGO LOS MÉTODOS INDUCTIVOS?
Un gran número de factores deben ser tomados en cuenta cuando se evalúa la condición de los animales bajo condiciones de investigación en el campo. La Grounded Theory, una técnica inductiva, puede ser empleada para correlacionar estos factores con resultados cientificos para generar una herramienta gratuitamente disponible que puede ser empleada por personas con relativamente poco entrenamiento para evaluar el bienestar de los animales. Este trabajo en curso intenta determinar si las técnicas inductivas pueden usarse dentro del proceso de evaluación del bienestar de los ejemplares de nutria desgarrada asiática (*Amblonyx cinereus*) en cautiverio.

REPORT

FOLLOW UP TO A REHABILITATION OF GIANT OTTER CUBS IN COLOMBIA

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Giant river otters (*Pteronura brasiliensis*) face numerous biotic and abiotic threats throughout their geographical distribution. In Colombia, otters are also captured to satisfy the local demand for pets. Many of these pets, upon reaching maturity, become an enormous expense for the family that possess it due to the large quantity of food that the otter requires. Likewise, many otters are killed by humans due to a fear of their considerable size and strength.

During the field phase of the Bojonawi Project (Ecology of the Giant Otter (Pteronura brasiliensis), in the Bita River, Vichada Colombia [Orinoco basin] (1997-1998)), rehabilitation and release of two Giant River Otter cubs was undertaken. Two investigators associated with the OMACHA Foundation carried out this activity over a period of 7 continuous months. Since this activity was not formally developed beforehand, it was mainly a case of trial and error. Due to a lack of information and financial resources, our actions depended on situations at the moment, but we always tried to make decisions that were for the benefit of the otter cubs.

One of the pups (Ñamñam), a female, was received at approximately 2 months of age and she participated in the program for a period of 6 months until her liberation. We know for sure that this cub was adopted by a wild otter family that resided within the study area, adjacent to the NIMAJAY Ecoturism Campsite that also served as the base camp for the larger study on giant river otter ecology (Fig. 1).

The second cub came from a small village (Cumaribo, Vichada) and was offered to us as a pet. However, after a long talk with the owners, she was donated to us, at no cost, for rehabilitation. After five years, in May 2003, I had the opportunity to visit the Bita River again and, of course, I looked forward to reports and clues about this giant otter in particular. Happily, I received three reliable reports that indicate that this not so young otter (6 years old), is now the head (alpha female) of one small group comprising four otters, two adults and two juveniles (probably her cubs).

These reports come from two local fishermen that were involved in the former activities of the OMACHA foundation, and constantly visit the zone as part of their fishing activities. The other report came from a young ecology student from Bogota, Colombia, who is carrying out a study on pink dolphins and manatees in the area. All three describe the neck mark, it's unique behaviour (not afraid of people, and on some occasions gets very close to the boats), and all three locate the animal in a small lagoon and in a defined part of the river, very near to the place where the liberation was made (none of the three persons knew the exact location of its liberation).

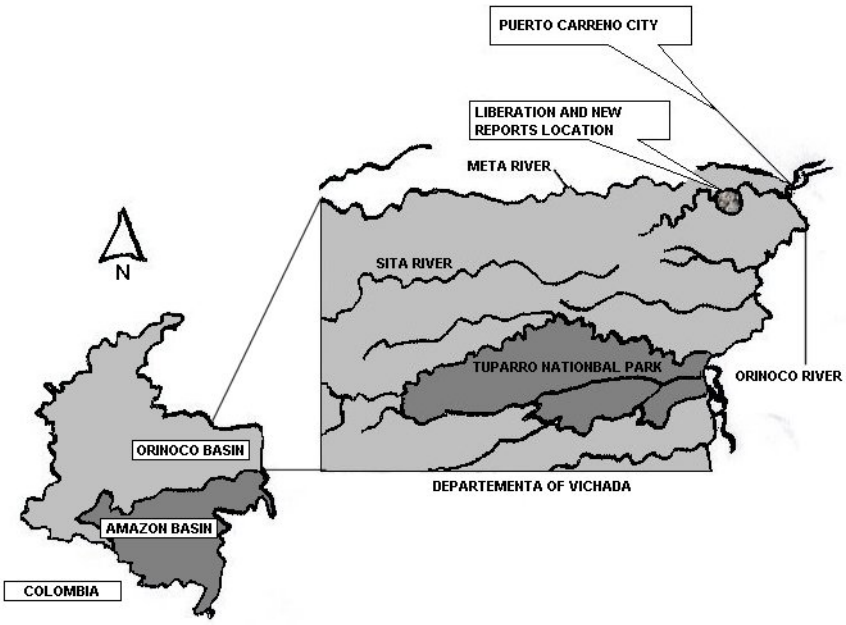

Figure 4: Localization of the relocation site

As a preliminary conclusion, the rehabilitation process appears to have been successfully achieved, i.e. that the individuals were capable of surviving and behaved as normal wild giant otters, completely independent and able to breed. I can also confirm, therefore, that the physical and biological rehabilitation of Giant Otters is a hard and difficult process, but possible. I suggest that the success was due to five major factors:

1. The rehabilitation process was carried out in-situ. I found this factor crucial, and perhaps the most significant of all. The animal was in contact with its natural environment throughout the process.
2. The rehabilitation process was gradual.
3. The animal was completely isolated from human presence. Only the rehabilitation personnel were in contact with the cub.
4. The rehabilitation personnel comprised of two giant otter investigators. Not only did these investigators care deeply about the species, they had knowledge of 'normal' otter behavior and requirements.
5. This particular species is very strong and resilient.

Further to this, I would make one recommendation; that an effort is made to gather together all experience and knowledge related to captive breeding, physical requirements, behavior, rehabilitation, and threats for otter species, and for the giant otter in particular, in order to provide protocols to help or guide new efforts in giant otter conservation.

Acknowledgements *- Special thanks go to Clímaco Unda and Roamir, the two local fishermen who have kept an interest in the project since 1997.*

REPORT

PROTECTING FISH FARMS FROM PREDATION BY THE EURASIAN OTTER (*LUTRA LUTRA*) IN THE LIMOUSIN REGION OF CENTRAL FRANCE: FIRST RESULTS

Frédéric LEBLANC

Mediateur Faune Sauvage, Limousin Nature Environnement e-mail: diclidurus.albus@wanadoo.fr

Abstract: This paper describes the first results of a two-year study on methods suitable for preventing predation of fish farm stock by the Eurasian otter (Lutra lutra). The work has allowed a valuable insight into the behavioural characteristics of otters that frequent fish farms.

INTRODUCTION

Though relatively scarce in France (Figure 1), the Eurasian otter (*Lutra lutra*) is quite widespread in the region of Limousin (Figure 2), resulting in a potential conflict with local fishfarmers (GAUTIER et. al., 1995; GMHL, 2000). In response to an inquiry from one of the fishfarmers in Corrèze (Central France) to 'Limousin Nature Environnement' (Contributing organisations: SFEPM, GMB, GMHL, IUCN; and funded by the 'Direction Régionale de l'Environnement du Limousin') led a study to determine effective methods of protecting fish stocks from otter predation. The aim was also to reduce the risk of illegal trapping and killing by fish farmers under threat from this protected species. The study period covered September 1999 to October 2001. Each of eight local fish farms, producing fish of the genus Salmonidae, suffered occasional stock losses through otter predation. Detailed behavioural observation of otters and testing of various protection methods was used to identify those considered most effective. Their selection and installation, however, depends on the type and location of the individual fish farms.

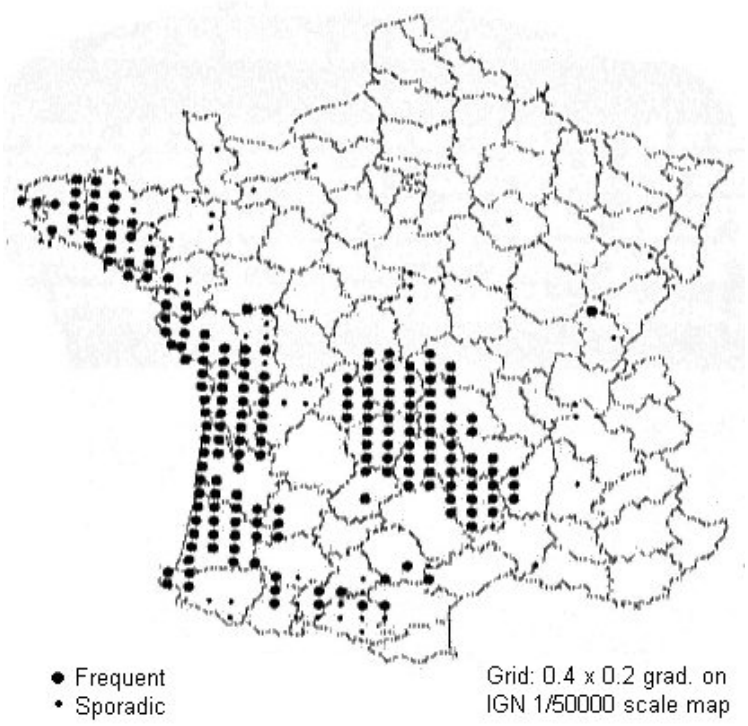

Figure 5: Distribution map of the Eurasian otter (*Lutra lutra*) in France.

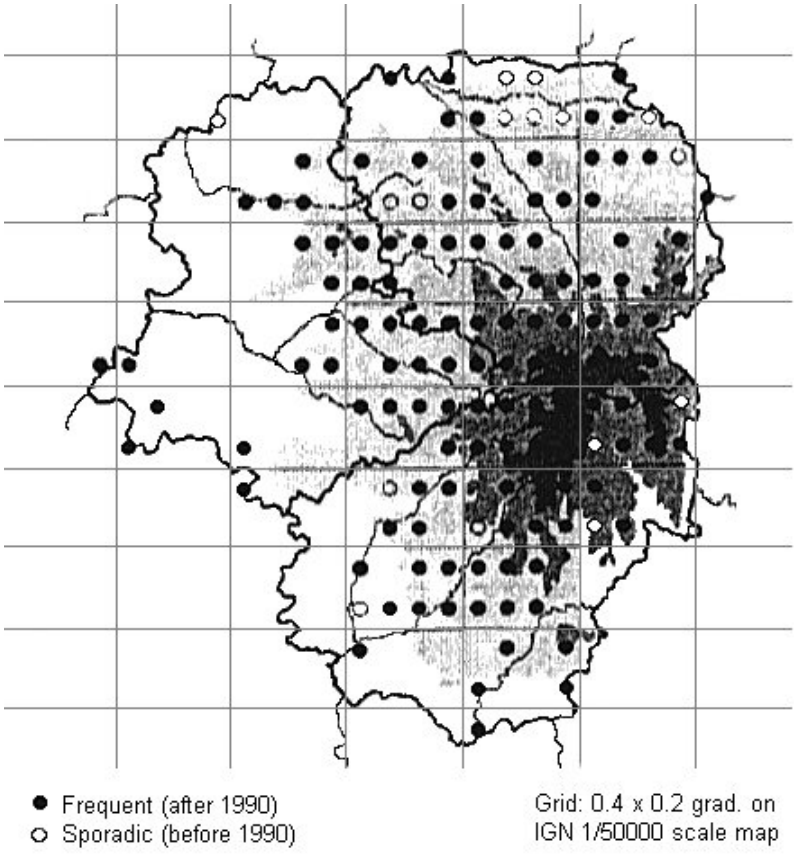

Figure 6: Distribution Map of the Eurasian Otter (*Lutra lutra*) in Limousin

PRELIMINARY RESULTS AND RECOMMENDATIONS

General protection methods:

If used alone, security-type lighting systems, i.e. those fitted with automatic detection sensors, or repellents for carnivorous animals proved ineffective. A combination of techniques is therefore recommended:

1. Bury wire netting (45-50 cm deep). Where this is not possible a concrete base or wire netting directed outwards should be used to prevent digging under fences.
2. Installation of 3-wire electric fences around fish farms (Figure 3); including across all entrances. Wires should be placed at 5cm, 15cm and 40cm above ground level.
3. Prevent access to the fish farm via water channels, e.g. from reaches of rivers, by streams, ditches or culverts used to supply or direct water around the farm. For slow-flowing waters, the installation of a removable grid is recommended. For fast-flowing streams, block all accesses to separate the fish farm from watercourses, including any debris screening devices.

Figure 7: Example of three electric wires placed around a fishpond

Behavioural observations:

During this study, a number of behavioural characteristics of Eurasian Otters were observed:

- Hunting habits: During one night, several otters (from 2 to 5) tend to hunt on one fish farm for about 2 or 3 hours. These observations were of a family group, comprising a female, her two cubs and two 2-year old otters.

- Fish loss per night: The number of fish caught was significant, e.g. 2 to 5 otters present together were able to catch more than 10 trout (*Salmo trutta fario*), weighing between 1 and 2 kg, in a single night.

- Large, breeding fish: Catches of large (6 to 10 kg) breeding salmon or trout were frequent.

- Hunting times: Otters do not appear to have regular hunting hours on fish farms. In winter (December to January), they tend to arrive fairly early in the evening, i.e. around 17:30 GMT, and remain until 5 to 6 a.m.

- Climbing ability: Otters could easily climb over wire netting or fencing up to 1.50 m in height; often starting from angles or corners. They were also able to climb over gates fitted with wire netting and are likely to climb trees that border the farm.

FURTHER WORK

Providing that funding is forthcoming, the next step is to install the preventative measures on a fish farm. This will serve as both a demonstration model and educational aid for other local fish farmers and those across Europe requiring efficient deterrents against the predation of their stock by otters.

Acknowledgements *- I wish to thank the following people for their assistance in this work: René ROSOUX (SFEPM); Christian BOUCHARDY (SFEPM); Lionel LAFONTAINE (Groupe Mammalogique Breton/ SFEPM / IUCN Otter Specialist Group - France); Hélène JACQUES (SFEPM / IUCN Otter Specialist Group - France); Michaela BODNER (IUCN Otter Specialist Group - Austria); Aksel BO MADSEN (IUCN Otter Specialist Group - Denmark). Bob HUSSEY and Jo WILSON (RJTC-France) for their help with the translation into English.*

REFERENCES

Gautier, J.Y., Rosoux, R., Libois, R. 1995. La Loutre et le Vison d'Europe. Actes du XVIIº Colloque International de Mammalogie. Cahiers d'Ethologie, 15 (2-3-4), (Proceedings of 17th International Conference on Mammals, 'The European Otter and European Mink'.) 434pp.
GMHL 2000. Mammifères, Reptiles et Amphibiens du Limousin. (Mammals, Reptiles & Amphibians of the Limousin). 215pp.

RÉSUMÉ : PROTÉGER LES PISCICULTURES CONTRE LA PRÉDATION DE LA LOUTRE EURASIENNE (LUTRA LUTRA) EN RÉGION LIMOUSIN, CENTRE DE LA FRANCE: PREMIERS RÉSULTATS
Cet article détaille les premiers résultats d'une étude de deux ans, relative aux méthodes de prévention efficaces pour lutter contre la prédation de la loutre eurasienne (Lutra lutra) dans les stocks de poissons de pisciculture. Ce travail a permis de jeter un regard précieux sur les caractéristiques comportementales des loutres qui vont fréquenter les pisciculture.
Revenez au dessus

RESUMEN: PROTEGIENDO LAS GRANJAS PISÍCOLAS DE LA REGION LIMOUSIN EN EL CENTRO DE FRANCIA DE LAS DEPREDACION CAUSADA POR LA NUTRIA EUROPEA (LUTRA LUTRA): PRIMEROS RESULTADOS
Este articulo describe los primeros resultados de un estudio de dos años que analiza diversos métodos para prevenir la depredación en granjas piscícolas causada por la nutria europea (Lutra lutra). Este trabajo ha generado una valiosa perspectiva acerca de las caracteristicas del comportamiento de las nutrias que frecuentan las granjas piscíicolas.

SHORT NOTICE

OTTERS (*LUTRA LUTRA*) HUNTED AS BEAVERS (*CASTOR CANADENSIS*) IN FINLAND

Uolevi SKARÉN

Tupsuntie 75, 74300 Sonkajärvi, Finland

Otters (*Lutra lutra*) are protected in Finland, but it is legal to hunt beavers (*Castor canadensis*). Otters often live in the ponds and thickets made by beavers. There is plenty of shelter and often open-water in winter because of water flowing over the dam.

One typical accident happened on 13.4.2001 in eastern Finland, Tuusniemi, Karhulampi (Bearlake). A man was waiting for beavers in the evening. He heard a splash such as a beaver makes when warning conspecifics by hitting the water with its tail. Soon after the sound, the hunter saw a swimming head and shot. After noting that he shot an otter instead of a beaver he informed the police. According to Finnish law, the prosecutor has two years to consider whether to bring an action into court or not. After one year, still nothing has happened in the Karhulampi case. A corresponding event was documented on 26.11.1993, also in eastern Finland. Then the hunter was not prosecuted "because he honestly informed about the incident". However, both hunters have broken the law by shooting at an unknown animal in twilight; further, you may not shoot swimming beavers.

In theory, the value of a poached otter in Finland is estimated at up to 1,200 Euros. Nobody knows how often such accidents happen; however, it is known that otters have also sometimes been shot in Finland during waterfowl hunts.

Some hunters in Finland "hate" otters because they open the "katiskas" (local fish traps) and steal the catch. Such persons now safely kill, and will continue to kill, 'by accident' the "nuisance" otter if the prosecutors do not change their line. The problem is, of course, that in the case that prosecutors take a harder line nobody would report such incidents anymore.

SHORT NOTICE

OTTERS IN EUROPE CONFERENCE, ISLE OF SKYE, SCOTLAND

Grace YOXON and Paul YOXON

After many months of preparation, the 'Otters in Europe Conference' finally arrived and for the next five days, Sabhal Mor Ostaig, the Gaelic College, was filled with the diverse tongues of around 100 delegates from some 22 different European countries. The week started well. On the very first night a few delegates watched two otters just below where the conference was being held. Their delight as they rushed in for dinner having watched otters, some for the first time in their lives, gave a great feeling of optimism that spread throughout.

On the first morning, Lady Claire MacDonald (wife of the Chief of the Clan MacDonald) welcomed the gathering of scientists, vets and rehabilitators, all specialising in otter work, to Skye, pointing out how such events as the conference are important not only to Skye, but as a means of people meeting in nice surroundings. Dennis Furnell (Joint president of IOSF) followed with his own words of welcome and presented an outline of what he hoped the meeting would achieve. Both speakers have supported IOSF since its outset and their enthusiasm and help has always been invaluable.

The first session was a grand tour around Europe, looking at populations of otters in both the East and West. All in all, things seem to be looking better for our Eurasian otter than it has for a long time. Most reports were very positive, but a few still told a story of no or slow recovery. However, the next session made us realise that we must not be too complacent, with threats from pollution, road accidents, oil contamination, habitat loss and water demand being discussed. It was pointed out that "it is a frightening thought that in parts of Scotland alone, we may be losing as many as 20% of our otters to road mortalities". The conference also looked at caring for, and veterinary work on, otters and also highlighted the importance of post mortems, not only to assist with diagnosis but also to indicate potential problems for the future. In the evening Peter van der Werff (IVM, Vrije Universiteit Amsterdam, The Netherlands) gave an invited keynote lecture on human perceptions of nature and wildlife that resulted in discussions during the rest of the conference.

Day two started with speakers looking at educational and economic aspects of otter conservation. In certain countries, such as Austria and the Czech Republic, otters cause a great deal of damage to fish farms and delegates looked at ways to compensate fish farmers and fencing of fish ponds. In other countries, such as Scotland, which also has extensive aquaculture, there appears to be no conflict between the animals and the fish farm operators.

We then went on to look at the important and potentially controversial issue of re-introductions, how they have or have not worked and the future of such projects. Our second invited guest speaker, Thomas Serfass from Frostburg University, USA, described how he has been running a re-introduction programme since 1984 with great success. Re-introduction is currently underway in the Netherlands and it is vital to look at past projects to improve and prepare for any such work. Perhaps the most meaningful result of the wide-ranging discussions that followed was the agreement of the delegates that the question of re-introductions should be addressed on a case-by-case basis, and that it is not practical to have a policy of *Thou shalt* **or** *shalt not re-introduce*.

On Thursday, we had a trip around Skye to show our visitors something of our island, its scenery, wildlife and especially our otters. We stopped to look for signs of otters and how IOSF has been working to reduce road mortalities, and how some of these methods can hopefully be implemented elsewhere. We also had wonderful views of golden eagles and seabirds.

The final day looked at both classical and new methods of otter research. The classical methods included breeding of otters in the wild for re-introduction, and new methods included the use of genetics for monitoring.

The social part of the meeting was not forgotten, the small bar in the college was well used each evening. Here, social discourse was regularly mixed with scientific discussions as the whisky went down and the night developed into morning. One memorable event was the ceilidh organised by local children, who came and entertained us all in Gaelic song and music, ending up with everyone joining in a few Scottish dances - indeed a sight worth seeing.

So what were the conclusions? Overall, the conference was an excellent success. Many of the delegates (and I quote) said, "It has been one of the best conferences I have ever been to". In fact, Don Jefferies said, "Nowhere else can otter conservationists actually see wild otters at the conference site!" Valery Neronov, Head of Mammals, IUCN Species Survival Commission, also said "It was a good chance to see so many delegates from different countries and learn results of their important studies." The success of the event was largely due to the beautiful setting, the great food, the excellent talks and presentations, but mostly because it was otter people openly sharing experience and knowledge with no hint of ego.

From the programme committee, there goes a special thank-you to all the chairmen and speakers. With over 15 sessions and 40 presentations, the whole conference overran by only 30 minutes (and 20 minutes of that time had been agreed!!).

Everyone left knowing they have real friends all over Europe from the UK to Israel and Georgia, from Finland to Spam and Turkey - we all have people we can contact at any time for help and advice in our work. This can only be positive for otters in Europe as it is only by such open discussion and co-operation that anything can be achieved.

And the reward for the delegates (apart from new friends)? Sightings of up to five otters both morning and evening for everyone - not bad when you consider there were 103 people! Skye itself was at its best - beautiful sunny and warm weather throughout the conference, long hours of daylight and little darkness. This could not have been better even if we had wanted it to be.

Thanks to everyone who came, including the otters, and to the College and the sponsors who made this memorable event possible.

Acknowledgements *- The conference was funded by Scottish Natural Heritage, Skye and Lochalsh Enterprise, Highland Council, Highland Biodiversity, Ellice MacDonald, and the IOSF).*

L I T E R A T U R E

BACKBIER, L.A.M., JANSEN, S. 2002. Zum Vorkommen des Fischotters (*Lutra lutra*) in Limburg von 1990 bis 2000. *Säugetierk. Inform*. **5**, 201-209. [in German with English abstract] (van Galenstraat 64, NL-6163 XW Geleen, The Netherlands).
BACKBIER, L.A.M. 2003. De otter en het oeverloze gestuntel met natuurwaarden. *Limburgs Milieu*, **17**/1,11-13. [in Dutch] (address - see above).
BUYS, J., JANSEN, W., JANSSEN, S., SCHEPERS, F. 1991. Toekomst voor de otter in Limburg. *Natuurhist. Maandblad*, **80**, 198-208. [in Dutch with English abstract].
CATALUNYA, DEPARTAMENT DE MEDI AMBIENT II 2001. Pla de conservación de la llúdriga a Catalunya: biologia i conservació. Dept. Medi Ambiental, Barcelona, 145pp. [in Catalan with English Abstract].
CLAVERO, M., PRENDA, J., DELIBES, M. 2003. Trophic diversity of the otter (*Lutra lutra L.*) in temperate and Mediterranean freshwater habitats. *J. Biogeograph*. **30**, 761-769.
CRAWFORD, A. 2003. Fourth Otter Survey of England 2000-2002. Environment Agency, Bristol, 88pp. (Conservation Section, Environment Agency, Waterside Drive, Aztec West, Almondsbury, Bristol, BS32, 4UD, England).
DEWIT, T.J., CLULOW, V., DAVÉ, N.K., MIRKA, M.A., PARKER, G.H., PETERSON-SCHAFFNER, N. 2002. Ra-226 in bone of mink (*Mustela vison*) and otter (*Lutra canadensis*) taken near U workings at Elliot Lake, Canada, and from reference areas, with calculation of transfer parameters. *Bull. Environ. Contam. Toxicol.* **68**, 878-884. (Biol. Dept., Laurentian Unversity, Sudbury,

Ontario, Canada P2E2C6).
HARDING, L. 2002. Environmental Contaminants and reproductive and physiological condition of wild mink (*Mustela vison*), martens (*Martes americana*), river otters (*Lutra canadensis*) and wolverines (*Gulo luscus*). PhD thesis, (free download at http://www.Sciwrite.ca/toxicology.htm)
HYVÄRINEN, H., TYNI, P., NIEMINEN, P. 2003. Effects of moult, age, and sex on the accumulation of heavy metals in the otter (*Lutra lutra*) in Finland. *Bull.Environ. Contam. Toxicol*., **70**, 278-284. (Univ. Joensuu, Dept. Biology, FOB 111,FIN-80101 Joensuu, Finland).
MCDONALD, S., MASON, C.F. 2003. Essex otters - struggling in a hostile environment? *British Wildlife*, **14**, 153-158. (Dept. Biological Sciences, University Essex,)
REUTHER, C. 2002. Straßenverkehr unf Otterschutz. Aktion Fischotterschutz, Hankensbüttel, 39pp. [in German] (GN-Gruppe Naturschutz GmbH, Sudendorfer Allee 1, D-29386 Hankensbüttel, Germany). **WICKENS, J.D. 1991**. Otter survey of Roaringwater Bay, South West Cork, Ireland - 1990. **Bulletin Sherkin Island**, *12,* 38pp.

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

C O N G R E S S A N N O U N C E M E N T S

IX International Otter Colloquium
Otters: Ambassadors for Aquatic Conservation
4^{th} – 6^{th} June 2004, USA

The IXth International Otter Colloquium will be hosted on the campus of Frostburg State University, Maryland, USA on 4-10 June 2004. The meeting is a truly international event, likely to be attended by participants from at least 40 countries and to include discussion on the world's 13 species of otters. The two most recent colloquiums were in Chile and the Czech Republic.

The colloquium has not been hosted in North America since 1985 and it is hoped that professionals and others from throughout the world with an interest in otter biology, ecology, and conservation will attend. Information about the colloquium can be obtained by emailing (otter@frostburg.edu) and from the colloquium web site (http:/otter.frostburg.edu).

June is a wonderful time to visit the beautiful campus of Frostburg State University in the eastern United States. Please plan on joining us for a unique and enjoyable opportunity to learn about these amazing species by interacting with otter enthusiasts from throughout the world. We look forward to seeing you next June!

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

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)

Catalysts for Conservation: A Direction for Zoos in the 21st Century
19 - 20 February 2004
ZSL Meeting Rooms, London UK

A joint symposium of the Zoological Society of London, UK and the Wildlife Conservation Society, USA, supported by the North of England Zoological Society, UK.

Organised by Alexandra Zimmermann, Chris West, Matthew Hatchwell, and Richard Lattis

Modern zoos and aquariums are playing an increasingly active and important role in protecting and managing global biodiversity. Many zoos explicitly include wildlife conservation in their mission and, in recent years, have entered a wave of determination to advance their active involvement even further. With this progression, however, searching questions are being asked:

- What is the true role of zoos in conservation?
- How can they contribute more significantly to global conservation efforts?
- What are the unique attributes of zoos that can be applied in the conservation landscape?
- And should zoos be doing more?

In parallel with this voluntary movement, legal requirements for zoos to support conservation in the wild are also becoming more stringent. This, coupled with the imminent revision of the World Zoo and Aquarium Conservation Strategy, is creating a need for zoos and aquariums to consider how best to direct their expertise to the maximum benefit of biodiversity conservation.
This symposium will challenge the global zoo community to review its conservation missions. It will bring together leading thinkers and practitioners familiar with the in situ and ex situ conservation roles of zoos. Speakers will aim to define a new conservation vision for zoos and aquariums that increases their contribution to tackling the on-going global biodiversity crisis.
Admission is by ticket and must be booked in advance. A full programme and registration form is attached
Also available from Deborah Body, Scientific Meetings Coordinator, ZSL deborah.body@zsl.org or tel: 020
7449 6227. http://www.zoo.cam.ac.uk/ioz/meetings.htm
for further information please contact:
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www.chesterzoo.org / www.savethejaguar.com

CALL FOR INFORMATION

Dear friends:

Our organization, NACRES (www.nacres.org), and the Tbilisi State University faculty of biology, department of Hydrobiology and Toxicology, intends to carry out research on some rivers and lakes of Georgia to identify level of PCBs and heavy metals in water, fish and the otters' body. Therefore, we would appreciate receiving any papers, including methodology, regarding this problem.

Thank you very much for your earliest convenience. Best regards,
Giorgi Gorgadze

Otter Conservation Program
NACRES (http://www.nacres.org)
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Georgia (CIS)
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NEW BOOKS

Bulletin Vydra 9-10/2000 and Bulletin Vydra 11/2001 are finally published. For further information please contact:
Ján Kadlečik, Administration of the Velka Fatra National Park, Cachovsky rad 7, 038 61 Vrutky, SLOVAKIA

VIRTUAL OTTERS

http://www.otterjoy.com