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CONTENT

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NOTE FROM THE EDITOR

First of all I have to apologise, but in the hectic moments before a Bulletin is finalised mistakes sometime happen. As some of you may have realised, I swapped the references of the two articles on *Aonyx congicus* in the last issue (IUCN OSG Bull. 19/1) by using <copy> and <paste>. Or was this a test of who was reading carefully? No - my mistake, and sorry Helen.

I would like to thank all those who sent me compliments; sometimes it is really a tiring job to produce the Bulletin, to find financial support, etc. I have to admit that I also get irritated now and then when I receive another final manuscript at the last moment, when once again the list of references in the manuscript have nothing to do with what is mentioned in the list of references (please check this before submitting a manuscript!), or when people that never contribute anything to the Bulletin start to send me e-mails about commas that are missing (no joke this happened!).

As I realised from e-mails, some of you have heard about rumours that, over the last months, there has been some irritation behind the scenes! This is not the place to discuss this but I am sure that any problems can be solved and that the persons involved have already made some progress in this. Some of these problems are related to the apparently never-ending story of otter reintroductions - an item that has already caused a lot of discussion in the past (see IUCN OSG Bull. 15/2 and 16/1), and it is still a hot item. In the light of these developments, the Conference 'The Return of the Otter - Where and How' (30th June - 5th July 2003, Isle of Skye) will be completely devoted to this theme and a range of invited international experts on otters and issues related to reintroductions (conservation, captive breeding, toxicology, genetics, veterinary aspects, telemetry, politics, ethics, etc.), will discuss the positive and negative aspects of this issue. The Proceedings, containing the contributions and overall conclusions, will be made available as soon as possible and Marcela Kucerova will report on the results and suggestions of the conference in Skye at the 4th European Congress of Mammalogy, to be held on July 27 - August 1, 2003, in Brno, Czech Republic, where the meeting of the European Section of the IUCN Otter Specialist Group will also take place.

Many thanks go to Adam Grogan, Silke Hauer, Roel Hoeve, Brigitte Komposch, Claus Reuther and Elke Staib, all of who 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 Alvaro Soutullo (Uruguay) 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 and Annemarie Gerritsen (Wageningen), and Els Hoogsteede-Veens and Erwin Hellegering of GRAFISCH SERVICE CENTRUM VAN GILS (Wageningen).

I U C N / S S C O S G G R O U P

FROM THE CHAIRMAN'S DESK

Another year has come to an end. As already mentioned in my report in the last issue of our bulletin, 2002 has to be summarised as a year of some remarkable progress in the work of the OSG. Most exciting for me is the fact that, finally, we have finally realised a task agreed at the Trebon Otter Colloquium in 1998. Through the address www.otterspecialistgroup.org you will now find the website of the OSG on the internet. Thanks to the assistance and support of the German Association for Otter Conservation (Aktion Fischotterschutz) it has been possible to develop this website, which, it is hoped, will become a major source of information not only on the activities of this Specialist Group but also on otter conservation world-wide. So far, the site mainly contains basic information on the IUCN, SSC and the Otter Specialist Group, especially on the continental network of the latter and the addresses of the group members. New publications on otters are introduced, and the recently published leaflets on African otters can be downloaded. Many links to other otter websites provide much more information on otters and their conservation. Some additional chapters will be added soon, for example an otter literature databank and identification sheets for all 13 species of otters.

The website also contains an 'Otter Project Databank', providing the opportunity to add and to find basic descriptions on projects related to otter conservation and research. This databank could become an important resource for information on what is going on in otter conservation and research or for establishing contacts between people or institutions working on similar topics. I therefore ask all people involved in otter projects (not only the members of the OSG) to provide information on their projects via this databank. I am quite sure that it will soon become an important platform for cooperation.

Again, I received some very exciting reports from the Continental Coordinators, describing efforts and progress over the previous months. Jan Nel has posted the printed version of the leaflets on African otters to more than 20 African countries. Both of us have already received the first responses, offering data on otter observations throughout Africa. The data will be stored on the ISOS (Information System for Otter Surveys) of Aktion Fischotterschutz and will be provided for scientific or conservation purposes as soon as the GIS and databank system will be able to handle these African data satisfactorily. Everybody who has contacts to Africa can assist by distributing the information on the availability of the leaflets and by asking people to provide observations of otters. You can send any addresses to Jan Nel, who will mail the printed version, or you can download the leaflets as a PDF file from www.otterspecialistgroup.org (-> News, Events, Publications -> Publications -
>Publications of OSG -> Lea/lets African Otters). It is hoped that further small but important steps forward will be made in trying to lift the curtain of 'mystery' covering Aonyx congicus. Helen Jacques, especially, is collecting more and more information and I am quite optimistic that soon our knowledge of this species will increase dramatically.

From Asia, Padma de Silva reported that otter surveys are being undertaken in Sri Lanka, India, Bangladesh, Vietnam and Indonesia with small grants provided from the Columbus Zoo for the year 2002. The survey of the Hairy-nosed Otter is being continued quite successfully in Vietnam by Dr. Dang and Dr. Anh with funds from IOSF (UK) and the Columbus Zoo. However, in Thailand, the scenario is not so good as Budsabong Kanchanasaka was transferred to the headquarters of the Wildlife Department in Bangkok. Also, the latest male otter (3rd one to be trapped) she trapped sometime in July died. As a result, she decided to stop trapping, but will continue her survey activities in the Narathiwat area.

IOSF has given another grant for an otter survey in Nepal, with Dr. Tej Thapa as the recipient. He has collected data on the distribution of otters in the Karnali River. Padma herself is writing up some teaching materials for children in the age group 5-10 yrs. The otter is introduced to the children among other wetland animals in a colouring book, jigsaw puzzles, and in a storybook featuring an otter family. These will be distributed among handicapped children as a donation. For this work, Padma got a small grant from the Columbus Zoo.

The European members of the OSG are looking forward to meet at the 4th European Congress of Mammalogy (ECM); to be held on July 27 - August 1, 2003, in Brno in the Czech Republic. As agreed at the last meeting of the European section at ECM3 in Finland, this most important European conference on mammology should always form the background for meetings of the European OSG members, when possible. Some steps forward can also be reported from the project 'Otter Habitat Network Europe (OHNE)', a cooperation project of Aktion Fischotterschutz and the European section of the OSG. At a regional conference for northern Germany and Denmark in September the results of the landscape assessment for otter habitat corridors in this region were introduced. Both our German and our Danish colleagues were very excited about the results. Not least as the recovery of the otter in this region seems to be occurring mainly in just those areas identified as suitable and less problematic in the project. At the moment, the assessment is also being undertaken for Austria and the Czech Republic, aiming at the identification of corridors between the otter populations in these two countries and in Germany.

Referring to the Dutch otter release project, the Dutch ministry of agriculture recently decided to stop the trapping activities in Belarus and Latvia. The reason for this was that, of 12 otters that have been trapped, four died before they could be brought to the Netherlands. For this reason, the European section of the OSG once again will offer the Dutch ministry of agriculture the advice of foreign otter specialists. Dutch and German conservationists are still trying to influence this program via the European Commission.

From North America, Tom Serfass reports that efforts have increased for the preparation of the IX International Otter Colloquium (IOC), which will be held on 4-10 June 2004 at the Frostburg State University, Maryland/USA. A website is under preparation which will be released soon and which will offer more detailed information. Following 1985, this will be the second time that we will have had an IOC in the United States. I am sure that it will contribute to the improvement of otter conservation activities both in North America and abroad.

I have received so much information on the Sea Otter from Angela Doroff, assisted by Andy Johnson, that I have had to cut it down to some main aspects. You can find more information on the very instructive sea otter websites, e.g. that of the U.S. Fish and Wildlife Service (FWS).

The U.S. Fish and Wildlife Service has finalized the draft stock assessments for the northern sea otter, the stock structure designation changing from a single stock to three stocks. The sea otter population in the southwestern stock has undergone significant declines in the past 10-15 years and, as a result, the FWS has developed a proposed rule to list the stock under the Endangered Species Act. It is anticipated that the draft of this proposal will be available for public comment in January 2003, if all goes well. The U.S. Fish and Wildlife Service also hosted a workshop last April to discuss research and management information needs for the southwestern population in Alaska (workshop reports and stock assessment reports are available on request to the FWS). The sea otter population in Prince William Sound, Alaska, is still considered a recovering species from the affects of the Exxon Valdez oil spill of 1989. Current studies are monitoring health and survival.

A cooperative study was developed to assess sea otter abundance and winter mortality in the Commander Islands, Russia, for 2002-2003. Sea otter surveys were conducted in the Commander Islands in 2002; however, results are not available as yet. The Commander Islands have not experienced the dramatic population declines that have been observed in the Aleutian Islands.

The population of the southern sea otter is threatened under the Endangered Species Act. A draft Environmental Impact Statement evaluating the sea otter translocation to San Nicholas Island is anticipated to be available in early 2003. Annual population surveys are conducted to monitor trend and abundance. Large-scale telemetry projects are ongoing throughout the range to assess survival, reproduction, and food habits. There is a fairly remarkable alliance of state, federal, academic and NGO partners working on southern sea otter conservation.

This is also true if we summarise the worldwide work of OSG in 2002. I would like to thank all members and all our partners for their efforts and their cooperation. I would be glad if this 'otter network' could be further improved to ensure a similar successful year 2003.

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A R T I C L E

INFLUENCE OF SELECTION OF BANK SIDE ON THE STANDARD METHOD FOR OTTER SURVEYS

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Abstract: The effectiveness of the standard method used to survey otters can be affected by the choice of which stretch of bank is examined. The sensitivity of the standard method was evaluated in two regions with differing otter (*Lutra lutra*) population densities by surveying 300m stretches of bank from bridges on both upstream and downstream banks, in a region with a high population density, 64% of the 'positive' sites would be recorded as positive, regardless of which stretch of bank the surveyor chose. When using the standard survey method in a sparsely populated region, as few as 9% of 'positive' sites would be recorded if the choice of riverbank were not optimal. Examination of 100m of all four banks improved the success rate of the survey substantially in the sparsely populated region. The study suggests that the standard method is very sensitive to the selection of the stretch of bank in sparsely populated areas. The accuracy of the standard method can be increased with little extra effort, if survey guidelines are changed from "an optional search" of both banks under bridges to "an obligatory search".

INTRODUCTION

Systematic and comparable surveys are important for conservation and management of species. The survey method originally developed in the UK to monitor otter (*Lutra lutra*) distribution (CRAWFORD et al., 1979; GREEN and GREEN, 1980; LENTON et al., 1980) has now developed into a standard method for monitoring otter distribution in Europe. The standard method is recognised as an adequately accurate, objective and easily repeatable field method to monitor otter distribution over large areas, although some watercourses occupied by otters are not detected (REUTHER et al., 2000). At each survey site a maximum of 600m of riverbank is searched for signs of otters. For the national surveys of Denmark, two 300m stretches of bank on either side of bridges, and both banks under bridges, were examined (MADSEN and NIELSEN, 1986; MADSEN et al., 1992; HAMMERSHØJ et al., 1996). The selection of which stretches of bank to examine is a subjective choice made by the surveyor. At sites where the presence of otters is not evident on either the upstream or the downstream banks, the surveyor's choice affects the result of standard surveys. In an area with a very low population density, successive standard surveys have failed to detect otters (MADSEN and GAARDMAND, 2000).

Several studies have evaluated both the effectiveness and the limitations of the standard method (recently summarised in REUTHER et al., 2000), but no studies have specifically addressed the effects bank selection has on the survey method. In this paper we evaluate the effect bank selection has on the reliability of the standard method in two regions of Denmark with different otter population densities.

STUDY AREAS AND METHODS

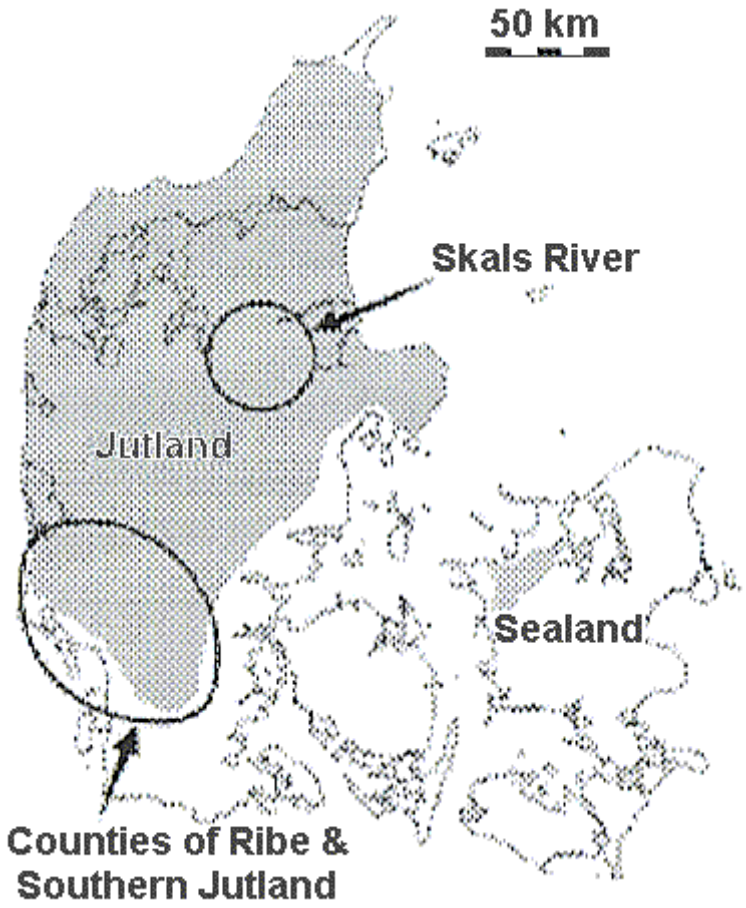

Figure 1: Distribution area of otter (*Lutra lutra*) in 2000 (grey shaded) and location of surveyed regions in Denmark (after PIHL et al., 2001; ELMEROS, 2000; BUSSENIUS, 2000).

Surveys were carried out in two regions of Denmark (Figure 1). One region was located in Mid-Jutland, in the Skals River catchment area, where all national surveys have recorded a widespread occurrence of otters (MADSEN and NIELSEN, 1986; MADSEN et al., 1992; HAMMERSHØJ et al., 1996). Forty-one sites were surveyed in November and December 1999 following the standard method. If possible the search covered the full distance. Numbers of spraints and the distance of the sprainting sites from the bridge were recorded. Imponderables as swamps, ditches and tributaries prevented full survey of all four stretches of bank at 30 sites. Eleven sites were surveyed 300m on both upstream and downstream banks. These sites were surveyed twice with a one-month interval. During the second survey only new spraints were recorded.

The second region was located in southern Jutland, covering the County of Ribe and parts of the County of Southern Jutland. Only one positive site had been recorded in the extreme north of the area during the national survey in 1996 (HAMMERSHØJ et al., 1996). Previous national surveys had failed to detect any presence of otters (MADSEN and CHRISTENSEN, 1986; MADSEN et al., 1992). Surveys were carried out in December 1998, in January 1999 and in late September 2000 and they showed a sparse presence of otters in the region (ELMEROS, 2000). In the course of these surveys, 160 sites were examined. Some sites were located by lakes and on stretches of waterways without bridges.

On occasions, the survey distance was extended to 1000m. Density of spraints and the location of sprainting sites were recorded. When otters were recorded in watercourses, the density of survey sites was increased in order to collect more information on otters' use of the river system.

Watercourses in both regions have slow currents. They are lowland watercourses that meander through undisturbed meadows and agricultural lands. Land use, bank side vegetation, watercourse size and watercourse management was comparable in the two regions. The majority of the survey sites were situated in places where the waterway was 5-10 m wide.

RESULTS

Sixty-one percent of all 41 sites and all six 10x10 km UTM grids were positive in the region with a widespread otter population. In the sparsely populated region, 24 % of sites and 34 % of the 38 UTM grids surveyed were positive. As survey methods differed the overall percentages of positive sites and UTM grids in the two regions should be compared with caution. Site occupancies had differed more if the standard method been applied in both regions, e.g. all positive sites in one UTM grid in the sparsely populated region were negative when surveyed only 600m. The national survey in 1996 recorded otters at 59 % of 162 sites in a wider region around Skals River catchment (HAMMERSHØJ et al., 1996). The evaluation of the performance of the standard otter survey method and the comparison between regions is based only on positive sites where all four stretches of bank were surveyed up to a distance of 300m from each bridge.

The mean number of spraints registered on each positive 300m stretch of bank at each positive site was 3.8 in the region with a widespread otter population. In the sparsely populated region only 0.5 spraints were found per 300m stretch of bank at a positive site. Footprints were the only indication of the presence of otters at 19 % of positive sites in the sparsely populated region.

Most spraints were located within the first 100m surveyed in both the region with a widespread occurrence of otters (χ^2=6.59, d.f.=2, P>0.05) and in the sparsely populated region (χ^2=21.1, d.f.=2, .P>0.001). There was no difference in numbers of spraints on the right and left-hand banks of the waterways in the region with a widespread occurrence of otters (χ^2=0.07, d.f.=l, n.s.), nor in the sparsely populated region (χ^2=0.97, d.f.=l, n.s.).

Spraints and footprints of otters were not found on all four 300m stretches of bank at positive sites (Table 1). In the widespread otter population, tracks from otters were found on 72% of the surveyed 300m bank stretches. In the sparsely populated region, spraints or footprints were recorded at 36 % of the surveyed banks at positive sites. The majority of positive sites had only one positive stretch of bank.

Table 1. Percentages of positive banks and sites with 1, 2, 3, or 4 positive banks in regions with widespread and sparse occurrence of otters. Only positive sites included where 300m were surveyed at all four banks

Occurrence of Otters	n	% Positive Banks	% Positive Banks			
			1 bank	2 banks	3 banks	4 banks
Widespread	2 x 11	72	5	32	36	27
Sparse	32	36	66	25	9	0

At positive sites where only one or two banks were examined, the results using a standard survey depended on which banks were surveyed (Table 2). If a surveyor, by accident, examined negative banks whenever possible, 63 % of the actual positive sites were recorded as positive in the region with a widespread population. The worst possible result from a standard survey of the region with a sparse population recorded only 9 % of the actual positive sites and 25% of the actual positive UTM grids correctly.

Table 2. Dependence of numbers and length of surveyed banks on percentage of positive sites recorded correctly in regions with widespread and sparse occurrence of otters. Only positive sites included where 300m were surveyed at all four banks

Occurrence of Otters	n	% Positive Sites			
		4 x 300m	2 x 300m	4 x 200m	4 x 100m
Widespread	2 x 11	100	63 - 100	86	68
Sparse	32	100	9 - 100	91	81

Examination of all four stretches of bank, upstream and downstream from bridges, improved the reliability of surveys. Efficiency decreased as survey distances were reduced. Reducing survey distances to 100m on four bank stretches resulted in a marginally better percentage of positive sites occupation than the minimum number of positive sites recorded by the standard method in the region with widespread occurrence of otters. The majority of positive sites that became negative sites, if surveyed either for only a 4 x 100m stretch or as spot checks at bridges exclusively, were located on small streams.

In the region with a sparse occurrence of otters the majority of sites had only one positive bank and, therefore, the reliability of surveys increased noticeably if four stretches of bank were searched. If all four banks were searched for a distance of a 100m from the bridge, the presence of otters was detected at 81% of all positive sites in the region with a sparse occurrence of otter. If surveyed as spot checks at bridges only 53% of positive sites were recorded correctly.

DISCUSSION

Seasonal variations in the sprainting activity of otters (REUTHER et al., 2000) and survey conditions may also hamper comparison of the two surveys as an evaluation of the standard method. However, meteorological conditions during the surveys in Mid-Jutland and the winter survey of southern Jutland were similar (STATISTICAL YEARBOOK, 1999, 2000), but lower sprainting activity and denser vegetation may have affected the results from the autumn survey in the sparsely populated region. Excluding the positive recordings from the autumn survey from the evaluation, the percentage of correctly recorded sites dropped to 76% if all four bank stretches were searched for 100m. Changes in other figures were negligible, possibly because the autumn survey took place during a period with low water levels, which offered optimal tracking conditions with sand and mud banks under bridges.

Surveying otter distribution by the standard method is affected by the choice of which bank to survey. Table 2 indicates minimum achievable occupation percentages with the standard method. However, the efficiencies of the standard method improved if banks were chosen randomly and should increase even further if an experienced surveyor with knowledge of otters' sprainting behaviour performed the survey and selected bank sides that offered the best preconditions for finding otter tracks. A standard survey conducted by an experienced surveyor would probably be at least as accurate as surveys of all four banks 100m from bridges in the region with a widespread distributed population of otters. The validity of the standard method becomes more questionable in low-density otter population. Although the accuracy should improve considerably compared to the minimum values stated in Table 2 with an experienced surveyor, it is uncertain if the standard method would be more efficient than a survey of 100m of all four bank stretches in areas with few signs of otters.

Signs of otters are often recorded within the first few metres from bridges (MASON and MACDONALD, 1987; O'SULLIVAN, 1993) and bridges might be the only place to find signs of otters in some areas (LENTON et al., 1980; ROMANOWSKI et al, 1996). These findings suggest that the survey technique could be modified to surveys at bridges only, thus making it possible to monitor larger areas with less time and effort and without compromising the accuracy of the survey (REUTHER et al., 2000). However, many bridges in our study areas had no suitable sprainting places

at normal water levels due to the type of bridge construction, intensive dredging, and stream management. The reliability of monitoring otters by surveying bridges exclusively is therefore more vulnerable than longer surveys of riverbanks, due to fluctuating water levels and the availability of 'spraintable' bridges. The impact of these factors, and the reliability of surveying otters by spot checks at bridges, may vary between the various habitat types occupied by Eurasian otters (JAHRL, 1995; ROMANOWSKI et al., 1996).

RUIZ-OLMO et al. (2001) found that presence of otters would be detected in catchments with very low density after surveying 2-3 sites or after relatively few repeated surveys at each site following the standard method. Average distance to find the first evidence of otters varied between 88m and 349m. A pragmatic procedure to improve the accuracy of the standard method would be to increase efforts to detect the presence of otters at each site, or to increase the number of survey sites in areas with a low density of otter occupancy.

The objectives of the standard method are to monitor otter distribution and population trends over large areas. Intensive survey efforts in smaller areas will inevitably record otters more efficiently than standard surveys. It is questionable if any survey methods designed to monitor distribution over large areas can record presence of individual residents or transient otters on every stretch of river.

National surveys should use a standard method to achieve comparability between studies. Present guidelines for the standard method states that the examination of both banks under bridges is optional (REUTHER et al., 2000). To improve the accuracy of the standard method with little effort, guidelines should state that the examination of both banks under bridges is obligatory. To optimise accuracy for more detailed regional surveys, the survey technique could include a search of minimum 100m of both upstream and downstream banks from bridges and include more sites pr. km waterway.

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RÉSUMÉ: INCIDENCE DE LA SÉLECTION DES BERGES SUR [LE RENDEMENT DE] LA "MÉTHODE STANDARD" DES INVENTAIRES LOUTRE

La pertinence de la "méthode standard" utilisée durant les inventaires loutre peut être affectée par le choix de la berge prospectée. Le rendement de la "méthode standard" a été evalué dans deux regions où les densités de populations de loutres (*Lutra lutra*) diffèrent, en prospectant à partir d'un pont les deux berges sur 300m, vers 1'amont et vers 1'aval. Quand les densités de populations sont elevées, 64% des sites positifs seraient notés comme tels, selon la berge choisie. En basse densité seulement 9% des sites positifs seraient identifiés comme tels en utilisant la "méthode standard" et si le choix de berge n'est pas idéal. La prospection de 100m supplémentaires des quatre berges améliore significativement le rendement de 1'inventaire là où 1'espéce est sporadiquement présente. Cette étude suggère que la "méthode standard" est très dépendante du choix des berges dans les zones où 1'espèce est présente de façon sporadique. Le rendement de la "méthode standard" peut ainsi augmenter sans un effort trop important, si le protocole consiste à ce que la prospection des deux berges, de facultative, devienne obligatoire.

RESUMEN: INFLUENCIA DEL BANCO ELEGIDO EN EL METODO ESTANDARIZADO DE RELEVAMIENTO DE NUTRIAS

La efectividad del método estandarizado de relevamiento de nutrias puede verse influida por la elección de que sector del banco es examinado. Se evaluó la sensibilidad del método estandarizado en dos regiones con diferentes densidades poblacionales de nutrias (*Lutra lutra*) relevando tramos de 300 m aguas arribas y abajo de puentes. En una región con alta densidad poblacional 64% de los sitios "positives" serán registrados como positivos independientemente de cual sector sea elegido por el investigador. En una región poco poblada solo 9% de los sitios "positivos" van a ser registrados usando el método estandarizado de relevamiento si la elección del banco no es optima. En la región poco poblada relevar 100 m de las cuatro orillas mejoró sustancialmente la tasa de éxito del relevamiento. El estudio sugiere que en áreas poco pobladas el método estandarizado de relevamiento es muy sensible a la elección del tramo. La exactitud del método estandarizado de relevamiento puede mejorarse con un poco de esfuerzo adicional si los lineamientos para los relevamientos se cambian de "una búsqueda opcional" en ambos bancos bajo puentes a "una búsqueda obligatoria"

REPORT

THE RIVER OTTER (*Lontra canadensis*) IN CLARCKE COUNTY (GEORGIA, USA) - SURVEY, FOOD HABITS AND ENVIRONMENTAL FACTORS

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Abstract: The status of the river otter (*Lontra canadensis*}. was surveyed in and around Clarcke County (Georgia, USA). Although nearly extinct in the nineteen fifties, the otter population appears to be well developed today. Food habits were analyzed through spraint analysis using spraints collected in winter and summer. Sunfish and crayfish were found to be the most important food items. An attempt was made to find out if otters in the study area are affected by environmental pollution. Literature data and heavy metal analysis showed that the exposure to chemical pollution has been relatively low. The siltation of the rivers and creeks does not appear to harm the river otter or change it's food habits.

INTRODUCTION

In the early 1950s, river otters (*Lontra canadensis*) were considered rare in the Georgia Piedmont area (JENKINS, 1953). No records are known from Clarcke and surrounding counties from those years, though the original distribution included the whole of Georgia. The most probable cause of their decline and subsequent eradication was over-trapping (JENKINS, 1983). However, by 1970 river otters had recolonized the Georgia Piedmont area (JENKINS, pers. comm.). This recovery took place while pollution was dramatically affecting ecosystems all over the world.

In 1993, the status of otters in Clarcke county was assessed through a survey of local rivers for presence (tracks and spraints, and a survey of pollution status through analysis of spraints and locally caught fish for heavy metals (Hg and Pb). Data on organochlorine and polychlorinated biphenyl (PCBs) loading was assessed from previous studies. The results were compared to reports in literature to see if food habits and pollution status have changed over time. In addition, a comparison was made with food habits of river otters in the nearby Smokey Mountains, where the rivers are clear, to see how water with a low transparency affects their food habits and the possible role of underwater scent in searching for food in turbid water is discussed

MATERIALS AND METHODS

The study site comprises most of Clarcke County and parts of the surrounding counties in the Piedmont area of Georgia. Most otter spraints were collected in and around the town of Athens. Athens is a medium sized town with approximately 80,000 inhabitants. The North and Middle Oconee River both run through Athens and join south of the town. The rivers and creeks are provided everywhere with a dense riparian vegetation, also within the town limits. According to ODUM (pers. comm.) a lot of this riparian vegetation has been restored in the last forty years to prevent erosion. Large trees, such as sycamore (*Platanus occidentalis*) and river birch {*Betula nigra*), are abundant along the rivers and creeks. Rapids, rocks and logjams are common. All these structures are known to be important to river otters (MELQUIST and HORNOCKER, 1983; MACDONALD and MASON, 1983). Beavers are

abundant everywhere in the study area. It is well known that river otters benefit from the activities and dens of beavers (TUMLISON et al., 1982)

The soil type is sandy loam and the pH of the North Oconee River is 7.35, total Organic Carbon content in summer is about 2.6ppm, and the total calcium concentration is about 5.2ppm. All year round, but especially in winter, the rivers and creeks are loaded with silt. Underwater visibility usually does not exceed 20cm.

In order to get an impression of the status of the river otter in the study area, the rivers and creeks were searched for signs of this animal. About 16 stretches of approximately 100m of river or creek bank were surveyed. Sand strips, rocks, rapids, logs and banks were checked for tracks and spraints. Looking for 'positive sites' of otters is one mean of surveying an otter population (MASON and MACDONALD, 1987). When footprints were found, the prints of the hind foot were measured. By doing this it became possible to estimate if there was more than one individual present at a certain site. Adult male footprints are usually much larger (wider than 7cm) than female or subadult male footprints (MASON and MACDONALD, 1986).

Spraints, not older than about two weeks and non-weathered, were collected from January through the end of March and from July until the end of September 1993. After collection, they were dried and stored. Two hundred and fourteen spraints from nine different sites in the study area (of which four were situated within the city limits) were collected on visits every fortnight. These were used to determine food habits. The spraints were shaken in water containing commercial washing powder and then rinsed on sieves with mesh sizes of 2 and 0.5mm resp. and all the food remains of each sample were than collected from the sieves and dried.

Fish bones and scales and remains of other vertebrates were identified with the help of the bone collection of the Museum of Natural History in Athens and with LEE et al. (1980). Skeletal remains or gastroliths indicated the presence of crayfish. Crayfish were keyed out according to HOBBS (1981).

The importance of the different types of food item is expressed as frequency of occurrence and relative frequency. The frequency of occurrence was calculated by dividing the number of occurrences of a particular food item by the total amount of spraints. The relative frequency was calculated by dividing the number of occurrences by the sum of the occurrences of all food items.

During January, February, and March, a total of 40 spraints, containing mainly crayfish remains, and a total of 11 spraints, containing mainly fish remains, were collected from 8 different sites in the study area. These spraints were selected from spraint sites for heavy metal analysis. Four of these were situated within the city limits; one site was upstream, and three sites downstream of Athens. Three to eight spraints per site were dried and ground in a glass mortar and analyzed for Pb and Hg. For the analysis of Pb, 1g dried spraint was muffled and dissolved in 10ml 30% HCL and 10% HNO_3. The Pb concentration was determined with a Thermo Jarrell-Ash 965 Inductivity Coupled Argon Plasma (ICAP) with a detection limit of 1ppb for Pb. For the analysis of Hg, 1.5g was muffled and dissolved in 20ml 15% HCl and 5% HNO_3 and analyzed with an AVA800 Thermo Jarrell-Ash mercury analyzer with a detection limit of 1ppb.

Fifteen crayfish and three small catfish were caught in 'minnow traps', baited with catfood, in the North Oconee river. Five *Procambarus spiculifer* were caught just north of Athens. Five *Procambarus spiculifer*, five *Cambarus bartonii* and three small snail bullheads *Ameiurus brunneus* were caught close to the center of Athens. From the crayfish and the catfish, the muscle, intestine and fat bodies were freeze-dried. Five samples (5 *P. spiculifer* from north of Athens; 5 *P. spiculifer* from Athens; 5 *C. bartonii*; 1 larger catfish and 2 small catfish) were analyzed for mercury in the same way as described for spraints.

RESULTS

Signs

The distribution of signs of river otters is given in Fig. 1. Most of the signs were found in winter. Footprints were always found on sand strips that were often freshly deposited after heavy rains. It

appeared that animals preferred to go on land on these coarse sand strips or on rocks, as prints on muddy sediment were never found. The map shows that river otters are also present within the city limits. Prints of adult males (width hind foot larger than 7cm) were hardly ever found within the city limits, but were very common outside the city. Activity of otters within the city limits was found both in summer and winter.

Twelve of the sixteen surveyed river or creek stretches (75%) showed signs of otters. In the study area, nine spraint sites were found. Spraints were collected repeatedly from these sites. The average amount of spraints collected on the visits to the sites was 5.3.

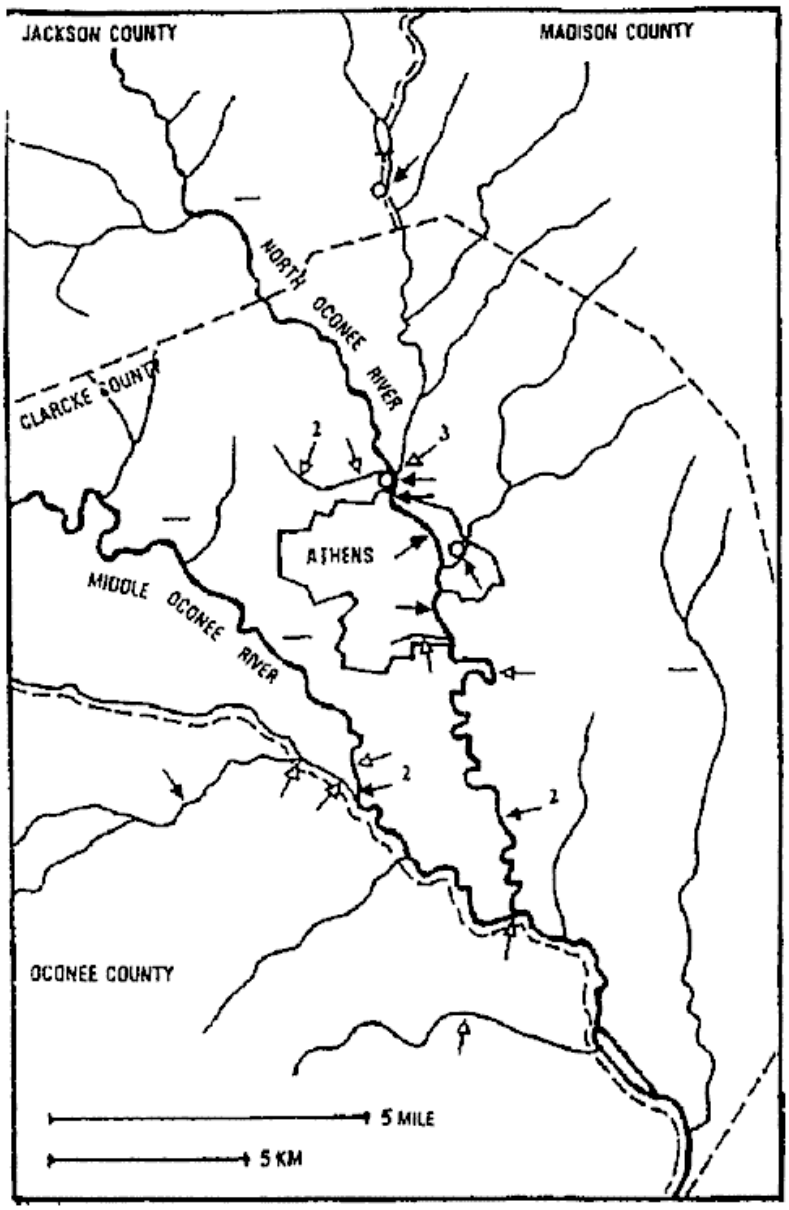

Figure 1: Signs of river otters found on 100m stretches of river/creek in the study area.
Open arrows = footprints only;
closed arrows = spraint site (often accompanied by footprints and other signs);
\- = no signs found on a 100m stretch;
O = beaver den used by otters.
If more than one individual was suspected on the basis of footprint size, then the estimated number is indicated.

At eight spraint sites otter prints could be found as well. Four spraint sites were on sand strips; four were on banks on the forest floor and one was on rock.

The sprainting activity was higher in winter than in summer; four spraint sites regularly used in winter were abandoned in the summer. One spraint site sparsely used in winter was more frequently used in summer and another one was moved 50m in summer. At four spraint sites, signs of heavy rolling in coarse sand were observed. At three of these places sliding trails were also found on the sandy banks.

One winter site was on a creek in a park close to the center of Athens. Spraints were found at the entrance of a simple beaver den. The measurements of prints from the hind foot were the smallest measured during the study (5.3cm).

Two large beaver dens in banks outside the city limits appeared to have been used by otters. One den was heavily sprainted upon but the spraints were old when found. The second one had a spraint site very nearby and trails led from and to the den. The site was frequently used in winter and irregularly in summer.

Food habits

In winter, 149 spraints were collected for food analysis, whilst in summer only 65 could be collected, a total of 214. The results of food analysis are given in Table 1.

Table 1. Food remains analysis from spraints collected in Clarcke County in 1993

	Winter (J, F, M 93)		Summer (J, J, A, S, 93)	
No. of spraints	149		65	
Estimated no. of prey (min)	745		227	
Total no. of occurrences	353		97	
	% occ	rel % occ	% occ	rel % occ
fish Pisces (total)	87.9	58.1	35.4	24.7
pickerel *Esox sp*.	4.0	1.7	3.1	1.0
minnow Cyprinidae total	26.2	11.0	3.1	2.1
Semotilus atromaculans	7.4	3.1	-	-
Nocomis leptocephalus	6.0	2.5	-	-
Unidentified minnows	14.8	6.2	3.1	2.1
sucker Catostomidae	17.4	7.3	3.1	2.1
catfish Ictaluridae total	23.5	9.9	9.2	6.2
Ictalurus punctatus	1.3	0.6	-	-
Ameiurus nebulosus	0.7	0.3	-	-
Ameiurus brunneus	1.3	0.6	-	-
sunfish Centrarchidae tot	66.4	28.0	20.0	13.4
Lepomis macrochirus	2.6	1.1	-	-
Micropterus salmoides	1.3	0.6	-	-
Unidentified sunfish	65.1	27.5	20.0	13.4
crayfish Carambaridae	79.8	33.7	98.0	66.0
frog Anuridae	4.0	1.7	7.7	5.0
salamander Caudata	1.3	0.6	-	-
snake Serpentes total	3.4	1.4	6.2	4.1
Nerodia sp.	1.3	0.6	3.1	2.1
pond turtle Testudines	0.7	0.3	-	-
bird Aves	0.7	0.3	-	-
mammals Mammalia	1.3	0.6	-	-
millipede Diploda	0.7	0.3	-	-
insect	7.4	3.4	1.5	1.0

One third of the winter food and two thirds of the summer food consisted of crayfish. Ninety percent of the crayfish remains could be identified as *Procambarus spiculifer*. This species can be seen and caught easily in the rivers and creeks around Athens where it is abundant. It is restricted to lotic habitats and can be found under stones, in litter and among roots. *Procambarus spiculifer* does not usually make burrows (HOBBS, 1981). About ten percent of the crayfish remains were identified as *Cambarus sp*.. Five species are known from the area (HOBBS, 1981), but *Cambarus latimanus* and *C. bartonii* are the species most likely to be caught. These two species only burrow under certain circumstances, while the remaining three spend all their lives in a burrow (HOBBS, 1981).

Fish are the most important source of food in the winter months. Fifty-nine percent (relative frequency) of the food remains were fish, against less than half of this in summer. Sunfishes (Centrarchidae) form the most important group eaten. It is hard to identify sunfishes to the species level; however, it was possible to identify bones and otoliths of the largemouth bass (*Micropterus salmoides*) and the otoliths of bluegill sunfish (*Lepomis macrochirus*) in this study. *Micropterus salmoides* was found rarely. About one third of the sunfish ototliths were bluegill and most of the remaining part was thought to be redbreast sunfish (*L. auritus*), considering its abundance in the area. Some spraints from winter consisted of only very small sunfish olotiths. They were of redbreasts or bluegills of the 0-generation. The largest redbreast found was estimated at about 20cm. Most sunfishes caught were relatively small.

Minnows were second in importance in the winter and the remains identified belonged either to creek chub {*Semotilus atriomaculans*) or bluehead chub (*Nocomis leptocephalus*). Because the otter eats pectoral spines of catfish, these bones can help to identify the species of catfish eaten and to estimate the fish length (PALOUMPIS, 1978). Most catfish caught were small, one brown bullhead (*Ameiurus nebulosus*) however was estimated at 28cm. Almost all suckers caught were large individuals, estimated to have been three to five years of age; judging from the annual rings of the scales found. The larger individuals were estimated at about 40cm. In 6% of the winter spraints small molluscs were found. These remains were usually associated with catfish remains and were therefore not counted as otter food.

Lead and mercury levels

The spraints with crayfish remains from eight different sites had a mean Pb concentration of 18.2 ±2.2 ppm. Spraints with fish remains, collected from two sites downstream of Athens, had a lower Pb content, at 11.9 and 12.9 ppm. The Hg-concentration of all the spraint samples was below detection and therefore lower than 0.07 ppm. The level of Hg in all freeze-dried crayfish and fish samples was below 0.07 ppm.

DISCUSSION

Food habits

Studies that analyze spraints of otters to assess their food habits may contain a certain amount of error, however, comparative research in captive Eurasian otters (*Lutra lutra*) reveals that spraint analyses tend to show a reasonable match with the actual diet (CARSS and PARKINSON, 1996; JACOBSEN and HANSEN, 1996). The results of winter food habits are comparable to the data of LAUHACHINDA and HILL (1977). They investigated the winter food habits of the otter in Alabama and Georgia by analyzing 315 digestive tracts and 12 spraints, collected from 1973 to 1977 (siltation was already a widespread problem at this time). Unfortunately, the data from Alabama and Georgia were mixed, but most otters came from Alabama. Georgia otters were mostly collected from four counties just west of Clarcke County. The relative frequencies of fish from 5 families - Centrarchidae, Catostomidae, Ictaluridae, Cyprinidae, and Esocidae, and crayfish were 50.2; 27.7; 6.2; 5.4; 3.3; 2.6 and 37.7% respectively. Indeed, Centrarchidae, Cyprinidae, Catostomidae and Ictaluridae are the most commonly mentioned fish families in reports about the food habits of river otters. These results are not very different from the results presented in Table 1, although LAUHACHINDA and HILL (1977) found slightly more amphibians and insects. Although Cyprinidae were found less than in the present study, the authors found shiners in the tracts, four times more than they found creek chubs. Even though extra attention was paid to very small fish bones, shiners and darters may have been overlooked in the present study.

It could be concluded that there was little change in the food habits of the inland river otter in the southeast since the nineteen seventies.

Crayfish, as part of the river otter's diet, is reported in many food studies. In the Smokey Mountains National Park, 95% of the summer spraints contained crayfish (GRIESS, 1987). McDANIEL (1963) examined 63 stomachs from Florida otters caught in the trapping season and noted that crayfish had a relative frequency of 17.7%.

KNUDSEN and HALE (1968) found a higher percentage offish in winter than in other seasons, whilst crayfish was eaten less frequently in this season. PARK (1971) suggests that otters eat what is available and accessible in the aquatic habitat; but could crayfish be a preferred food item?

Because of the abundance and diversity of crayfish in the southeast (PENNAK, 1978), one could expect that crayfish would be eaten more frequently in this area than elsewhere. The occurrence of crayfish in otter food of, for example, New York State and the Great Lakes Area (HAMILTON, 1961; KNUDSEN and HALE, 1968) is indeed lower than in the research of LAUHACHINDA and HILL (1977), GRIESS (1987) and the present research. However, in the three former mentioned papers, crayfish is said to be an important food source.

Pond turtles are very abundant in the study area, but only once was a pond turtle found as food (Table 1). A similar observation was made by GREER (1955). It may be that turtles are eaten more frequently but that the shell, skin and bones are left behind. This may also be true with freshwater mussels. If the shells were not eaten, it would be hard to detect consumption without direct observation. Walruses feed largely on molluscs, but remains were never found in their stomachs (LOCKLEY, 1967).

Siltation and food habits

The major environmental problem of the rivers and creeks in the study area is siltation, causing widespread disruption to the ecology of these waters (BURKHEAD et al., 1992). The problem is as old as the erosion problem, but is nowadays mainly caused by road construction or maintenance. Especially in winter, the water is highly turbid due to silt. Underwater visibility may be limited to 20cm for most of the year (own observation, 1993). Despite this, the amount of otter signs indicates a well-developed otter population, compared to data from MASON and MACDONALD (1987, 1993). In Wales, these authors found an average of 3.1 spraints per spraint site (MASON and MACDONALD, 1993), compared to 5.3 in the present research. Both species are closely related and show very similar ecology and behaviour and, therefore, this comparison can be justified.

In areas with healthy otter populations in Spain and Greece, MASON and MACDONALD (1987) found, on average, about 75% of the searched stretches positive for otters. The river otters in our study area do not, therefore, appear to be limited by the heavy siltation.

Does turbid water change the river otter's food habits? The large amount of crayfish taken could be partly induced by the heavy siltation, since crayfish are easy to catch, even in turbid water. The research of GRIESS (1987) on Abrams Creek in the Smokey Mountains National Park showed that, from April to September, crayfish was the most frequently taken food item with a frequency of occurrence of 95%, compared to 98% around Athens. Fish was encountered in 90% and 35% of the spraints resp. The water of Abrams Creek is very clear (GRIESS, pers. comm.). It cannot be concluded that the high relative frequency of occurrence of crayfish during summer around Athens is induced by heavy siltation, although relatively more crayfish (66% compared to 40%) and less fish (24% compared to 38%) were taken in summer around Athens than on Abrams Creek. Data on the relative abundance of crayfish in both places are lacking, but it is clear that crayfish is an important food source at both locations. In the present research, the majority of fish taken were Centrarchids. Apart from Centrarchidae, the Cyprinidae, Catostomidae and Ictaluridae were also important, the majority of them bottom feeders. In the research of GRIESS (1987), otters showed a preference for Cyprinidae and Catostomidae amongst fish, the species taken of these groups being mostly bottom feeders. Centrarchidae and Ictaluridae were not common in Abrams Creek; however, more bottom feeding fish were taken in the clear water of Abrams Creek than in the turbid water of Clarcke County. The preference for bottom feeding fish does not, therefore, appear to be related to turbidity.

Underwater scent as an adaptation to turbidity

Although sight is considered very important for some aquatic mammals (ERLINGE, 1968), they are capable of catching fish and other food without the use of the eyes. LOCKLEY (1967) describes a completely blind grey seal (*Halichoerus grypus*), living on a rocky coast, that didn't starve and even raised young. Also, he explains that the Weddell seal (*Leptonychotus weddelli*) often feeds in almost complete darkness under the ice. Vibrissae, according to LOCKLEY (1967), play an important role in navigation and feeding in murky or deeper water for aquatic mammals. GREEN (1977) showed that this was also true for otter, by cutting off the vibrissae of a European otter (*L. lutra*). He observed no difference in hunting success in clear water, but a significant loss of success in turbid water.

PARK (1971) points out that much of the river otters' food is caught by 'rooting around' in the mud or debris at the bottom of ponds and creeks. This behavior was also often observed in captive otters from local origin in a small zoo in Athens (own observation, 1993). PARK (1971) states that 'undoubtedly the vibrissae are important to locate food in the mud'.

In the present research, 34% of the diet from January through March consisted of crayfish, however, crayfish are not active during January and February (HOBBS, 1981) and may be very well hidden. MASON and MACDONALD (1986) state that otters in Great Britain forage for hibernating frogs in autumn and winter. KNUDSEN and HALE (1968) explained frogs and insects in the winter food by assuming that the otters did considerable digging in the bottom sediment.

Hidden immobile animals, such as crayfish in a layer of leaves or a hibernating frog, cannot be detected easily with the vibrissae. Scent may, therefore, play a major role to detect prey under these circumstances. De JONGH (1986) showed that otters could pick up chemical stimuli with their rhinarium ('wet nose') and he speculated that scent might play an important role in locating fish at close range. Threatened sunfish, chub, catfish, crayfish, etc. may also hide under stones where vibrissae cannot always reach. Such a hidden animal in turbid water may be rediscovered by scent rather than by touch. Scent seems to be generally underestimated or forgotten by several authors as a tool in hunting. The use of underwater scent may be of extra use in turbid water. The most conspicuous difference between the river otter and the European otter is that the river otter has a much larger rhinarium (MASON and MACDONALD, 1986). Because of this difference, it is possible that the river otter is better adapted to living in turbid water.

PCBs, organochlorines and heavy metals

Of the pollutants present in the environment, PCBs are the most threatening to otter populations, followed by organochlorines (MASON, 1988; BROEKHUIZEN and RUITER-DIJKMAN, 1988). HILL and LOVETT (1975), CUMBIE (1975) and HALBROOK et al. (1981) investigated pollutants in river otters in Alabama and Georgia. In Georgia (Piedmont and two areas of the Coastal Plain), levels of PCBs and organochlorines were moderately low. Only about 50% of the 94 otters from the Coastal Plains had detectable levels of PCBs and only about 24% of the 34 Piedmont otters. Average concentrations are low compared to data from European otters (MASON and MACDONALD, 1986), and are well below the level of concern of 30ppm, and even below the level of no effect (13.3ppm), as defined by de VRIES (1989). However, some individuals had levels higher than the critical level of 50ppm. Of the organochlorines, only DDE was high and was detected in more than 50% of the otters. Mercury levels were a little elevated in the Coastal Plain area (CUMBIE, 1975), but still below the levels that caused reproductive failure in mink, as found by WOBESER et al. (1976). The nineteen otters from small rivers in Alabama examined by HILL and LOVETT (1975) had even lower levels of organochlorines and PCBs than those found by HALBROOK et al. (1981).

The levels of lead in the spraints analyzed in the present research were comparable to, or lower than, that from the 450 spraints collected in four different areas in Great Britain (MASON and MACDONALD, 1986). The mercury levels in the spraints of the present research were much lower. In the crayfish and fish analyzed no elevated Hg-levels could be detected.

OSOWSKI et al. (1995) examined trapped mink from 1989 -1991 in North and South Carolina and Georgia. They suggest that mink from the Coastal Plain had suffered population declines because of

elevated mercury levels. Also, PCB levels were elevated compared to the controls. Mink from the Piedmont area were used as controls. Average PCB levels in 14 mink from three different counties just west of Clarcke County were 0.005 ppm (wet weight liver) while mercury levels were 0.57 ppm (wet weight in kidney). The level of organochlorines and PCB's was recently measured in a dam lake fed by the Oconee River south of Athens (Department of Natural Resources, EPA, Atlanta; personal communication). The levels of these pollutants were very low. The Oconee rivershed is known to be more pristine than many other riversheds in Georgia (Freeman, pers. comm.).

From the above it could be concluded with some optimism, that river otters in the study area were, and are presently, not exposed to critical levels of organochlorines, PCB's, lead and mercury. Micropollutants were probably not a real obstacle for the recovery of the river otter in the area. The restoration of riparian forests, reduced trapping and the return of beavers, however, may have facilitated the return of the otter.

CONCLUSIONS

At present, the river otter population in Clarcke County in the Piedmont area is well developed. The food of the river otter in the study area consists mostly of crayfish and sunfish. Especially in the summer, crayfish is very important. When comparing food habits in winter in the 1970s (LAUACHlNDA and HILL, 1977) in Alabama and Georgia (when siltation was already widespread) with data of the 1990s, little difference was found. Food habits of the river otter are similar in both clear and turbid water. The problem of siltation does not, therefore, appear to affect the river otter population or change its food habits. Micropollutant levels in river otters in the area have been relatively low in the past, and remain so presently, as the exposure to micropollutants still seems to be below critical levels.

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RÉSUMÉ: LA LOUTRE DE RIVIÈRE NORD-AMÉRICAINE (*Lontra canadensis*) DANS LE COMTÉ DE CLARCKE (GEORGIA, USA): ÉTUDE DU RÉGIME ALIMENTAIRE ET DES FACTEURS ENVIRONNEMENTAUX

Le statut de la loutre de rivière nord-américaine (*Lontra canadensis*) a été étudié dans et aux environs du Comté de Clarcke (Georgia, USA). Bien qu'ayant presque disparu dans les années 50, la population de loutres apparaît florissante actuellement. Le régime alimentaire a été étudié par l'analyse d'épreintes en hiver et en été. Perches (Centrarchidae) et écrevisses sont les proies majoritaires. Nous avons cherché à tester si les loutres de ce secteur sont affectées par les pollutions environmentales. Des données de la littérature et la recherche de quelques métaux lourds suggérent que l'exposition aux pollutions chimiques est relativement faible. La sédimentation des rivières et ruisseaux n'apparaît pas porter atteinte à la loutre ni modifier ses habitudes alimentaires.

RESUMEN: LA NUTRIA DE RÍO (*Lontra canadensis*) EN EL CONDADO CLARCKE (GEORGIA, USA): UN RELEVAMIENTO, HÁBITOS ALIMENTICIOS Y FACTORES AMBIENTALES.

Se relevó el estado de la nutria de río (*Lontra canadensis*) en y alrededor del condado Clarcke (Georgia, USA). A pesar de haber estado casi extinguida en los años cincuenta, la población de nutrias parece actualmente en buenas condiciones. Se estudiaron los hábitos alimenticios a través de un relevamiento de fecas en verauo e invierno. Se encontró que los items alimenticios más importantes son cangrejos y langostas de rio. Se intentó evaluar si las nutrias en el área de estudio son afectadas por polución ambiental. Datos de la literatura y algunos análisis de metales pesados mostraron que la exposición a polución química ha sido relativamente baja. La silvatación de ríos y cañadas no parece dañar a las nutrias o modificar sus hábitos alimenticios.

REPORT

DISTRIBUTION AND POPULATION STATUS OF THE GIANT OTTER *Pteronura brasiliensis* IN BOLIVIA

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Abstract: The giant otter (*Pteronura brasiliensis*) is one of the most endangered mammal species in the Neotropical region. In Bolivia, it has been reduced to very low population numbers as a result of poaching in the 40s and 70s. Recently, 14 researchers on the giant otter, who together estimated that around 350 individuals exist in Bolivia, published a preliminary distribution map. In this report, we briefly present the most recent information on the distribution and population status of this species in the Bolivian Del Plata and Amazon river basins. Moreover, we comment on the superposition of giant otter family groups, hydro-ecoregions, and National Parks. Finally, we present a short discussion on the possibilities of interchange between Bolivian giant otter subpopulations.

INTRODUCTION

The giant otter (*Pteronura brasiliensis*) used to be a common sight in the Bolivian river floodplains. As in all neighbouring countries, the species was decimated to the border of extinction by poaching between the 1940s and 70s. Between 1975 and 1995, the species was only known from very isolated locations in the Mamoré, Iténez and Madre de Díos basins (DUNSTONE and STRACHAN, 1988; CAMERON et al., 1989; BARRA et al. 1992). On a continental scale, Bolivia represented one of the black spots on the distribution map of the giant otter (EISENBERG and REDFORD, 1999). This pessimistic view changed with the discovery of relatively healthy populations in the Iténez-Guaporé river basin by PAINTER et al. (1994), GONZÁLES JIMÉNEZ (1997), FRASER et al. (1993), van DAMME et al. (2002) and PALMER (pers. comm.). These authors reported a minimum total population of 350 individuals, organized into more than 40 family groups. The present report summarizes the distribution and population status of this species. We also discuss the protection status of the respective giant otter populations and the possibilities of interchange between neighbouring populations. This report is a brief summary of a recently published review (van DAMME et al., 2002).

METHODS

The present report is based on field observations from the period 1993-2002. Some of the observations have been published in scientific articles (TEN et al., 2001), but most were only available in relatively inaccessible reports (FRASER et al., 1993), Management Plans of National Parks (FAN-WCS, 1994; PAINTER et al., 1994), RAP expedition reports (EMMONS, 1998) and student theses (GONZÁLES

JIMÉNEZ, 1997; SARAVIA, unpubl.). None of the previously mentioned authors used a standardized methodology, though there are some constant patterns in their approach. For example, most observed otters from a boat, which in most cases was equipped with an outboard motor. Some observations were made in the framework of other studies on neotropical mammals.

FRASER et al. (1993) conducted a study on giant otters in the River Iténez. GONZÁLES JIMENEZ (1997) and van DAMME et al. (2002) focused their attention on the River Paraguá, on the western border of the Noel Kempff Mercado National Park. PAINTER et al. (1994) conducted field surveys in the Blanco, Negro, Negro de Caimanes and San Martin rivers, whereas TEN et al. (2001) focused on more downstream segments of the latter river and other rivers in the Iténez National Park. In addition, isolated observations were made by REBOLLEDO and QUIROGA (unpublished data) in the Bolivian Pantanal, VARGAS (unpublished data) in the Etanahua river (Madidi River basin), TORRES (unpublished data) in the Ipurupuru River (Iténez-Guaporé basin), and WALLACE, PAINTER, TABER and RUMIZ (unpublished data) in the Iténez-Guaporé, Negro and San Martin rivers (for a summary see van DAMME et al. 2002).

RESULTS

Distribution and population status

Distribution data are presented in Fig. 1. More detailed results can be obtained in van DAMME et al. (2002).

In Bolivia the largest populations of giant otter occur in the **Iténez-Guaporé** river basin. In this basin, four important populations were reported:

- a rather large population in the Parque Nacional Noel Kempff Mercado and its surroundings, in the upper Iténez-basin (EMMONS, 1998; FRASER et al., 1993; GONZÁLES JIMÉNEZ, 1997, WALLACE and PAINTER, unpublished data; van DAMME et al., 2002; PALMER, pers. comm.). Most of the giant otters were found in the rivers (Iténez, Paraguá, Tarvo) and dead river arms that border the National Park. This population probably consists of more than 100 individuals.
- a subpopulation in the middle Iténez basin and in the lower parts of some tributaries, e.g. San Martin, in the Iténez Reserva and its surroundings (TEN et al., 2001; TEN, unpublished data). This population consists of more than 120 individuals.
- a smaller population in the upper parts of the same tributaries, i.e. the Ríos Blanco y Negro Wildlife Reserve and surroundings (PAINTER et al., 1994;GONZÁLES JIMÉNEZ, 1997; RUMIZ, unpublished data). This population consists of around 44 individuals.
- a very small isolated population was recorded in the Upurupuru and Negro Caimanes rivers, in the lower Iténez river basin. In contrast with the above-mentioned rivers, these do not drain the Precambrian Shield, but the Beni alluvial lowlands.

Figure 1: National Parks and Giant otter populations in Bolivia

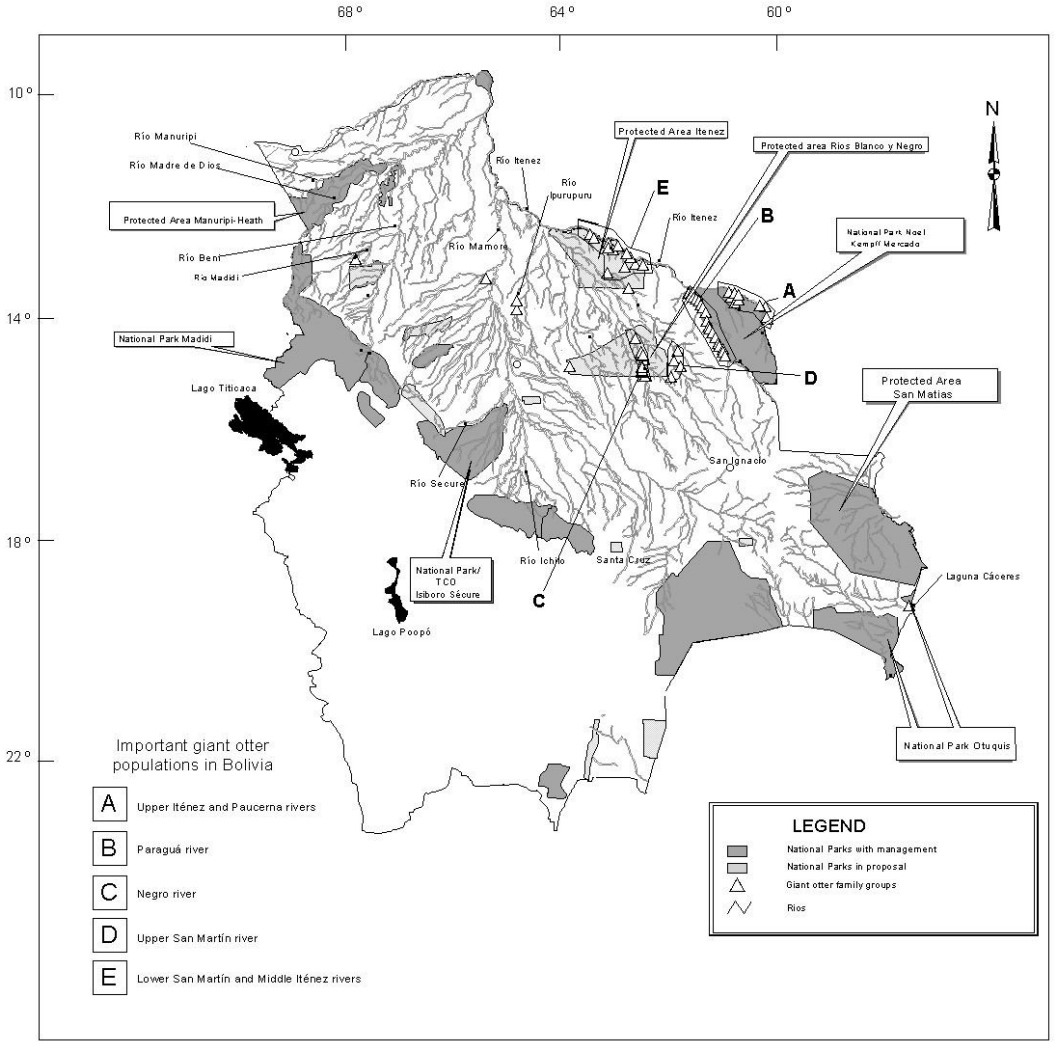

Table 1. Surveys for *Pteronura brasiliensis* in Bolivia (1992-2002)

AUTHOR	SURVEY YEAR	STUDY AREA	RIVERS	HABITAT	POPULATION ESTIMATES
PALMER (unpubl. data)	2001	National Park Noel Kempff Mercado	Iténez, Paraguá, Paucerna, Verde	River channels and old river arms that are permanently connected with rivers	Not Published
van DAMME et al (2002)	2001	National Park Noel Kempff Mercado / Indigenous Territory Bajo Paraguá	Río Paraguá	Paraguá river channel, river arms permanently connected with river, lakes of fluvial origina	Paraguá: 21 groups / 76 ind.
TEN et al (2001) TEN (unpubl. data)	2001	National Park Iténez	Iténez, Negro de Iténez, San Martin, San Simón, San Antonio	Rivers and lakes	San Martin: 89 ind. Iténez: 6 groups / 40 ind.
GONZALES JIMÉNEZ (1997)	1995	National Park Noel Kempff Mercado / Indigenous Territory Bajo Paraguá	Río Paraguá, San MArtin	River channels and old river arms that are permanently connected with rivers	Paraguá: 12 groups / 27 ind.
PAINTER et al (1994) WALLACE (unpubl. data)	1992	Wildlife Reserve Ríos Blanco y Negro	Blanco, Negro, Negro de Caimanes	Rivers and streams	Negro: 12 groups / 44 ind.
FRASER et al (1993)	1992	National Park Noel Kempff Mercado	Iténez, Paucerna, Verde	River channels and old river arms that are permanently connected with rivers	Verde: 1 group / 2 ind. Paucerna: 2 groups / 9 ind. Iténez: 6 groups / 26 ind.

In the **Mamoré** river basin, very few giant otters have been recently observed. In the upper Mamoré basin, some historical records exist. The last known group in the Ichilo river basin (in an oxbow lake of the Sajta river) was extinguished a few years ago. The last giant otters in this river basin may occur in the Isiboro-Sécure National Park, where indigenous people have observed them.

Finally, in the most western parts of the Amazon basin, in the **Madre de Díos** and **Beni** river basins, individual otters or isolated family groups were recently recorded in the Heath, Madidi, Etanahua, Tuichi, Hondo, Quiquibey, Emero and Tequeje rivers (WALLACE et al., unpublished data; MONTAMBAULT, 2002; VARGAS, unpublished data). CARBAJAL (pers.comm.) recently observed a group of 8 giant otters in the Manuripi-Heath National Park (not indicated in Fig. 1). A systematic survey of these rivers has not been carried out so far.

In the basin of the **Paraguay river**, the giant otter has not been studied very well, though it may be expected to occur given its proximity to the Brazilian pantanal, where a relatively large population of

giant otters occurs (SCHWEIZER, 1992). Recently, a family group was observed in the Cáceres lake, within the Otuquis National Park (REBOLLEDO Y QUIROGA, pers. comm.).

Habitat selection

Recently, NAVARRO and MALDONADO (2002) proposed a classification of Bolivia in hydro-ecoregions. Within the distribution range of the giant otter in the Amazon and De Plata basins, they distinguished three hydro-regions: the alluvial lowlands, the Precambrian Shield and the Oriental Mountain Ridge (Table 2).

Table 2: Number and percentage of individual *Pteronura brasiliensis* reported in different hydro-ecoregions (division in hydro-ecoregions based on NAVARRO and MALDONADO, 2002)

No	HYDRO-ECOREGIONS AND SECTORS	PAST OR PRESENT OBSERVATIONS [1]	TOTAL NUMBER OF INDIVIDUALS REPORTED[2]	% OF INDIVIDUALS[2]
HYDRO-ECOREGION: ALLUVIAL LOWLANDS				
1	Holocene deposites	+	0	0
2	Fluvial seasonal alluvial lowlands	+	19	5.1
3	Fluvial alluvial lowlands	+	0	0
4	Dry alluvial lowlands	-	0	0
5	Chaco Piedemonte	-	0	0
6	Hills, Ridges and Mesetas	-	0	0
HYDRO-ECOREGION: PRECAMBRIAN SHIELD				
7	Alluvial lowlands of the Precambrian Shield		340	90.4
8	Penillanura laterítica	+	17	4.5
9	Chiquitano mountain ridge and mesetas	-	0	0
10	Mesetas from the Precambrian Shield	-	0	0
HYDRO-ECOREGION: ORIENTAL MOUNTAIN RIDGE				
11	Fluvial seasonal mountain ridge and hills	+?	0	0
12	Fluvial mountain ridge and hills	+?	0	0
13	Fluvial seasonal sub-Andean valleys	+?	0	0
14	Fluvial seasonal Piedemonte	+	0	0

[1] + Present

\- Absent

+? Probably present (based on anecdotal / historical reports)

[2] Anecdotal and historical reports were not included

Among the sectors that can be distinguished in these hydro-regions, the giant otter was most often reported in the alluvial lowlands of the Precambrian Shield (88.5% of all individuals), overlapping with the floodplain of the Iténez-river and some of its tributaries (Paraguá and San Martin rivers). Fewer individuals were recorded in the Fluvial alluvial lowlands of the white-water floodplains of the Mamoré and Madre de Díos rivers, whereas in other sectors only anecdotal and historical reports were available. Overall, more than 85% of the observations so far were made in small rivers, most of them draining the Precambrian Shield. So far, very few giant otters have been reported in white-water oxbow lakes, though they are expected to occur.

Protection status of the giant otter

Current data (Table 3) suggest that only 7% of giant otters can be found in protected areas with a management plan. Twenty four percent were observed in rivers that are borders between National Parks and indigenous territories. Eight percent were found in international rivers that represent the border of Bolivian National Parks and 61% were found in areas without adequate official protection status.

Table 3: Number and Percentage of Pteronura brasiliensis reported from National Parks, Indigenous Territories, areas in the process of titulation, areas without protection, in rivers that represent limits between different types of areas and in international rivers

CATEGORY	NUMBER OF INDIVIDUALS REPORTED	% OF INDIVIDUALS REPORTED
Within protected areas	27	7.0
Immovilized parks (with management plan) partly superposed with indigenous territories	134	34.7
Within National Parks with uncertain conservation status	45	11.7
Within Indigenous Territories (TCO) [1]	0	0
In rivers that are borders of National Parks and Indigenous Territories	86	22.3
In international rivers (Brazil, Peru) that are at the same time borders of National Parks	68	17.6
Areas without official protection status	26	6.7

[1] The giant otters observed in the TCO Tacana were not included

DISCUSSION

The giant otter is a rare species in Bolivia and is found only in National Parks and in remote areas. According to preliminary estimates, the minimum population size is 350 individuals. However, the effective population size is much smaller, considering that each family group consists of only two adults. The population status is particularly alarming in the white-water floodplains of the Amazon (Mamoré, Beni and Madre de Díos river basins), though low estimates may partly reflect low research effort in this area. In the Iténez-Guaporé river basin, however, relatively healthy populations can be found in the black-water floodplains of the rivers San Martin, Paraguá, Paucerna, Iténez and Negro.

One of the central issues in conservation science is the degree of isolation of animal populations. EISENBERG (1989) and EISENBERG and REDFORD (1999) indicated that the actual giant otter populations have a patchy distribution in the Amazon, with little possibilities of gene interchange. Connection of Peruvian and Bolivian populations in Peru is highly probable considering the conservation status of the border area (Bahuaja-Sonene and Madidi National Parks in Peru and Bolivia, respectively). The nearby populations in Brazil (> 500 ind.) can be found in the Bolivian Pantanal (SCHWEIZER, 1992; CARTER and ROSAS, 1997), but connection between the Amazon and Pantanal populations is less probable given the fact that the Pantanal belongs to the La Plata river basin and that interchange can only be realized over land, which is heavily affected by deforestation. In the Brazilian states of Rondonia and Mato Grosso, some conservation units neighbouring the Noel Kempff Mercado and Iténez National Parks might also harbour giant otters, though so far there are no otter reports from these areas.

Within Bolivia, connection between the upper Iténez and middle Iténez populations is highly probable (subpopulations A and E in Fig. 1). The major human impact on this river is commercial navigation and commercial fisheries, but it is thought that these activities do not disrupt the function of the River Iténez as a corridor for giant otters. The population in the upper San Martin and Negro rivers (subpopulations C and D in Fig. 1) may be relatively more isolated as they are separated from the lower river populations by a colonized area, characterized by increased deforestation and habitat destruction. Interconnections of the populations of the Blanco y Negro protected area (subpopulations C and D in Fig. 1) and the Noel Kempff Mercado National Park (subpopulation B) might be realized by

individuals that cross terra firma forest. According to some authors (WALLACE, pers. obs.) giant otters may cross high forest stretches, but the relative importance of this terrestrial route is not known.

In Surinam and Guyana, the giant otter seems to prefer slow-moving rivers with transparent water (DUPLAIX, 1980; LAIDLER, 1984). This also seems to be the case in Bolivia, where giant otters are predominantly found in the so-called black- or clear-water rivers that drain the Precambrian Shield. These rivers are characterized by a high water transparency, abundance of submerged and emergent macrophytes (KILLEEN and SCHULENBERG, 1998) and the occurrence of steep riverbanks. The giant otters prefer the downstream segments of these rivers, upstream parts probably not providing enough food to sustain viable populations.

In the past, giant otters probably inhabited white-water oxbow lakes, an otter habitat similar to the one described for this species in the Manú and Bahuaja-Sonene National Parks in Peru (SCHENK and STAIB, 1998; GROENENDIJK et al., 2001), and in lakes of tectonic origin. This is indicated by their relict presence in these habitats in the white water floodplains of the rivers Mamoré, Beni and Madre de Díos. There are also indications that they occurred historically in the clear water tributaries of these white water rivers. The white water river channels themselves were possibly used as corridors for colonization of new river stretches or lakes.

There are strong indications that general habitat characteristics determined the original distribution patterns of giant otters in Bolivia. Other factors, such as food availability, and carrying capacity may become important in smaller river basins where the carrying capacity for giant otters is reached, such as on the rivers Paraguá, San Pedro and San Martin in the Iténez river basin. In some of these rivers, competition for fish with fishermen may already occur (van DAMME et al., in prep.). The spatial distribution and the abundance of the fish resource may also determine giant otter group size. For example, in the lower San Martin river, large groups of up to 20 individuals (possibly 2 or 3 family groups that temporally feed together) are sometimes formed around fish-rich river stretches that dry up in summer (TEN, pers. obs.).

Nevertheless, current distribution pattern of giant otters in Bolivia may reflect the ease of human access to areas where giant otters originally occurred. The giant otter is extremely susceptible to hunting pressure. Its large size, diurnal activity and social behaviour make it an easy prey for fishermen who assert that giant otters compete with them for fish, and to occasional hunters in search of a trophy (OJASTI, 1996; GROENENDIJK et al., 2001). The negative correlation between human population density and otter occurrence suggests that human presence represents a major threat to the species and is probably related to the booming skin trade of the last century, In Bolivia, occasional kills, habitat loss and disturbance caused by river traffic seem to be important causes of current population stagnation or decrease (van DAMME et al., 2002). Mercury contamination (MAURICE-BOURGOIN et al., 1999) and demographic isolation of populations may represent additional threats that will need to be seriously considered in the future. This situation makes the development of national research and conservation strategies for the species a pressing priority, particularly given the flagship nature of the species, the globally threatened situation for giant otters, the probable ecological importance of the species, and the potential economic importance in terms of ecotourism opportunities.

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RÉSUMÉ: RÉPARTITION ET STATUT DES POPULATIONS DE LOUTRES GÉANTES *Pteronura brasiliensis* EN BOLIVIE

La loutre géante (*Pteronura brasiliensis*) est l'une des espèces de mammifere les plus menacées de la ceinture néotropicale. En Bolivie, les effectifs des populations se sont effondrés du fait du braconnage durant les années 50 et 60. Récemment, 14 lutrologues ont produit une première carte de répartition, estimant à environ 350 l'effectif total de loutres géantes subsistant dans le pays. Le présent article rapporte brièvement les connaissances les plus récentes concernant la répartition et le statut des populations de l'espèce sur les bassins boliviens de 1'Amazone et du Rio del Plata. Est ensuite étudiée la correspondance entre groupes familiaux de loutres, hydro-ecorégions et Parcs Nationaux. Les possibilités de brassage entre différéntes sous-populations boliviennes de loutres sont enfin discutées.

RESUMEN: DISTRIBUCIÓN Y ESTADO POBLACIONAL DE LA NUTRIA GIGANTE *Pteronura brasiliensis* EN BOLIVIA

La nutria gigante (*Pteronura brasiliensis*) es uno de los mamiferos más amenazados de la región Neotropical. En Bolivia ha sido reducida a muy poco números como resultado de la caza durante los 50s y 60s. Recientemente 14 especialistas en nutrias han publicado un mapa preliminar de distribución en el que se estima que aproximadamente unos 350 individuos existen en Bolivia. En esta nota presentamos brevemente información mas reciente sobre la distribución y el estado poblacional de esta especie en la cuenca boliviana de los ríos Amazona y del Plata. Además comentamos la superposición de grupos familiares de nutria gigante con hidroregiones y parques nacionales. Por ultimo, presentamos una breve discusión sobre las posibilidades de intercambio entre las subpoblaciones bolivianas de la especie.

REPORT

HISTORICAL AND ACTUAL PRESENCE OF THE GIANT OTTER (Pteronura brasiliensis) ON THE LOWER META RIVER, DEPARTMENT OF CASANARE - COLOMBIA ORINOQUIA

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Abstract: There has been little information published about the distribution of giant otters (*Pteronura brasiliensis*) in Colombia, and recent distribution maps have failed to include the Department of Casanare as having giant otters present. Some ancient chronicles, however, record giant otter occurrence in the Colombian Orinoquia, as well as the value of its skin. It is believed that since 1974, when the commerce of skins ceased in Colombia, populations of this species have recuperated in this area. In this paper we confirm the presence of giant otters in this part of the country, and provide identification of individuals sighted through neck patterns

INTRODUCTION

Unfortunately, information on the distribution and status of giant otter (Pteronura brasiliensis) populations in Colombia is fragmented, despite being considered Critically Endangered (RODRIGUEZ, 1998) or Endangered (HILTON-TAYLOR, 2000) and being included in Appendix I of CITES. Distribution maps published to date by CHEHEBAR (1990), CARTER and ROSAS (1997), EMMONS (1997) and SCHENCK (1999) fail to include the Department of Casanare as part of the species' distribution range. In the Colombian mammals list, published by ALBERICO et al. (2000), the presence of *P. brasiliensis* is recorded in the Amazonía (Department of Amazonas) and Orinoquía regions (Departments of Arauca, Vaupés and Vichada), but fails to include the Department of Casanare.

Several studies have provided valuable data on the ecology of the giant otter in different areas of Colombia. DEFLER (1983, 1986) undertook censuses along 1750 km of fluvial system at the Natural National Park El Tuparro in the Department of Vichada, finding 163 individuals in 30 groups. MARTINEZ (1998) found 40 sites used by the species and she observed 2 groups and 3 solitary individuals in the River Metá and small tributaries of the River Caquetá in the Department of Amazonas. VALBUENA (1999) determined the population size in the low river basin of the Bita river in the Department of Vichada and found a mean density of 0.8 individuals/km^2. GÓMEZ (1999) characterized the foraging ecology of the species in the same area as VALBUENA (1999), through faecal analysis and direct observation of individuals feeding. BOTELLO (2000) studied the ecology and behaviour of the species in the low Apoporis river, Colombian Amazonia, and found a density of 0.8 otters/km of river. BOTELLO (pers. comm.) is currently monitoring populations he previously observed (BOTELLO, 2000) in the low Apoporis river.

Chroniclers and missionaries accompanying Spanish conquistadors during the Conquest and subsequent colonisation often documented the presence of fauna in the Colombian Orinoquia region. One of those chroniclers, R.P. Joseph Gumilla (GUMILLA, 1791), recorded the presence of the giant otter and the quality of its skin: "In Arauca, Apure, Duya, Cravo and many other rivers draining to the Orinoco river, there are lots of wolves or water dogs, as large as a hunting dog; they are otters, but the subtlety and smoothness of the water dog's hair, called "guacbi" by the Indians, exceeds by far that of the otter's skin, and the smooth touch of silk. They swim with great lightness and they eat fish; they live in the water as well as on land, although they always go to the river to eat...". The R.P. Felipe Salvador Gilij (Biocolombia 1996) accurately describes the presence of the giant otter in the region: "In waters of the Orinoco river, and a lot more in neighbouring lakes and rivers, there are certain animals similar to dogs. In fact, the Spaniards call it water dog. They are as large as dogs and they even bark like them. Its fur has a reddish and black colour, it is smooth to touch and universally valued...". In the canon José Cortés de Madariaga's voyage diary of 1811, appears a reference regarding the occurrence of the species in a tributary of the Metá river: "In the passage of Rionegro river I did not find any rational creature....; I only saw some tapirs and baquiras (Peccary) crossing the river, a diverse multitude of aquatic wolves, snakes and a diversity of fishes..." (reported in VELANDIA, 1992).

This type of historical chronicle is useful for getting an idea of the possible changes in the distribution of this species due to habitat destruction or action of excessive hunting pressure.

Between 1950 and 1975, the species was overexploited for the value of its skin. Before this period, it is believed that giant otters were widely distributed in the rivers, streams and lagoons of the Orinoco and Amazonas River basins, in the geographical regions known as Orinoquia (Llanos Orientales) and Amazonia (DONADIO, 1978, HERNANDEZ-CAMACHO, pers. comm.). It is believed that after 1973, when hunting was prohibited, and after 1974, when the commerce for skins ceased in this country (DONADIO, 1978), populations of this species have recuperated. Currently, there is little information published about the zones in which the species remains and in which it has recuperated.

In order to increase information about the distribution and the actual status of this species in Colombia, we present data collected during a visit to a sector of the Casanare Department (Colombian Orinoquia). Through this, we confirm its presence in this zone of the country and we provide a basis for future studies.

STUDY AREA

The area studied was located around and in the La Lorena Herd (Property of the Yamato Foundation), near the Village of La Hermosa (5°32'30"N - 70°26'36"W), in Paz de Ariporo, Casanare Department, Colombia (Fig. 1). Its physio-geography corresponds with the Poorly-Drained Orinoquia, whose topography is plane and plane-concave, having savannas crossed by streams and lagoons. Drainage is poor and floods occur in the rainy season (CORTES, 1986, SARMIENTO, 1994). According to the Ramsar Convention classification of Natural Wetlands (NARANJO et al. 1999), these habitats are part of the fluvial system and flooded savannas of the Metá River.

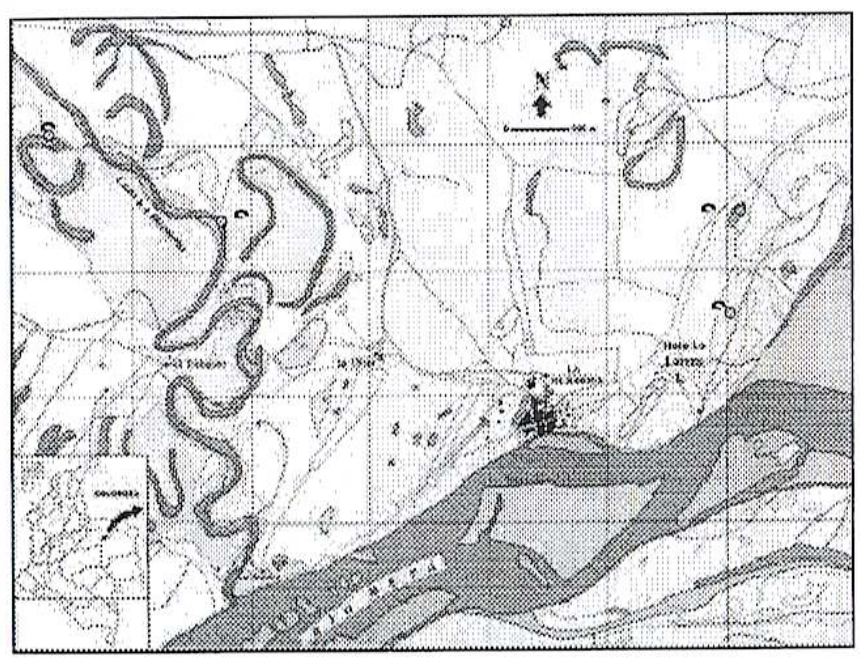

Figure 1: Location of the study area. Department of Casanare, Colombia. Blue dots correspond to places visited.

METHODS

In March 1999, during the dry season (low waters), in order to confirm the presence of this species, preliminary data were collected over 10 days, surveying approximately 50 ha of riparian forest. These preliminary surveys were relatively random, in that we visited sites suggested by local people, rather than undertaking a standard survey method. In such places we established fixed points for direct observations using a video camera, and we explored the area to locate campsites of the otters. Total time of observation of giant otters was 51 min. 15 sec. In addition, we carried out interviews with those persons that had had some interaction with the species, in order to assess the relationship of local people to the otters.

RESULTS AND DISCUSSION

We visited a forest patch (approximately 17 ha.) located 2 km from La Hermosa village, where we found a small seasonal lagoon (Site A, Fig. 1). We observed two adult otters fishing and eating in the water from a fixed point for a period of 5 min 35 sec. One of the otters was identified by its pattern of neck spots (Fig. 2a and 3a). The next day, we visited a different lagoon, approximately 1.25 ha in area (Site B, Fig. 1).

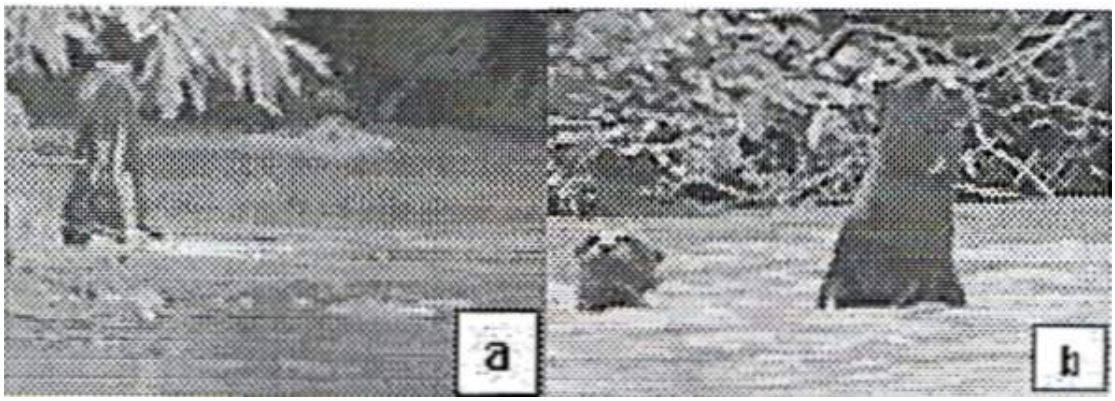

Figure 2: Otters sighted in a) Site A, and b) Site B. Department of Casanare, Colombia.

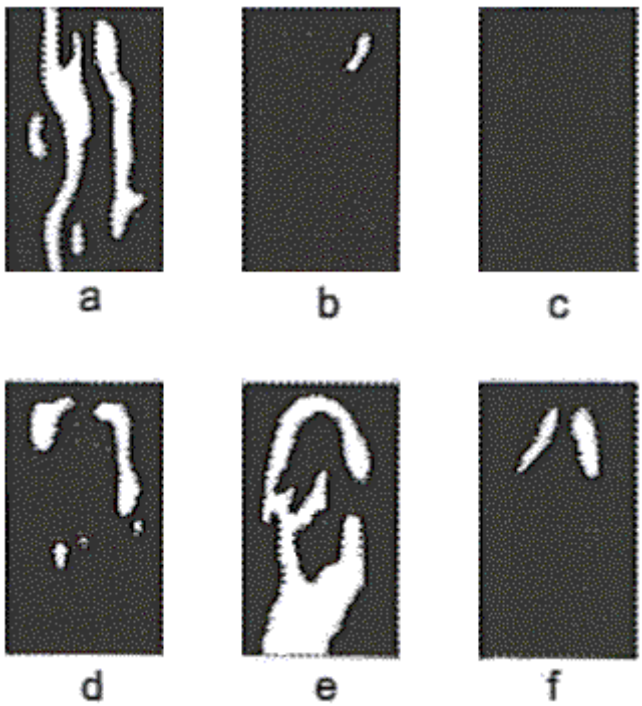

Figure 3: Neck patterns of otters sighted, a) Site A. b-f) Site B. Department of Casanare, Colombia.

There, from a fixed point, we observed a family group of giant otters, composed of eight individuals, two of which were identified as cubs, for 38 min 8 sec. The group was moving over a small area and fishing and eating close to the lagoon's border, where we located its campsite. On a second day, this group was observed from a boat for 7 minutes in the same place. Using a video camera, we were able to identify five ofn the eight individuals by the pattern of spots on the neck (Fig. 2b and 3b, c, d, e, f). In addition, we visited some sites around the La Hermosa stream at Site C (Fig. 1), where we explored approximately 250 m of the stream course; however, no sign of giant otters was found. At Site D (Fig. 1), we found old otter campsites in a lagoon of approximately 25 ha). Local inhabitants reported that otters had recently been present at this site.

A total of seven interviews were made. With the information collected we obtained an idea of the human-otter-habitat interaction We were able to highlight four main negative interactions between otters and humans that might affect the otters continued recuperation in the Department of Casanare:

a. Sometimes people shoot them, or shoot at them to frighten them away, as they consider that all otters eat their fishes.
b. Forest destruction for logging and cultivation has increased the pressure on the otter's habitat.

c. Sometimes people hunt them to use its skin to manufacture articles such as clothing
d. People capture cubs to keep them as pets.

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RÉSUMÉ: PRÉSENCE ACTUELLE ET HISTORIQUE DE LA LOUTRE GÉANTE (*Pteronura brasiliensis*) SUR LE COURS INFÉRIEUR DU RIO META, DÉPARTEMENT DE CASANARE -VERSANT COLOMBIEN DU BASSIN DE L'ORÉNOQUE.
Peu d'informations ont été publiées concernant la répartition des loutres géantes (*Pteronura brasiliensis*) en Colombie. Quelques archives anciennes rapportent la presence de l'espèce sur le versant colombien de l'Orénoque, ainsi que la valeur de sa fourrure. On considère que depuis 1974, lorsque le commerce des fourrures a cessé dans le pays, les populations de loutres ont spontanément repris. Ce présent article vise à confirmer la présence des loutres géantes dans cette partie du pays, et à preciser l'identification des individus par l'observation des taches de la nuque.

RESUMEN: PRESENCIA ACTUAL E HISTÓRICA DE LA NUTRIA GIGANTE (*Pteronura Brasiliensis*) EN EL BAJO RÍO META, DEPARTAMENTO DE CASANARE - ANTIOQUÍA COLOMBIANA.
Hay poca información publicada sobre la distribución de las nutras gigantes (*Pteronura brasiliensis*) en Colombia. Algunas crónicas antiguas reportan la ocurrencia de la nutria gigante en la Antioquía colombiana así como el valor de su piel. Se cree que desde 1974, cuando el comercio de pieles en el país cesó, las poblaciones de esta especie se han ido recuperaudo. En esta nota queremos confirmar la presencia de nutrias gigantes en esa parte del país, y brindar información sobre los individuos identificados a través del patrón de manchas en su cuello.

REPORT

NEW INFORMATION ON THE PREDATION OF FISH EATING BIRDS BY THE EURASIAN OTTER (*Lutra lutra*)

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Abstract: The Eurasian Otter (*Lutra lutra*) mainly eats aquatic and

semiaquatic prey (such as fish, crabs, amphibians and snakes), although in some places, and at some times, mammals, birds and insects can represent a significant part of the diet. A meticulous review of the literature shows a few cases of otters preying on large birds. Three cases are examined: a heron killed and eaten by a wild otter in the Pyrenees, gulls killed and eaten by an escaped otter near Barcelona, and a red kite caught by a captive otter, but rescued by staff, at the Pont de Suert otter centre in the Pyrenees. Further research is needed to establish whether otters are superpredators of birds and play a role in population control.

The Eurasian otter (*Lutra lutra*) feeds mainly on fish in the wild, but amphibians and other types of prey, including birds, can be important in certain areas or times of the year. In most regions of Europe, including the Mediterranean area, ducks (*Anas*, especially *A. plathyrhynchos*), Moorhen (*Gallinula chloropus*) and small songbirds are the types of bird most frequently consumed, although usually to a very small degree in overall proportionate terms (see summary in RUIZ-OLMO and PALAZÓN, 1997). A detailed study of available literature (e.g. see summaries in MASON and MACDONALD, 1986; KRUUK, 1995) shows that the Eurasian Otter does not regularly consume predatory birds. GREEN (2000) provides some interesting data showing that pheasants (*Phasianus colchicus*), wrens (*Trogoldytes troglodytes*), song thrushes (*Turdus philomelos*), geese (*Anser* sp.) and gulls (*Larus* sp.) were all caught and eaten by otters (*Lutra lutra*) in captivity, and that Crows (*Corvus corax*) and Grey Heron (*Ardea cinerea*) were chased off whilst attempting to steal their fish. These data show *L. lutra* is capable of catching relatively large birds (on occasions weighing up to several kg), although these birds are generally non-predatory. At most, according to general opinion, the otter just scares such predatory birds off because they compete for food, although in one case a Yellow-legged Gull (*L. argentatus*) was caught. This gull is an aggressive species, capable of catching large prey, stealing prey (kleptoparasitism), and strongly defending itself. For example, POLECHLA et al. (1993) reported cases of a Mew Gull (*Larus canus*) attacking *Lontra canadensis*, but it was also pointed out that this was probably related to kleptoparasitic behaviour. According to these authors, three other species: the Common Crow, the Bald Eagle (*Haliaetus albicilla*) and the Osprey (*Pandion haliaetus*), act in the same way towards this species of otter.

In this report, we highlight some more interesting data on otters preying on ichthyophagous predators:

1. The first case refers to a Grey Heron, apparently caught and eaten near the Noguera Ribagorçana River (Pyrenees, Lleida, Spain) in February 1990. In mid-winter, an adult sized heron corpse was found five metres from the riverbank next to a large rock, where it had apparently either been caught or dragged by the otter. Wounds on the heron were compatible with an Otter attack. Otter tracks (probably of a male) found in the mud led away from the river and surrounded the grey heron (which had been pulled from the water). Part of the heron's pectoral muscle mass had been eaten and the area was strewn with feathers that showed the typical feather bite of a carnivore. This, together with one dropping on top of the heron carcass, certainly suggests an otter was responsible. The harsh mid-winter climate, combined with the difficulty of catching food, may have weakened the heron, making it easier to catch. No other occurrence such as this has been reported during 18 years of *L. lutra* studies in Spain and no heron remains have been found in thousands of analysed droppings.

2. One otter, from a reintroduction project in NE Spain, escaped from an enclosure in the town of Barcelona. This animal was living completely free for some weeks (January and February 1996) in the Ciutadella Park (Deli Saavedra & Jordi Ruiz-Olmo, unpublished). The otter intensively used two artificial lakes where several species of fish provided plentiful food. Many gulls and a population of more than 300 ducks also inhabited these waters (with daily population fluctuations). During a survey conducted on a more isolated island (used by ducks and other birds for resting and sleeping), we found the remains of more than 10 birds, some of them uneaten. It was clear that a carnivore killed the birds as both tooth wounds were found in necks and other parts and the feathers were bitten and broken in a typical manner. The otter was the only animal that could have killed the birds as no dogs or cats, etc, could reach the island (otter spraints were also found). Of these birds, two were Common Black-headed Gulls (*L. ridibundus*) and one a Yellow-legged Gull (*L. cachinnans*).

3. Another interesting piece of data refers to a Red Kite (*Milvus milvus*) that was attacked by a captive otter at the otter centre in Pont de Suert (Pyrenees, Lleida) on 11 August 1999. Kites often enter the otter enclosures to steal fish remains. In this particular case, the otter was fast enough to catch the kite by its wing, which broke. The bird barely managed to escape when centre personnel rescued it and took it to a recovery centre. In this otter centre, otters fairly frequently attack different species of winged predators (herons, kites, and crows) that come to eat their fish. Although this could be a captivity-induced behaviour pattern, the otter captured the kite relatively easily, suggesting that such birds could certainly be caught in the wild.

It has been noted that otters tend to catch and eat ichthyophagous and crayfish-eating birds from similar families (TILER et al., 1994). Predatory birds can often be found eating together when they take advantage of foraging otters, as has been shown in the case of *L. perspicillata* (KRUUK et al., 1993). Further, cases where predatory birds (especially small and medium-sized water birds) have been attacked by otters have tended to occur in places where they live close to large bird colonies, as when *L. canadensis* was reported catching gulls, terns and petrels (FOOTTIT and BUTLER, 1977; POLECHLA et al., 1993; CAMERON, 1995). Attacks on gulls are frequent in these areas, although they are normally limited to an attack followed by the rapid escape of the gull (personal observation in Alaska; see photograph). In certain circumstances (surprise, weakness of the bird being attacked, etc.), otters may, however, catch larger and more aggressive birds (as in the cases of the heron and kite reported earlier). The sea otter (*Enhydra lutris*) occasionally feeds on predatory birds, such as cormorants, gulls, grebes, teals and fulmars, resting on the water surface (RIEDMAN and ESTES, 1988), possibly as the otter's larger size and more pelagic habits make such birds easier to catch.
If we discount the possible effects of captivity, there are a number of hypotheses as to why such birds should be caught by the otter in the wild, including the chasing, and occasional catching, of competitors, or actual hunting for food. However, in many cases, this would entail a high outlay of energy and entail some risk to the otter, probably accounting for the fact that they are only rarely taken. Perhaps all these data represent only single incidents, without great relevance; indeed, very few records are found in the literature. However, the data above are interesting, bearing in mind that they may be situations involving cases of super-predation (one predator killing competing predators, which may contribute to their regulation and thereby to the conservation or increase in the stock of available prey). This mechanism has been reported in some other species of predators. For example, PALOMARES et al. (1995) showed that the Iberian lynx (*Lynx pardellus*) kills other carnivores (red fox, *Vulpes vulpes*, mongoose, *Herpestes ichneumon*, and genet, *Genetta genetta*) that prey on rabbit (the usual prey of the lynx), without actually eating them, resulting in a simultaneous increase in the abundance of rabbits. This could also be the case with otters, where its role as a super-predator, feeding on fish eaters or fish egg eaters (e.g. crayfish, amphibians, water snakes (*Natrix* ssp.) and predatory fish) has been highlighted in previous studies (RUIZ-OLMO and CASADESUS, 1998; RUIZ-OLMO, 2001). The isolated data presented above (in addition to similar reports made by GREEN, 2000), showing that otters can attack and kill medium and large-sized ichthyophagous birds, may also provide evidence of this type of behaviour. Given that this type of behaviour is infrequently observed and difficult to establish, it is possible that it has been overlooked in the past. There is evidently a lack of information on this matter and more data will be needed in the future if super-predation on ichthyophagous birds is to be confirmed.

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RÉSUMÉ : INFORMATION NOUVELLE SUR L'ORNITHOPHAGIE DE LA LOUTRE (*Lutra Lutra*): LA CONSOMMATION D'OISEAUX PREDATEURS

La loutre eurasienne (*Lutra lutra*) se nourrit principalement de poissons et d'écrevisses, bien qu'amphibiens ou autres catégories de proies puissent représenter, localement ou saisonnièrement, une part importante du régime de l'espèce. *L. lutra* est apte, à certaines périodes, de capturer des oiseaux de grande taille (pesant jusqu'à plusieurs kg), mais généralement non-prédateurs. Une revue minutieuse de la littérature montre que la loutre eurasienne ne consomme pas régulièrement les oiseaux prédateurs (MASON and MACDONALD, 1986; KRUUK, 1995). C'est également vrai sur le pourtour méditerranéen, ou canards (g. *Anas*, notamment *A. plathyrhynchos*), poules d'eau (*Gallinula chloropus*) et autres sont les catégories d'oiseaux les plus fréquemment consommées, bien que leur proportion soit toujours globalement très faible dans le régime (c.f. résumé de RUIZ-OLMO et PALAZON, 1997). Le présent article rapporte ici quelques cas intéressants de prédation d'oiseaux ichtyophages chez la loutre.

RESUMEN: NUEVAS INFORMACIONES SOBRE LA DEPREDACIÓN DE AVES POR LA NUTRIA EUROASIÁTICA (*Lutra lutra*): COSUMO DE DEPREDADORES

Las nutrias consumen usualmente especies acuaticas y semiacuaticas (especialmente peces, cangrejos, anfibios, culebras de agua), aunque a veces también pueden consumir mamíferos, insectos y aves. El trabajo recoje la bibligrafía existente de consumo de grandes aves (a veces depredadoras) y de interacciones con estas por las dierentes especies de nutrias del Mundo. Se revisan diferentes tipos de comportamiento (desde comensalismo o cleptoparasitismo, hasta la propia depredación). Se presentan tres casos de este tipo: una garza real (*Ardea cinerea*) muerta por una nutria en un río Pirenaico, un milano real (*Milvus milvus*) salvaje atacadao por una nutria captiva en el Centro de nutrias del Pont de Suert (que resultó herido y con un ala rota y sólo pudo ser salvado por el personal del centra), y varias gaviotas (*Larus cachinnans*, *Larus ridibundus*) muertas por una nutria salvaje en un parque urbano de Barcelona. Se discute el posible efecto beneficioso que la superdeprdación puede tener sobre las presas de la nutria.

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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,

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

The Return of the Otter - Where and How
Isle of Skye, Scotland
30 June - 5 July 2003

The International Otter Survival Fund is organising a conference that is dedicated to the return of the otter in Europe and all aspects of natural recovery versus reintroduction at the University of the Highlands and Islands campus at Sabhal Mor Ostaig on the Isle of Skye.

The aim of the conference is to discuss all aspects of natural recovery and reintroduction such as ethical aspects of human - otter interaction, conservation, breeding, genetics, toxicology, and other new and innovate research areas. The conference will have a number of sessions that will all be in support of the main theme including:

1 Status of the otter in Europe	2 Threat to otters	3 Otter conservation
4 Otter health & welfare	5 Otter care and rehabilitation	6 Otters - education and economics
7 Reintroductions	8 Recent research in otter biology	9 Future research, including integrated pan-European projects

The results and conclusions will be presented by a rapporteur at the Meeting in Brno later this summer, so that all information is made available as soon as possible to the attendees of this conference. Proceedings will be published in due time.

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4th European Congress of Mammalogy
August 2003, Brno/Czech Republic
http://www.kvetna.brno.cas.cz

We would like to invite you to participate on the **4th European Congress of Mammalogy**, to be held on **July 27 - August 1, 2003, in Brno, Czech Republic**. It is planned to hold a meeting of the **European Section of the Otter Specialist Group (OSG)** and a symposium on the **'Conservation and Biology of the Eurasian Otter (*Lutra lutra*)'** in connection with the Congress. The OSG meeting and symposium are expected to last 2-3 days.

For those who would only like to participate at the meeting of the European section of the OSG and the symposium, and not on the other program of the congress, it is possible to arrange a lower 'student' fee (to be announced). For those with real difficulty affording the registration fee, it is possible to apply for a grant, but please note that the funds are limited. The second circular will be sent to all members of the OSG within the next few days.

Preliminary program:
Meeting of the European Section of the OSG 2003
Discussion topics:

- Summary report of the status and conservation of otters in Europe
- Recommendations of the European OSG for the next International Otter Colloquium 2004, USA (progress, new ideas)
- Completion of the World Otter Action Plan and European part of the Otter Action Plan
- Future of the OSG Bulletin, OSG website, etc.

Symposium 'Conservation and Biology of the Eurasian Otter (*Lutra lutra*)'

Contributions should concentrate on new research projects, methods, or approaches to conservation and the biology of the Eurasian Otter - especially on monitoring, territoriality and home ranges. We will also provide an area to present poster contributions. Discussion topics:

- Monitoring of otters - National and local surveys, etc.
- Territorial behaviour and habitat use
- Reports on ongoing or new otter projects, methodologies, and programs
- Summary report on the conference in the Isle of Skye (Scotland)

Optional discussions / workshops:

- EU Habitat directive and/or EU Water Framework directive - as applied to otter conservation
- Priorities in otter research for Europe
- Otters and fisheries

For further information please contact:

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For more general information on the 4th European Congress of Mammalogy, please contact the web site at www.ivb.cz. and for information on travel, accommodation, www.waso.cz/ecm.

XXVIth International Congress of the IUGB
Xth International Perdix Symposium

"Integrating Wildlife with People"
1st-6th September 2003
Braga, Portugal

The scope of the congress will be broad and will interest those who work in almost any field of wildlife sciences. However the main theme will be "sustainable use of wildlife".
For further information:
www.bio.uminho.pt/iugb
e-mail: iugb_perdix@bio.uminho.pt
Fax.: +351 253678980

International Conference on the Conservation of the European Mink
5th-8th November 2003 Logroño, La Rioja, Spain

The European mink is one of Europe's most endangered animal species. The purpose of this event is to improve the communication which currently exists between the various people and bodies working on the conservation of this species.
For further information:
www.fundacion-cajarioja.es
e-mail: fundacion@,fundacion-cajarioja.es
Fax.:+34941 259931

IX International Otter Colloquium
4th - 6th June 2004, USA
TSERFASS@mail.frostburg.edu
See also From the Chairman's Desk

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)