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CONTENT

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NOTE FROM THE EDITOR

The 12th issue of the IUCN Otter Specialist Group Bulletin is released. Thanks to all whose comments were used for further changes of the Bulletin.
Some of you send me again information on their last publications which makes the compilation of the list on recent publications much easier. I encourage everyone to send information on publications and suggestions for further improvements.
As already mentioned in one line in the last Bulletin my wife Barbara is doing most of the lay-out work now, which is of great help to me. Please send articles and reports whenever possible on diskettes as otherwise articles have to be retyped by ourselfes, which we consider to be a rather boring and time wasting job. Secondly I would like to mention Hans van den Berg in the Netherlands, who is doing a hard job in coordinating everything in Wageningen. You can imagine that it is not easy to write the Bulletin in Vienna and to print it in the Netherlands. Thanks a lot to Mrs. Els Hoogstede-Veens in Wageningen. Her help and advise together with the good work of all her coworkers at the printing office GRAFISCH SERVICE CENTRUM VAN GILS in Wageningen is of invaluable help for the Bulletin.

The splitting of the Bulletin in two sections seems to be a step in a good direction. Thanks to all who reviewed and sent back articles in an amazingly short period of time. Articles will be fully reviewed by at least two reviewers. Reports will be published without a review system as we had it the last years.

Fotos for the front cover are welcome and will be send back on request. Name of authors will be mentioned on page 1.

ARTICLES

FISH LOSS IN AUSTRIAN FISH-PONDS AS A RESULT OF OTTER (*LUTRA LUTRA* L.) PREDATION

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INTRODUCTION

Like in many other European countries, the population of the Eurasian otter *Lutra lutra* L. decreased in Austria in the past decades. Although fully protected throughout the country since the early 1950s (KRAUS, 1981), otter distribution in Austria has declined and reached a minimum with only one viable population in the Northern Waldviertel, Lower Austria. This area has a long-standing tradition in fish-farming. Since the early 1980s, fish-farmers have been complaining about increasing otter damage to their ponds (BODNER, 1994) due to an increase in the otter population in this area. This increase apparently was an inherant problem of the thriving fish-farming industry itself, as the number of artificially built ponds is increasing year by year. The otters would, so it was argued, benefit in particular from newly built, very small ponds, as they made foraging very easy. In consequence of the status of *Lutra lutra* L. as an endangered species, since 1984 Austrian fish-farmers have been compensated for their losses due to predation by the otter. These compensations are paid voluntarily by 4 different organisations (Department for Nature Conservation of the Government in Lower Austria, Hunting Authorities in Lower Austria, Organisation for the Conservation of Nature and the WWF Austria). More than 200 cases have been reported in the past eleven years.

In this study the data of the damage cases are analysed. The analysis aims at investigating the diet of the otter in „damaged“ fish-ponds, i.e. in ponds where otter eat an amount of fish high enough to be noticed by the fish-farmer. Conclusions from the data analysis are discussed with particular emphasis on the mutual influence of otter population and fish-farming industry on one another.

MATERIAL AND METHODS

Fish-Farming In The Waldviertel

In the northern Waldviertel there are 1800 artificially built fish-ponds. Their size ranges from 15 m² to 60 ha, the total water surface area is 2000 ha.
The main fish species farmed is carp (*Cyprinus carpio* L.) with more than 95% of the total fish biomass. Other important species are rainbow trout (*Oncorhynchus mykiss* WALBAUM), tench (*Tinca tinca* L.), pike (*Esox lucius* L.), zander (*Stizostedion lucioperca* L.) and white fish (*Coregonus lavaretus* L.).
The ponds are stocked, drained and restocked at regular turnover intervals (mostly 6 or 12 months).

Documentation Of Damage Cases

Fish loss was officially recognised as otter damage under the following conditions:

- Evidence of the presence of an otter by the pond (spraints, tracks, slides, food remains) has to be reported and it is confirmed immediately by an expert.
- The fish-farmer has to keep records on the amount of stocked fish, on any possible fish-deseases, etc.
- The fish-farmer has to analyse the water quality regularly. Minimum requirements are measurements of oxygen, pH-value and ammonium. Records on water quality have to be kept.

From the amount of missing fish at the time of pond drainage a certain percentage (according to data from literature) is substracted as natural loss. Equally substracted are shares for other predators such as heron or cormorant or for any other reason for fish mortality that is evident (e.g. very high water temperature in summer).
For each damage case, the following parameters were known:

- pond size (ha);
- turnover interval (years);
- absolute biomass of fish stocked, seperately recorded for each fish species and fish age class (kg), summed up for one pond;
- absolute biomass of fish harvested, seperately recorded for each fish species and fish age class (kg), summed up for one pond;
- absolute otter predation (kg): the difference between absolute expected harvest (total possible harvest minus natural loss and minus loss due to reasons other than the otter) and the absolute real harvest in any one pond;
- absolute damage (ATS): biomass of otter predation multiplied by current local fish price)

Analysis Of Data

Between 1984 and 1994, 238 damage cases were recorded. For the present analysis, only the cases of the years 1991 till 1994 (207 cases) were taken, as the documentation had been rather unsystematic before that time. In addition to the parameters already mentioned, the following calculations were done:

- number of different fish species in the pond;
- number of different fish age classes in the pond (different species were automatically different age classes);
- relative damage (ATS/ha): absolute damage (ATS) devided by pond size (ha);
- relative predation (kg/ha): absolute predation (kg) divided by pond size (ha);
- %predation: ratio of otter predation (kg fish biomass) to expected harvest (kg fish biomass).
- shortest distance of any one pond to the nearest natural river (m): measured from maps (1:50.000)
- relative biomass of fish stocked (kg/ha): absolute biomass divided by pond size
- relative biomass of fish harvested (kg/ha): absolute biomass divided by pond size

RESULTS

Development Of Damage Cases

Both the number of damage cases and the total amount of compensations paid have been rapidly increasing from 1988 onwards (Fig. 1a and b). This development has reached its climax in 1992 (65 cases) and stayed on a constant level of about 60 damage cases per year since. Meanwhile, the amount of otter damage mounts up to an average of 500.000.- to 700.000.- ATS (50.000.- to 70.000.- US $) per year.

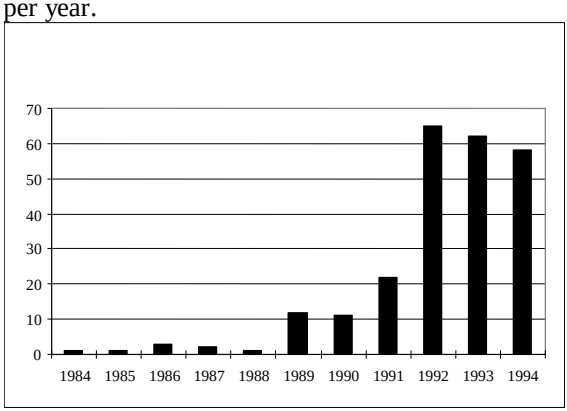

Fig 1a: Development of damage cases

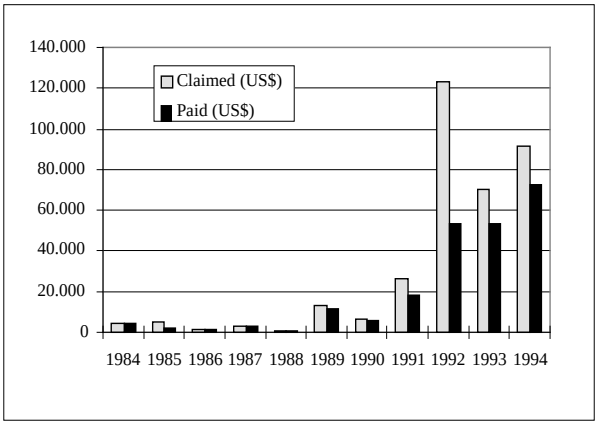

Fig. 1b: Development of damage cases. Left column in Fig. 1b shows total amount claimed by fish-farmers, right column shows total amount recognised as otter damage by experts and paid out

Comparison of Pond Size

The size of the ponds with otter damage was compared to the size of all ponds that exist in the area: Contrary to the assumption that damage should occur in particular at small ponds, the analysis showed that "damaged ponds" are on average larger than "existing ponds" (Fig. 2).

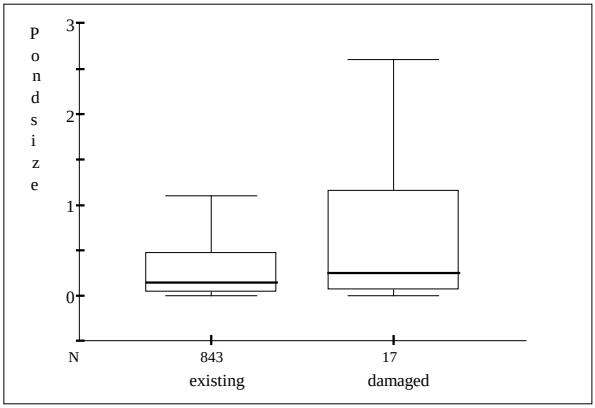

Fig. 2: comparison of pond size: „existing" contains all ponds that exist in the district of Gmünd, „damaged" contains all ponds that reported otter damage

Amount of Damage

The amount of absolute damage (ATS) increases with:
(1) increasing pond size (Spearman Rank Correlation - SRC), r=0,6345, p<0,01, n=207)
(2) decreasing distance to the nearest river (SRC, r=-0,0,1765, p<0,05, n=207)
(3) increasing absolute stocked fish biomass (SRC, r=0,6593, p<0,01, n=207)
No correlation was found between amount of damage and duration of turnover interval, number of fish species and number of fish age classes, respectively.

The amount of relative damage (ATS/ha) increases with:
(1) decreasing pond size (SRC, r=-0,7564, p<0,01, n=207)
(2) increasing distance to the nearest river (SRC, r= 0,3471, p<0,01, n=207)
(3) increasing relative stocked fish biomass (SRC, r=0,8653, p<0,01, n=207)

The difference between absolute and relative damage can only be understood knowing that the biomass of fish kept in the pond in the first place varies with pond size: whereas the absolute biomass (kg) of fish increases with increasing pond size, the relative fish biomass (kg/ha) decreases with pond size. These connections are important as a similar pattern can also be found in damage analysis (see above).

Predation by the Otter

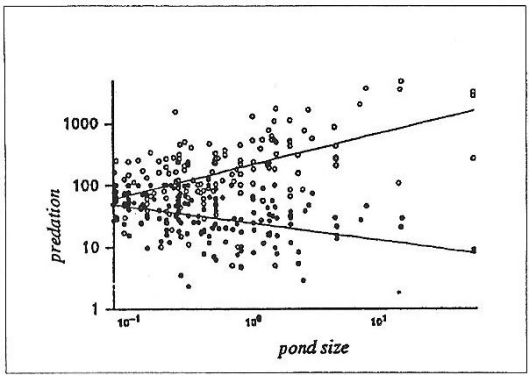

Fig. 3: Influence of pond size on absolute and % - otter predation

Equal to the damage, the predation of the otter varies with pond size: the absolute predation increases (SRC, r=0,6322, p<0,01, n=207) and the %predation decreases (SRC, r=-0,5183, p<0,01, n=207) with increasing pond size (Fig. 3).

PREDATION ON DIFFERENT FISH SPECIES

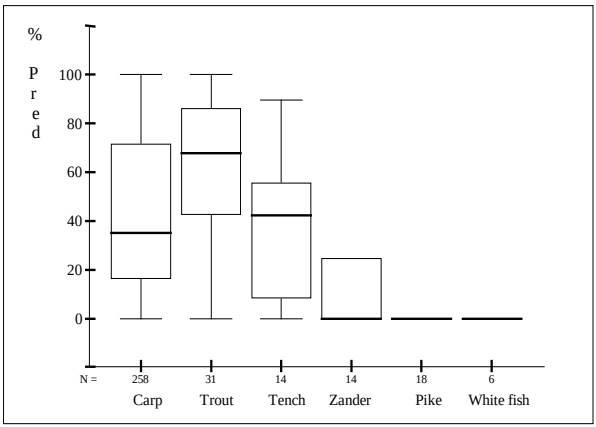

Fig. 4: predation on different fish species

In order to compare predation on different fish species, the % - predation for this analysis was calculated as the ratio from absolute otter predation to expected absolute harvest, seperately for each fish age class in each pond. These values were compared for all six fish species (Fig. 4) and showed significant differences (H-Test of Kruskal and Wallis, a posteriori test of Tukey and Kramer, n=341, $p<0,1$): Carp differs from trout, zander, pike and white fish. Trout differs from all other species except tench.

DISCUSSION AND CONCLUSIONS

Whereas otter damage was low between 1984 and 1988, it has started to increase since 1989 and has more than trebled from 1991 to 1992. Then, local fish-farmers explained this development by an increase in the otter population of this area. Between 1992 and 1994, the otter damage stayed at a constant level. To begin with, no data were available on the distribution of the otter in the Waldviertel nor on the number of individuals this population contained. Meanwhile, KRANZ (1995) confirmed an increase of the otter population in this fish-pond area. The same author also found that in some river systems, the otters has started spreading south. Both this and the fact that the otter damage to fish-ponds has remained constant for the last three years could mean that the region has reached its carrying capacity for otters and that the local otter population is no longer increasing. It has to be pointed out, however, that otter damage is defined via a procedure of negative exclusion: any fish loss that is not due to bad water quality,

fish parasites or any other reason that can be thought of is defined as „otter damage“ if otter presence at a certain pond is confirmed (see above). Thus, the mathematical calculation of this otter damage as it is done for compensation is exceedingly difficult and any results reached by this have to be interpreted with extreme care.

The importance of small ponds as food source for the otter could not be confirmed. On the contrary, large ponds are over-represented in the damage cases. These results confirm a study by KRANZ (unpubl.) who found at only 42% of ponds smaller than 0,5 ha evidence for otter presence, wheras 100 % of ponds larger than 5 ha showed otter signs. Two reasons are suggested for this:

(1) Larger ponds are closer to the main river. Otters while roaming around use the waterways, thus the otter finds large ponds with a higher probability than small ones which sometimes lie at a distance of several hundred m to the main river.

(2) Larger ponds are generally older than small ones, some of them have existed for several centuries. The ponds newly built each year now are usually small. Thus, the probability that otters have found an certain pond at some stage are higher for a large and old pond than for a young and new one.

Clearly, for any potential damage the distribution of stocked fish is essential. The otter can only eat what is there in the first place, thus it is to be expected that patterns of fish distribution will be reflected in the damage as well. The amount of otter damage can be looked at in two ways:

(1) By comparing the absolute damage (in ATS): it could be shown that the absolute damage increases with increasing pond size. Large ponds contain more potential food for the otter than small ones as the total absolute fish biomass is higher in large ponds.

(2) By comparing the relative damage (in ATS/ha): the relative damage decreases with increasing pond size. in large ponds the density of stocked fish is comparatively low.

The comparison of the percentage predation shows a similar pattern: percentage predation is higher in small ponds than in large ponds. This can be expained by the fact that otters clearly do not eat ratios but net amounts of fish biomass: any given amount of fish eaten by an otter will be represented with a higher percentage predation in a small pond with a small total amount of fish than in a large pond with a high total amount of fish.

The comparison of predation on different fish species showed a high ratio of predation both for carp and for trout. In the case of the carp, however, it must be considered that the predation calculated from the fish loss not only contains fish eaten by the otter but also includes secondary damage (weight loss, parasites, etc.) if carp are disturbed by the otter while hibernating. Moreover, carp represent more than 95 % of the total fish biomass in the ponds. It is therefore, simply for

statistical reasons, to be expected that otter predation on carp is high. Carp is taken by the otter as one prey species out of several, but otters in the Waldviertel have by no means specialised on this fish species. This result is also confirmed by KNOLLSEISEN (1995) who investigated the diet of the otter in the Waldviertel by spraint analysis. He found an annual average of 8,9 % for carp plus tench. The ratio of predation in the damage cases investigated is highest for trout, thus indicating the otter´s preference for this species in fish-ponds. Pike and white fish are taken least of all, it is unclear however if the otter actively avoids them or if these species are just more difficult to catch.

Concluding the results of the study, the mutual influence of otter population and fish-farming industry can be summarised as follows: the existance of the otter population in the northern Waldviertel is no threat to the existence of the fish farming industry in the same area. Otters do, however, forage in fish ponds, a certain amount of fish loss ("damage") being the result. The overall importance of small ponds for the otter population could not be confirmed. Although it seems to be a reasonable conclusion that fish are caught more easily in small ponds than in large ones this advantage remains hypothetic if the small ponds are not known to the otter, as seems to be the case. Small ponds represent a problem that is emotional rather than ecological as a net amount of fish loss in small ponds looks more dramatic than in large ones and is thus deplored more loudly by the fish-farmer. In large ponds, on the other hand, secondary damage to carp can lead to a high loss for the fish-farmer even if otter predation as such has been low. If big amounts of fish (up to several tons) are missing at the time of pond drainage, this is usually explained as secondary damage due to otter predation, providing other causes can be excluded (see above). This situation, however, gives rise to a number of questions. Further research on the biology of fish (in particular carp) in ponds in winter under the ice cover is needed to further reduce the probability of making mistakes when assessing otter damage. The fish-farming industry in general is of importance to the otter population as it increases the region´s carrying capacity for otters. Fish-ponds are for the otter one, but not the only one or the prefered source of food. In cold winter months when rivers are frozen and food availability generally is very low, ponds can be an essential food source for otters as they make it possible to overcome critical bottleneck situations.

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REPORTS

RECENT OTTER RECORDS FROM CENTRAL MOROCCO

JACOBY, M.C.[1], WILLIAMS, James L.R.[2]

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[2] *Stoford Manor, West Buckland, Wellington, ENGLAND*

MASON and MACDONALD give an abundance of positive sites in Morocco, recorded 1982-5, but give very little description of the country. Central Morocco is an arid, degraded area with a few isolated forests in the Middle Atlas, and some blocks of eucalypts and some scrubby Cork Oak along the Atlantic coast. Farmable land is exploited inefficiently, with heavy winter loss of top soil. Steep or stoney land is grazed to destruction by goats and sheep. The population of Morocco is 26 million, and doubles in 29 years.

Winter rainfall is critical to river flows and has been as follows: 1989/90, heavy all over; 1990/1,1991/2,1992/3, little; 1993/4, heavy in the north; 1994/5, little in north, heavy in south. (in this context 'north' refers to the country north of the High Atlas and west of the Rif; 'south' refers to the area between the High Atlas and the Oued Draa).

In six years of travelling there, progressive deforestation and degradation of the land have become very noticeable. It is now rare to see donkey loads of wood being brought into the villages for fuel; small bushes are being torn up by the roots, and one often sees bundles of leaves being carried for this purpose.

Yet, evidence of otters has still been found quite regularly on some of the rivers of this region.

AOULUOZ a reservoir on the Oued Sous, 85km east of Taroudant. The dam, built in 1988-92, fills only in wet winters; the surrounding country consists of arid hills thinly set with Argan trees.
8/10/93 dense padding over an extensive area of mud; two distinct foot sizes; plenty of spraints,and some anal jelly: possibly a dog and a bitch.
22/10/93 previous padding still clear; distinctly fresher were a set of larger tracks, and spraints with jelly.
26/02/95 recent padding and spraints under bridge.

ASIF IRIRI where it is crossed by the P 32, 35km west of Ouarzazate. This stream flows only in wet winters,and is bordered by simple agriculture. It flows into the Asif Imini which joins the confluence of the Dades and Draa at Ouarzazate.
11/10/90 padding

UPPER DADES 35-40 km north of Boumalne du Dades. The Oued Dades rises on the high steppe of the High Atlas and flows through the Gorges du Dades 30km from Boumalne. This river flows all year through a narrow strip of irrigated agriculture in mountainous semi-desert.
16/03/95 spraints at most sites checked

DRAA VALLEY: A major river, often 50 meters across, which drains the south side of the eastern end of the High Atlas. It is bordered by a narrow strip of intensive, animal-powered agriculture.
By road P31, 23km southeast of Agdz:
24/02/94 two spraints and broad padding
10/03/94 one old spraint
02/03/95 heavily worked ledges and rocks above and below the ford; 20+ spraints on three ledges. Large padding, mostly downstream and fresh

ZAGORA,27/02/95, searched one mile of the left bank upstream from the ruined bridge: no evidence, despite good rocks and boulders.
Road bridge on P 6958, northeast of Anagam: 28/02/95, no evidence despite good rocks over the kilometer searched.

OUED TENSIFT where it is crossed by the S511, 23 km north of Chichaoua.
19/02/95 padding and fresh and old spraint
P8 bridge, at head of estuary, 22/02/95, no evidence
Estuary of OUED TENSIFT, 22/02/95, no evidence

OUED MASSA, estuary and marshes, 24/02/95, no evidence

As this country is increasingly being visited by tourists, many of them on botanical or ornithological trips, it would be interesting to get further information of this kind. Is this population really restricted to the inland areas near the mountains? I was surprised to find no evidence near the cover and fish-rich estuaries which are so well-known for their abundant bird life. If there are in fact otters there do they meet the other ones from inland during the winter flows? There has been talk of recognising the otters of this region as a subspecies; it would be helpful for conservation strategies elsewhere to know more about how they cope with what seems to be such an unpromising environment.

OTTERS IN SW ANDALUCIA, SPAIN - AUGUST 1995

WILLIAMS, James L.R.[1], JACOBY, M.C.[2]

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Despite the severe drought in Spain, which is now in its fifth year, there were encouraging signs in August 1995 of a viable population of otters (*Lutra lutra*) in the system of the Rio Guardiaro. This river and its major tributaries, the Rio Hozgargantar and Rio Genal rise near Ronda, in the wildlife reserve, El Reserva National de Cortes de la Frontera, and flow into the Mediterranean at the rapidly developing resort of Sotogrande. It was, as far as I could ascertain, the only river along the Costa del Sol between Punta de Tarifa and Malaga Airport to meet the sea. Such is the demand for water in this area of rapid population growth that all the other waters are totally consumed.

AMA, the Spanish conservation agency, does a good job in the reserva and the surrounding sierras, keeping a good watch over the Ibex herds, and stationing guards at individual Eyries of Golden Eagle. By their nature, otters, an equally important part of this region's biodiversity, are harder to protect. Yet despite two hydro-electricity schemes, and considerable extraction of water for orange groves, and even for cotton, (surely a ridiculously thirsty crop to subsidise in such a dry area), the River Guardiaro has a connected flow and a strong population of fish, with considerable evidence from spraints that otters were using it frequently. The regular incidence of powerful winter floods from the heavy rains up in the mountainous headwaters has prevented overexploitation of the flood plain, and consequently there is a heavy bankside vegetation, which encourages not only otters, but also such animals as Genet and Mongoose. I have visited this valley at different seasons for several years, and have always found plenty of spraints. There is undoubtedly a strong otter population on this river system.

I even found evidence which pointed strongly to there being a bitch and cub in a most unexpected place, the Valderrama Golf Course. At first sight this is a very artificial and over-managed area, but on the initiative of the President, Senor J. Ortiz-Patino, a considerable conservation initiative has been undertaken, and backed up by money and manpower. The use of sprays is controlled, and a sixth of the grounds are set aside as wildlife reserves. There are various ornamental streams and water hazards on the course, with a careful system of conserving and recycling the water, and into these ornamental fish have been introduced. The club

is proud that this provides an opportunity for otters, which they have been using with increasing frequency since January 1994. In 1995 there has been almost continuous usage of these lakes and ponds, with padding of different sizes giving a strong indication that they have bred there.

This beautiful but busy place will be even busier in September 1997, when the club is to host the prestigious Ryder Cup golf tournament. As part of the preparations, wildlife information plaques are proposed, to draw the attention of the masses of spectators to the conservation aspects of the Club's management. However I wonder whether the one about otters will be still relevant.

The comparative abundance of the water in this system of rivers is to be exploited. A 12 km tunnel has already been started, to take the water right out of the catchment, to Cadiz on the Atlantic coast; dams are also proposed on the Hozgargantar and Genal. Although there are reassurances that only surplus water at times of heavy flow will be taken off, the size of the tunnel indicates that more is sought, and that there is a danger that the total flow of this river will be reduced to a mere 5 cumecs for most of the year. Irrigation for agriculture alone will use up all of that. The vast cost, £70 million, will not permit these works to be underutilised; that this is European granted, and that no ecological survey has been undertake in advance of work starting, which makes it illegal under European law, will not count for too much in a province with a rapidly growing population, an increasing dependence on tourism, and, according to a recent report, 50% of its sewage treatment works out of commission. Ironically, for the same cost they could build six desalination plants of the type that Gibraltar fuels with its refuse.

Thus, in one river system in SW Europe, are displayed the sort of problems which beset Otter conservation worldwide, with the additional instance of the golf course as an example of what can be achieved. Something to reflect about as you watch the golf match on television: how often will it be fish scales that they have to wipe off the ball? Or will this population have been destroyed in two years time, along with the river?

OTTER CONSERVATION IN PORTUGAL: DISTRIBUTION AND STATUS OF *Lutra lutra* IN FIVE PROTECTED AREAS OF THE COUNTRY

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ABSTRACT: Although otter (Lutra lutra L.) populations presents a tendency towards regression in much of its european range, portugal still has a fairly stable population. Nevertheless, the exact status of the species is unknown. In this context, it is actually in course the project Otter Conservation in Portugal, insert in a national program for the Knowledge and Managment for the Natural Heritage, cofinanced by LIFE PROGRAM (EC). In this paper are presented the studies carried out in five protected areas of the country: Montesinho and Serra da Estrela Natural Parks, and Serra da Malcata, Paul do Boquilobo and Sado Estuary Natural Reserves, which included habitats as different as rivers, upland oligotrophic streams, dams, lagoons, marshes, lowland rivers and fishfarm ponds.
First data concerning the distribution of the otter in that areas, the main threats observed in the areas, and some measures that can be implemented to improve the habitat conditions and the situation of the otter in some disturbed areas, are presented. The last two areas (Paul do Boquilobo and Sado Estuary) have the most acute problems for conservation, mainly due to intensive agriculture, and to domestic and industrial pollution in the freshwater and estuarine systems. The first three areas have good conditions to the existence of the species, not only in terms of habitat suitability (adequate presence of vegetation, water and preys), but also because of the relative reduced human disturbance.

INTRODUCTION

Although otter (*Lutra lutra* L., 1758) population presents a tendency towards regression in much of its European range, in Portugal it still has a fairly stable population. The project OTTER CONSERVATION IN PORTUGAL is being carried out in five different protected areas of the country : Montesinho and Serra da Estrela Natural Parks, and Serra da Malcata, Paul do Boquilobo and Estuário do Sado Natural Reserves. These areas include different habitats: rivers, upland oligotrophic streams, dams, lagoons, marshes, lowland rivers and fish farm ponds.
The methodology used was based on MACDONALD and MASON (1982). The surrounding areas of the transepts were carefully characterised, allowing an evaluation of the habitat suitability for the species, based on the necessary basic requisites to otter's presence (adequate presence of vegetation, water and preys) and human disturbance. The *Habitat Suitability Index* (HSI) which includes variables like vegetation presence, water availability, water pollution, macroscopic pollution and presence of human activities, was used as a measure to such characterisation.

We present the distribution and the local situation of the otter in these areas, the main threats observed and some measures that can be implemented to improve the habitat conditions to *Lutra lutra*.

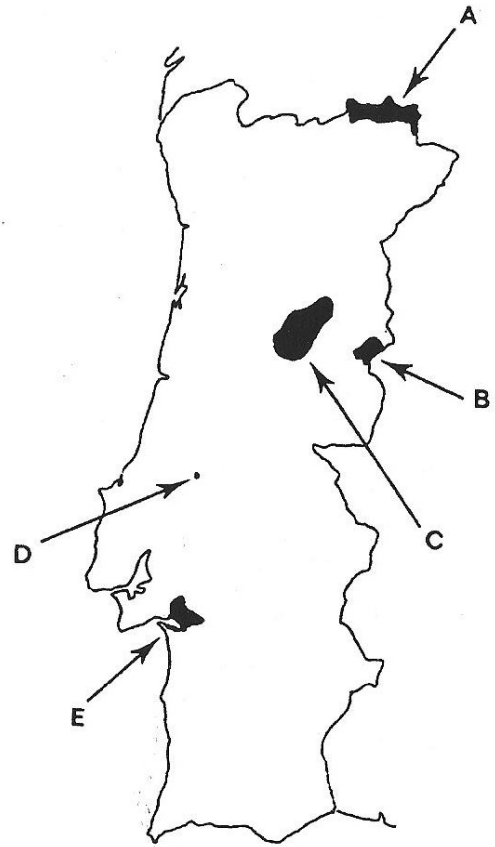

Figure 1 - Location of the five study areas
A - Montesinho Natural Park
B - Serra da Malcata Natural Reserve
C - Serra da Estrela Natural Park
D - Paul do Boquilobo Natural Reserve
E - Estuário do Sado Natural Reserve

MONTESINHO NATURAL PARK

Montesinho is located on the edge of Iberian plateau, in a region characterised by its undulated relief, in Northeast Portugal.

The otter is present in all rivers of the park being its signs of presence commonly seen along these rivers and their main tributaries.

The main threats to *Lutra lutra* in Montesinho are water deviations and hydroelectric enterprises, destruction by fire or cutting of the riparian vegetation, illegal fishing with poisons (by its impact on fish populations) and mining and gravel extraction (this factor being less important).

It is advisable to control and plan the policies and enterprises concerned with the management of the water resources, and to intensify the efforts of watching in order to prevent fires and illegal cuttings and fishing.

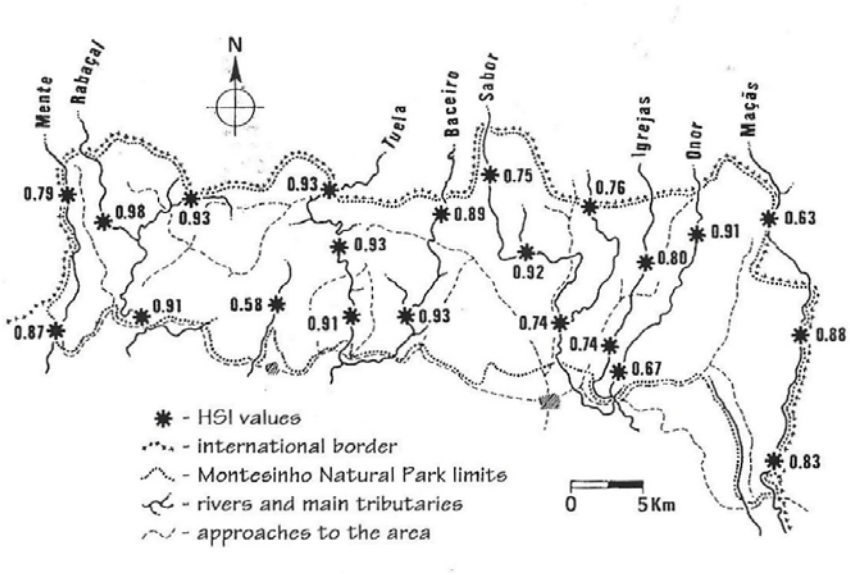

Figure 2 - Location of the study points in the Montesinho Natural Park

SERRA DA ESTRELA NATURAL PARK

The Natural Park of Serra da Estrela, the highest mountain in continental Portugal, shows a great variety of freshwater habitats (rivers, streams, lagoons, and water reservoirs), included in an extensive basin.
Lutra lutra presence was detected in all types of habitats present in the area.
The main factors of stress are: discharging of domestic and industrial effluents without a previous treatment; no control of the sediments' extraction; destruction of riparian vegetation; large uncontrolled tourist concentrations, specially those which occur every year in the highest altitudes
The major conservation measures are development of freshwater management policies, the recovery of the disturbed streams and the improvement of tourist activities on lower altitudes.

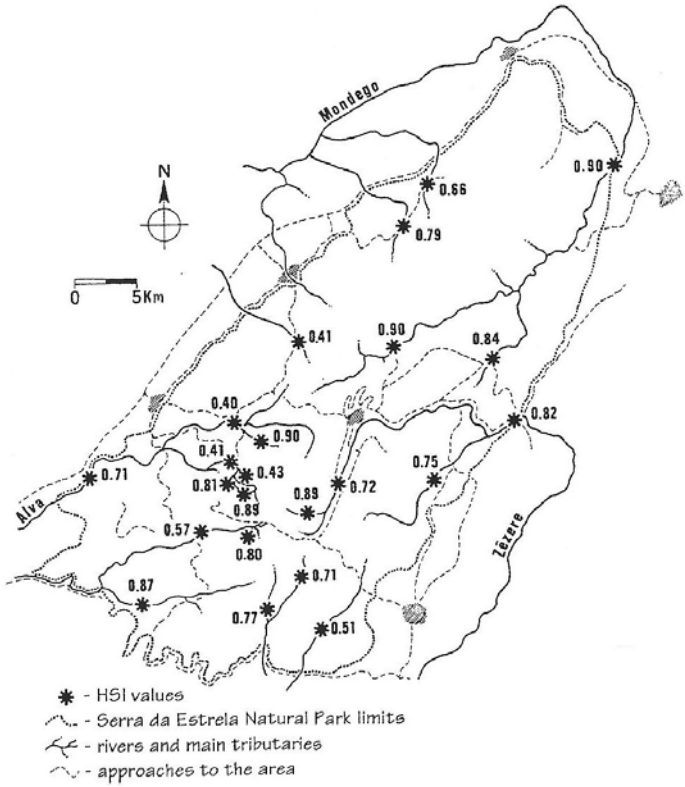

Figure 3 - Location of the study points in the Serra da Estrela Natural Park

SERRA DA MALCATA NATURAL RESERVE

Baságueda, Côa and Meimoa are the main watercourses of this protected area. All of them have a torrential regimen with great flow reductions during warm periods. They flow through an undisturbed watershed, which exhibits a well-developed riparian vegetation.

The species is widespread and abundant all over the area.

A high habitat quality with no pollution and high availability of prey and refuges can be found inside the Reserva Natural da Serra da Malcata.

Significant reductions in water quantity, due to excessive pumping for agricultural activities during the summer months must be carefully monitored.

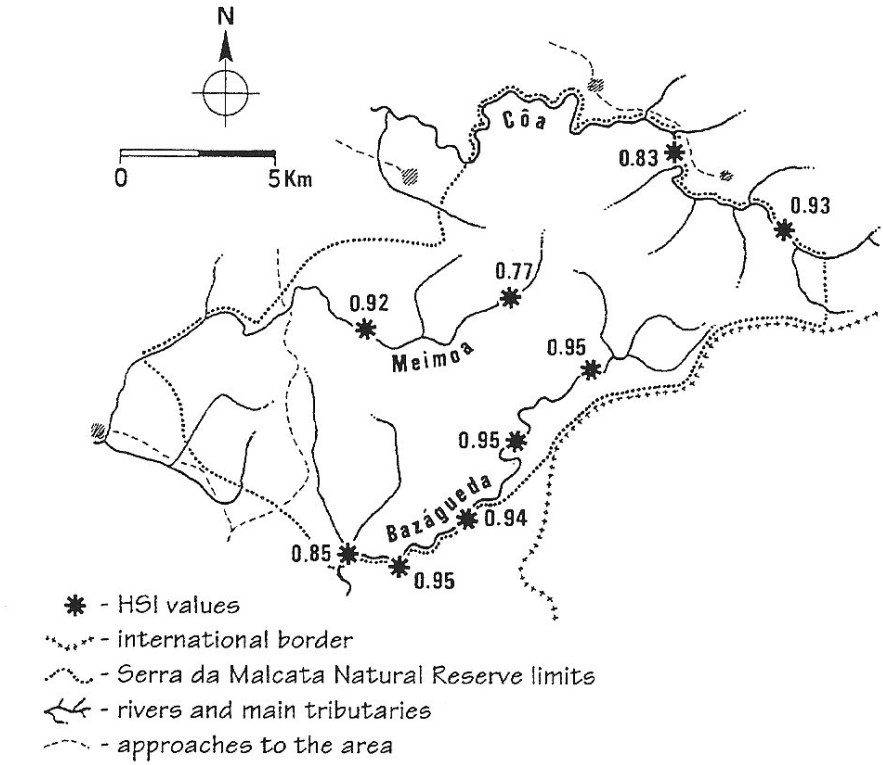

Figure 4 - Location of the study points on de Serra da Malcata Natural Reserve

PAUL DO BOQUILOBO NATURAL RESERVE

The Paul do Boquilobo Natural Reserve is a marshland situated between the Tejo and Almonda rivers, in central Portugal.
The otter occurs in all river, being its presence sporadic upstream and more regular on the Paul do Boquilobo and downstream.
The strong pollution of the river caused by industrial, agriculture and urban effluents, and the destruction of the bankside vegetation, are the major problems of this area. However, the direct death caused by the fishers is a threat as well.
The conservation measures to be carried out in this area are mainly the treatment of the industrial and urban effluents, the management and recovery of the bankside vegetation and the implementation of an environmental education campaign directed to the fishers.

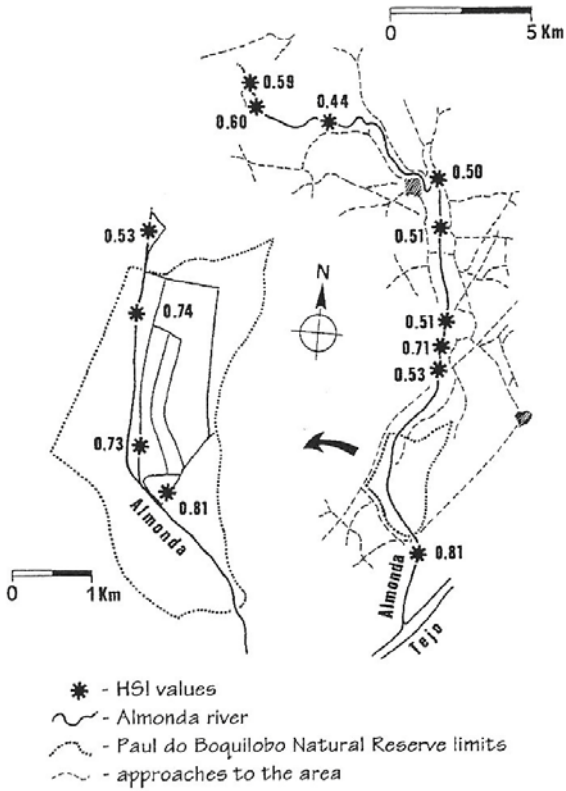

Figure 5 - Location of the study points in the Paul do Boquilobo Natural Reserve

ESTUÁRIO DO SADO NATURAL RESERVE

This reserve is a very important wetland supporting a rich variety of wildlife species and a wide range of aquatic habitats including the estuary, salt marshes, rivers, small streams and lagoons. Rice fields and fish farm ponds can also be found.

Lutra lutra is considered to be relatively abundant over most of the Reserve area. Nevertheless increasing stressing factors are threatening the species in some places.

The major causes of threat are water pollution resulting from industrial and agricultural effluents and the high level of human disturbance mainly due to fish farming activities. Several otters are certainly poached each year.

The main conservation measures are educational campaigns, effective surveillance of water quality and the implementation of a specific monitoring plan of the otter population.

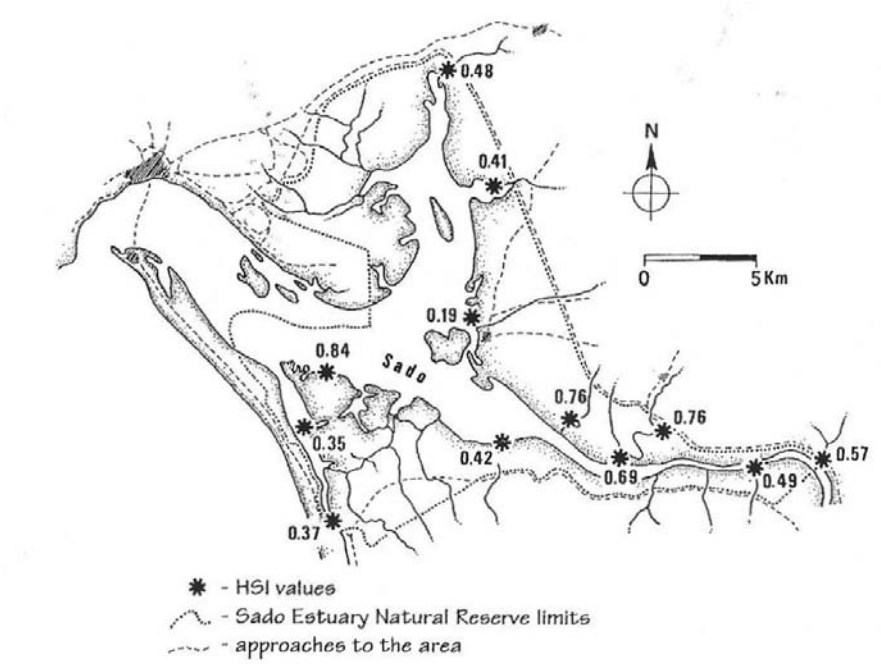

Figure 6 - Location of the study points on the Estuário do Sado Natural Reserve

FINAL CONSIDERATIONS

Portugal still has one of the most viable otter populations in Europe. Montesinho, Serra da Estrela and Serra da Malcata have good conditions to the existence of the species (medium HSI values range 0.81-1.00, n = 30), not only in terms of habitat suitability (adequate presence of vegetation, water quality and quantity and preys), but also because of the relative reduced disturbance.

The other two areas, Paul do Boquilobo e Estuário do Sado (medium HSI values range 0.41-0.60) have more acute problems with conservation, mainly due to intensive agriculture and to domestic and industrial pollution in the freshwater and estuarine systems. Nevertheless otters are still present all over these areas, being common in Estuário do Sado Reserve.

These results are similar to the data we are obtaining from the national survey of otter distribution that has been carried out since the beginning of 1995, following the standardized methodology (MACDONALD and MASON, 1982). The preliminary results seems to confirm that *Lutra lutra* is widely distributed all over the country, living in a great variety of habitats ranging from coastal waters in the Southwest to freshwater inland, and being quite abundant in many areas.

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THE GIANT OTTER PROJECT IN PERU 1995

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ABSTRACT: Giant Otters (*Pteronura brasiliensis)* are rarely investigated but highly endangered. The project "STATUS, HABITAT AND CONSERVATION OF GIANT OTTERS IN PERU" from the Frankfurt Zoological Society, - Help for Threatened Wildlife - started in 1990 with a two and half year fieldwork period. The project is actually run with a yearly two months fieldwork period in Peru and ongoing analyzing, management and coordination from Germany. Following we give the report for 1995.

MONITORING OF THE GIANT OTTER POPULATION IN MANU NATIONALPARK IN PERU

Until now there had been no long-term investigation of a giant otter population carried out. Therefore we put an emphasis since five years on the annual survey of the entire giant otter population in Manu Nationalpark. Giant otters can be distinguished from one another by their throat markings and therefore we are able to include even individuals in our stocktaking (Fig. 1). In 17 oxbow lakes of the Manu river we counted a total of 41 animals in 9 groups. No solitaire otter was seen. Besides we found certain signs (fresh tracks, scats, dens) from one more group. The number of otters along the Manu river is slightly higher than in the previous year.

Nevertheless there are still oxbow lakes without an otter group and two groups have not had cubs this year. The total encounter of otters over the past years has now raised up to 375 from 73 groups with an average group size of 4,85 members per group. (Fig. 2)

DANGER FOR OTTERS IN PROTECTED AREAS

The new survey indicate again that tourism could have a negative effect on the giant otters. At Lake Salvador, where tourism is most intense, we did not observe any offspring this year either - which is an exception among Manu´s otter population. Since three following years we have not seen cubs in this lake. As in previous years, we found otter groups and dens along the river only in the upper part of the Manu river, where no motorboat traffic exists.

First investigation to the danger caused by diseases from domestic animals had also been carried out. It is known that typical diseases of cats and dogs such as Parvovirus or distemper can have serious effects on wild animal populations.

Giant otter cubs held in captivity have died of Parvovirus and all mustelids are very susceptible to the canine distemper virus.
We took blood samples of 16 dogs from the villages from settlers and natives in and around the Manu National Park.

Five dogs had Parvovirus antibody concentrations showing an infection and one dog had a significant concentration of distemper antibodies. Domestic diseases could be extremely dangerous for the isolated giant otter populations. Infection could take place also in remote areas: Solitary otters searching for a new partner travel great distances and may control the campsites of several otter groups. Natives travel with their dogs and go to the oxbow lakes for fishing.

THE STEPS OF CONSERVATION

Also in 1995 the implementation of the conservation plan for giant otters was an important part of the work in Peru. In this context intensive co-operation was going on with the administration of the Manu Nationalpark, the ministry in Lima INRENA (Instituto Nacional de Recursos Naturales) and Pro Naturaleza (former name: Fundación Peruana para la Conservación de la Naturaleza - a Peruvian NGO). As part of the conservation plan we presented slide-shows, booklets, posters and information panels to the Peruvian counterparts. For the new rangers in the Manu National Park a three days seminar was held in Pakitza. Profound information of the biology and conservation of giant otters and other important species was offered as well as two excursions.

After five years of giant otter research and conservation in Peru a balance sheet was drawn up to see wether suggestions from the project have had any influence to the management of the National Park. Happily the list of implementation of measures is long. The canoe traffic on lake Otorongo has been halted and a provisional observation tower has been built. The otter group at this lake has been reproducing normally since then. Controlled by a permanent park ranger, a prohibited area has been established this year at lake Salvador. The tourism zone of the Manu National Park has not been enlarged and there were no other lakes opened for canoe trips. The control post of Romero is now moved down river to control an important area. The information of tourists and the education of park rangers was improved over the last years. Nevertheless there remains a lot of work to be done to safeguard the giant otter population of Manu.

PRELIMINARY SURVEY OF GIANT OTTERS ALONG THE RIO SAMIRIA

The third important tropical reserve of Peru (besides Manu National Park and the reserve of Tambopata-Candamo) is located in the Department Loreto in the

Northern part of the country: the national reserve of Pacaya-Samiria (Fig. 3). With an area of 21.500 km^2, the reserve s even bigger than Manu National Park and has a longer history of human exploitation. Its status permits a certain degree of economic use. Protection of the reserve has improved strongly since two years. The rivers Marañon and Ucayali, which form the Amazon, mark the boundary of this reserve. The main habitat difference is the occurrence of huge areas of flooded forest. Otherwise climate conditions are very similar to the Department Madre de Dios. The survey was carried out in September with the help of Pro Naturaleza, the administration of the reserve and local park rangers. Six lakes, several creeks and about 200 river-kilometers were controlled, but no signs of giant otters could be located. According to all reports by elder local people, giant otters had been common there about 20 years ago. Actual information on giant otters must be interpreted carefully: exaggeration and the tendency to report events of the past as current are common problems, as is the confusion of the giant otter with *Lutra longicaudis.*

Today it is still possible that sometimes solitaire otters or tiny groups pass through but stable populations of giant otters can no longer be found along the Samiria river mainly due to overhunting and disturbance. Otherwise, the habitat appears to be still intact and ideal for giant otters. The area contains big rivers with oxbow lakes and a network of tiny creeks with sufficient fish. The existence of several hundred river dolphins provides evidence of the latter.
Besides the negative result of the first survey along the Samiria river there is safe information that there are still giant otter populations in the Department Loreto. The zoo in Iquitos has a young female which was confiscated from local people and we found two very young cubs in bad conditions in the harbor of Iquitos. The owner of the animals told us that he has bought them from locals at the Puinahua river, closed to the borders of the Pacaya-Samiria Reserve. Further work is very important to locate the last remaining populations and to look for management measures to probably allow recolonisation of still intact habitat.

ACKNOWLEDGMENTS

The project is financed by the Frankfurt Zoological Society, - Help for Threatened Wildlife - and is carried out in cooperation with the Wildbiologische Gesellschaft München e.V.
We like to thank the Peruvian authorities INRENA and the administration of the Manu National Park and the Pacaya-Samiria Reserve for the possibility to carry out the field work. The field work in 1995 was supported by Pro Naturaleza, ALITALIA and the Zoological Society of Philadelphia.

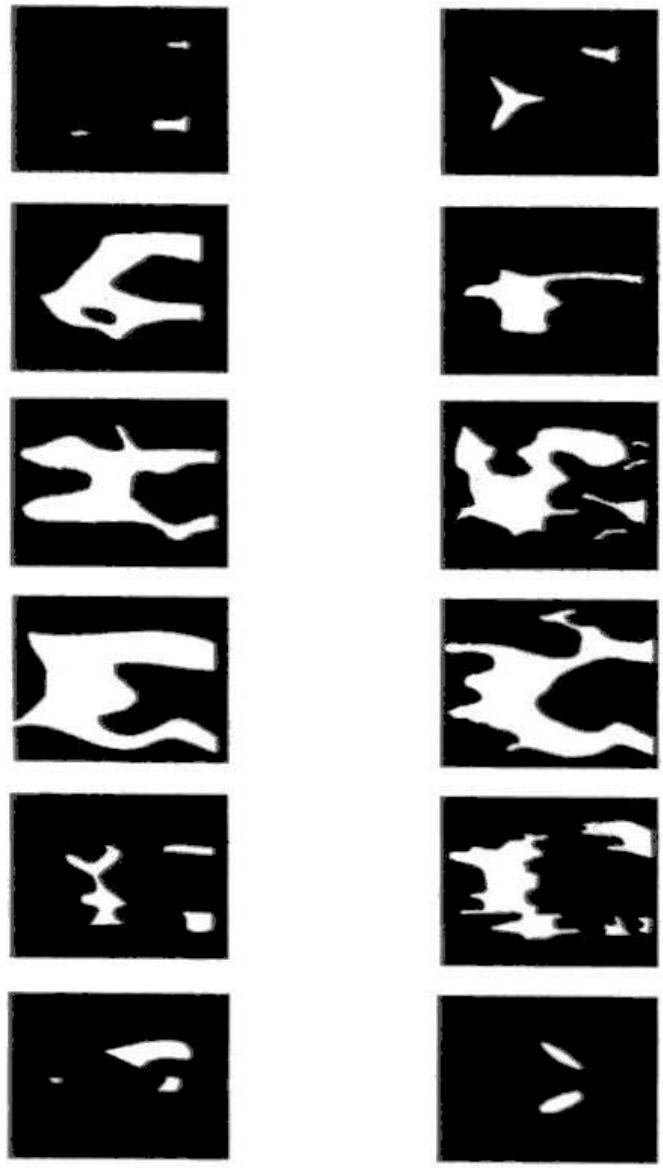

Figure 1: Examples of individual throat markings of giant otters

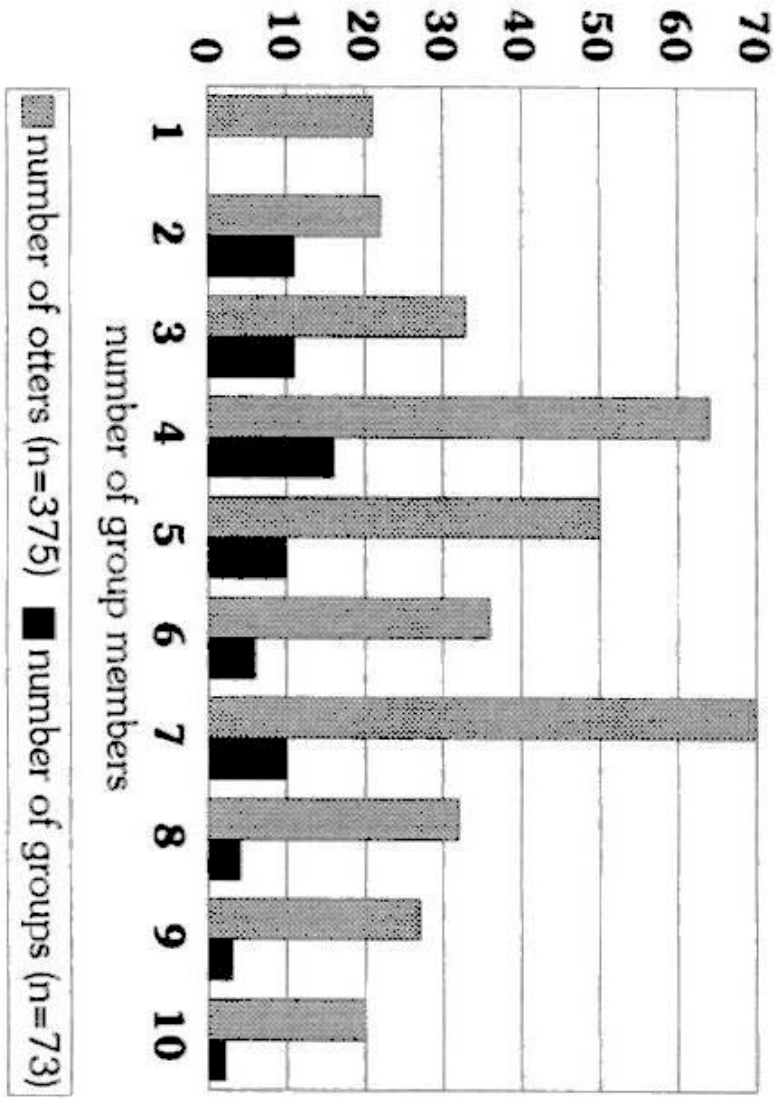

Figure 2: Size of giant otter groups. Click for larger version.

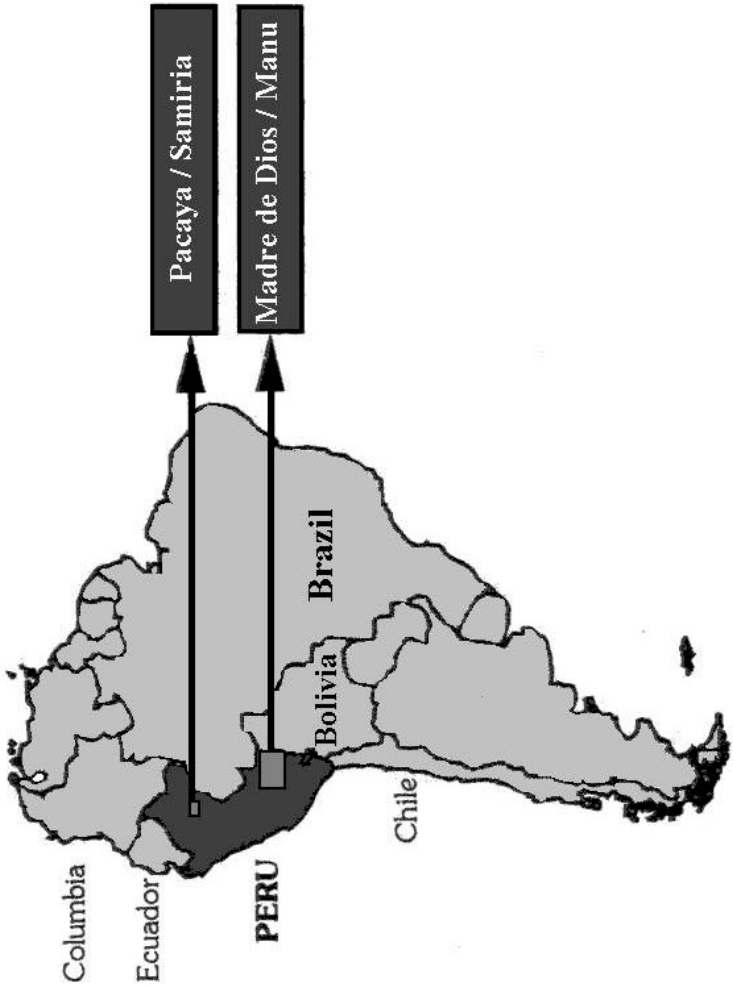

Figure 3: Study areas in 1995

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DIET OF THE RIVER OTTER *Lutra longicaudis* IN FURNAS RESERVOIR, SOUTH-EASTERN BRAZIL

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INTRODUCTION

The otter *Lutra longicaudis* is an animal with semi-aquatic habits, mainly nocturnal, that live in pairs or solitary. It is geographically distributed in South and Central America, from Mexico to Uruguay and through almost all Brazil (EMMONS, 1990), always associated with river and lake surroundings. *L. longicaudis* has been included in the Brazilian Red Book of Mammals threatened with extinction (FONSECA et al., 1994), with its natural populations decreased in consequence of habitat destruction and water pollution.

Little is know about its feeding habits. There are some articles that report this species mainly as piscivorous, completing its diet with crustaceans, amphibians, mammals, insects and birds (EMMONS; 1990; JOSÈ and ANDRADE, 1991), however no detailed studies about its diet were performed. This study reports the feeding habits of otters (*L. longicaudis)* in Furnas Reservoir, Minas Gerais, Brazil.

METHODS

From June 28 to July 5, 1994, eight samples of scats from otters were collected alongside Furnas reservoir, in order to analyse the diet. All the scats were analysed in the laboratory with a stereoscopic microscope and the remains of the preys (otoliths, scales and spiny rays) were identified with analogy to a reference collection of the fish structure found in the region. The remains of insects could not be identified to lower levels due to the complexity of this group. Each sample with the prey category was considered one record for the item, independent of the quantity of structures present in the sample (frequency occurrence).

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RESULTS AND DISCUSSION

The results of scat analysis of *L. longicaudis* in Furnas reservoir showed that fish are the most important food item eaten, being present in all the analysed samples, while the insects form a minor portion of their diet. This information is in agreement with the data obtainent by JOSÉ and ANDRADE (1991), analysing the scats of *L. longicaudis* in the State of Espírito Santo. Individuals of the Cichlidae family were the most common eaten fish, occuring in 88.9 % of the analysed samples. The Anostomidae family was the second in number of specimens encountered in the scats (55.5 %), followed by the Characidae and Pimelodidae families (44.4 %). In one sample, the family of the fish could not be identified. The predominance of scales and otoliths from specimens of the Cichlidae family, mainly Tilapia (*Tilapia rendalli*) and Acará (*Geophagus brasiliensis*) in the samples, demonstrated a feeding preference by the otters for these species. Cichlidae have sedentary habits and prefer habitats near the river and lake banks (VIEIRA, pers. Comm.). Some species like *G. brasiliensis* can form groups, and this may facilitate its capture by otters. KRUUK and MOORHOUSE (1990) verified that *Lutra lutra* hunting during the periods of inactivity of its prey, took a substantial part of the total population. The fish more often eaten by *Lutra canadensis* were those moving slowly or which show quick fatigue, with low capability of sustaining swimming to escape the predation by the otters. This suggests that otters catch the fish in a direct proprtion of its abundance and in an inverse proportion of its ability to swim (STENSON et al., 1984).

Insects were encountered in six samples, occuring in 66.7 % of the samples analysed. LARSEN (1984) comments that the invertebrate fragments found in *Lutra canadensis* scats were very little and because of that they might be first swallowed by fish, molluscs or birds and then eaten by the otters. However, the presence of relatively big insect remains in the majority of our samples suggests that the otters use this item constantly in their diet, rather than eventually. One sample consisted almost exclusively of insects thus confirming our hypothesis. The insects may be an important food source when the preferred prey species became scarce. The presence of this item in the otter diet confirms the results obtained by JOSÉ and ANDRADE (1991) for Lutra longicaudis in the state of Espírito Santo.

ACKNOWLEDGEMENTS - This study was made during the field course of Ecology, Conservation and Wildlife Management of the Universidade Federal de Minas Gerais and received financial support of the Furnas Centrais Elétricas, Fundação Biodiversitas and US Fish and Wildlife Service. We are most gratefully to G.W. Fernandes and F. Vieira who read critically the manuscript and to people of the Furnas Hydrobiology and Hatchery Station for their help in the field work. K.L. Goodwin reviewed the English version of the text.

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NEOTROPICAL RIVER OTTER, *Lutra longicaudis*, BREEDING UNDER CAPTIVE CONDITIONS IN BUENOS AIRES ZOO, ARGENTINA

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Previous reports on captive breeding of this species were published by CUBAS et al. (1993) and BLACHER (1994). The later author reports three offsprings for the same female in a period of eleven months in the Curitiba Zoological Park, Brazil. In that case delayed implantation had apparently not occurred, as it was presumed by several authors (DAVIS, 1978).

In Argentina there is few information avalaible on this species kept in captivity. The more extensive report was from ROSENZVAIG (1976), but the author has not included reproductive aspects. We have no knowledge on breeding in captivity apart from BLACHERS (1994) report from Brazil.

Recently a female dropes a litter of two cubs in the Buenos Aires Zoo. The group of *L. longicaudis* consisted originally of two females and a male but one female died during the period of observation. The animals were kept in a two sectors appartable enclosure. Each sector has a pool of 1.5 x 2 x 0.3 m and three shelters in different levels as shown in Figure 1. The animals were allowed to join each other only during daytime.

November 02, 1994: Starting of observation period.

December 30, 1994: The male was removed with the intention to start with a strategy to keep the animals 30 days joined and 30 days seperated. In this period the diagnosis of a pregnancy should be feasible.

January 01, 1995: Pregnancy became already externally evident.

January 15, 1995: Two cubs were born in the superior burrow. One of the cubs died. Necropsy gave no result for the reason of death.

February 28, 1995: The remaining male cub opened his eyes.

March 08, 1995: The young animal first explored the area outside the burrow. The female transported him in the mouth, avoiding water in her crosseds (the level of the pool was lowered to two inches).

March 30, 1995: The young first bathes in the pool.

At least in this case delayed implantation has not occured.

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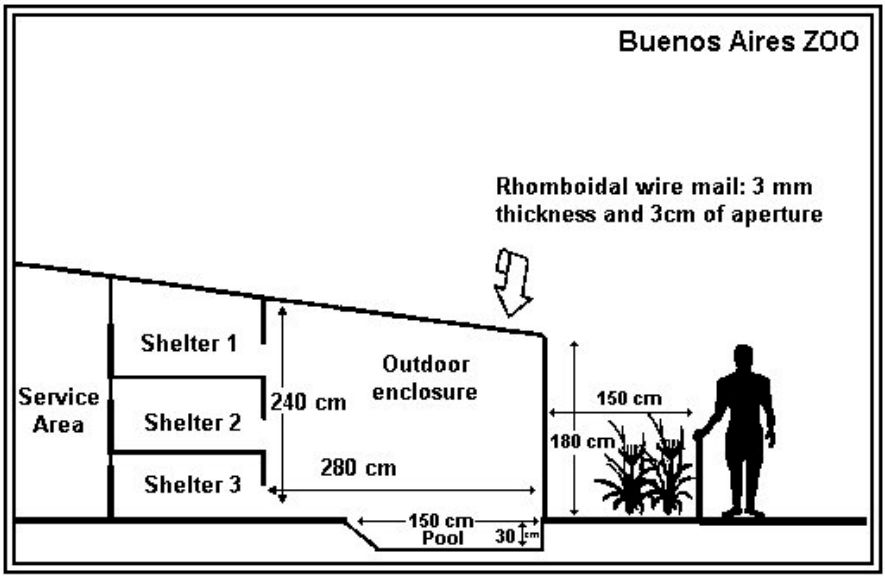
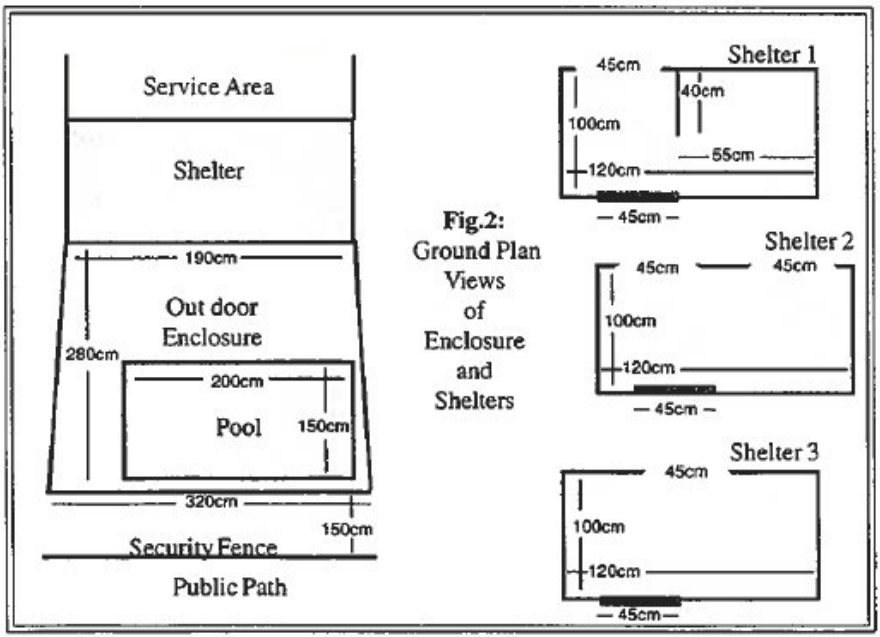


Figure 1: Otters' enclosure (*Lutra longicaudis*). Lateral view.



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WWF FORSCHUNGSBERICHTE

In this publication serie of WWF Austria two issues on the otter *Lutra lutra* were already published. Aspects covered are status of the otter in Austria, ecology, otter and fish ponds, causes for otter mortality, etc. The third issue is in press. Topics covered are status and distribution of the otter in Styria, otter and the problem of fish damage and PCBs and the otter in Austria.
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RUSSIAN LITERATURE

Dr. Jevgeni Shergalin is providing literature reviews for the Russian literature on all aspects of biology.
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IN HET SPOOR VAN DE OTTER
JONGH, A. de

In this book, written in Dutch, Addy de Jongh gives an overview on the otter (*Lutra lutra*), on plans for its conservation in the Netherlands and on the recently opened OTTERPARK AQUALUTRA.
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De Groene Stêr 2
8926 XE Leeuwarden
NEDERLAND

V I D E O

LA VIE SECRETE DES LOUTRES
(VHS - PAL, 31 min)

In this excellent video of Jean-Claude RENAUD, Centre de Reintroduction des Cigognes et de Reproduction de la Loutre, all aspects of the reproduction of *Lutra lutra*, (mating, pregnancy, birth of two cubs, suckling period) are shown in pictures never taken before.
For further information please contact the author:
Jean-Claude RENAUD
Centre de Reintroduction des Cigognes et de Reproduction de la Loutre
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L A S T M I N U T E N O T E S

BIODIVERSITY SUPPORT PROGRAM

The Biodiversity Support Programm (BSP), a consortium of WWF, The Nature Conservancy and World Resources Institute, funded by the US Agency for

International Development (USAID), is pleased to announce its 1995 Conservation Impact Grants Program.
Conservation Impact Grants submitted to BSP should aim to produce knowledge that will offer solutions to specific conservation and development challenges.
The deadline for submission of proposals is **March 15, 1996**.
For further information please contact:
Margaret M. Symington
Director for Research
c/o World Wildlife Fund
1250 24th Street, NW
Washington, DC 20037
USA
Tel.: (202) 293 4800
Fax.: (202) 293-9211

WORKSHOP ANNOUNCEMENT

OTTERS *LUTRA LUTRA* A PEST AT FISH FARMS?
8.-9. February 1996
Litschau, Austria

Due to the increased conflict between fishfarmers and conservationists the meeting will provide a discussion platform for the following topics:

* damage assessment
* damage prevention
* translocation of otters
* fish farming
* spraint analysis

For further information please contact:
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E R R A T U M

In issue 11 the first letters in the first column of one table were missing. The editor apologises for his mistake.

Jameson, J.R. 1995. Some preliminary observations on the foraging of sea otters off the outer coast of Washington State, USA. IUCN Otter Spec. Group Bull., **11**, 8-12.

Tab. 1: Summary of sea otter foraging data collected in Washington, summer 1994. Data are grouped by major taxonomic group.

Group	Occurence	Prey number	Prey not counted	Prey number + prey not counted	Percent occurence	Percent by number	Percent prey number + prey not counted
Bivalve	1364	2657	182	2839	33.85	29.18	28.01
Crab	461	661	50	711	11.44	7.26	7.02
Snail	431	2603	53	2656	10.70	28.58	26.21
Gumboot Chiton	70	73	0	73	1.74	0.80	0.72
Sea Urchin	65	293	11	304	1.61	3.22	3.00
Worm	41	62	10	72	1.02	0.68	0.71
Sea Star	18	18	0	18	0.45	0.20	0.18
Sea cucumber	7	7	0	7	0.17	0.08	0.07
Kelp	2	2	0	2	0.05	0.02	0.02
Unidentified Prey	1569	2720	722	3452	38.94	29.98	34.06
Octopus	1	1	0	1	0.02	0.01	0.01
Total	4029	9107	1028	1013[illegible]	100.00	100.00	100.00

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