IUCN OTTER SPECIALIST GROUP BULLETIN

The IUCN Otter Specialist Group Bulletin appears biannually. Articles, reports, symposium announcements and information on recent publications are welcome. All submissions should be typed in double-spacing. The submission of an electronic manuscript (winword, wp or ASCII) on diskette is strongly recommended. Reports should not exceed 2000 words in length, i.e. not to exceed four printed pages, including diagrams and tables. Articles may be longer. Diagrams, maps and tables should be included as a photocopy ready for reprint.
Articles will be fully reviewed. Reports will be accepted/refused by the editor. Authors are requested to add a notice whether they submit an article or a report.

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DEADLINE

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EDITOR'S NOTE

NOTE FROM THE EDITOR

The issue 13/2of the IUCN Otter Specialist Group Bulletin is printed due in time. The move to the new University of Veterinary Medicine is finished and in the moment the financial situation of the Bulletin has improved. The publication of this issue is sponsored by the BUNDESMINISTERIUM FÜR WISSENSCHAFT UND FORSCHUNG - BMWF. For their contribution to my personal printing costs of the last issue 13/1 I would like to thank (in alphabetical order) and hope not to forget someone: Rainer ALLGÖWER, Motokazu ANDO, Hermann ANSORGE, Koen van den BERGE, Edwin BRUSSEE, Dietrich DOLCH, James FAIRLEY, Rosemary GREEN, Xavier GRÉMILLET, Lee HARDING, Hélene JAQUES, Jan KADLECIK, Andreas KRANZ, OTTER ZENTRUM HANKENSBÜTTEL, Claus REUTHER, Hiroshi SASAKI, Scott SHANNON, Franz SUCHENTRUNK, TREBON OTTER FOUNDATION, Werner TSCHIRCH, Heike WEBER, James WILLIAMS, Paul YOXON - IOSF and two anonymus contributors. The INSTITUTE FOR WILDLIFE RESEARCH AND NATURE PROTECTION, KLAGENFURT paid the main part of the last issues´ postage.

In this issue you will find four reviewed articles and another two are already in the state of review. For articles there will be no deadline anymore as this causes only confusion and may result in delayed printing. Articles are welcome all year around and will be fully reviewed by at least two reviewers. Reports will be published without a review system as we had it the last years but authors are requested to keep the deadline for reports in their mind.

For their help in searching literature, editing and printing of this issue I would like to mention the „Otter Bulletin Team" Barbara Gutleb-Rainer (Vienna), Hans van den Berg (Wageningen) and Els Hoogsteede-Veens (GRAFISCH SERVICE CENTRUM VAN GILS, Wageningen). Without their efforts the Bulletin could not be published in its present form.

As a group we deal with otters and the protection of their aquatic environment is one of our main goals. Therefore it is a great pleasure for me to announce that our print-office - GRAFISCH SERVICE CENTRUM VAN GILS, Wageningen received on July 29th 1996 the „Milieuzorgstempel", the highest environmental award for printing companies in the Netherlands. Van Gils got this award with the highest score of all nominated companies for their efforts in environmental protection.

The foto on the front cover of issue 13/1 was provided by Juan Pablo GALLO from Mexico. I apologise for „translocating" him to Argentina.

A R T I C L E

FOOD AVAILABILITY VERSUS FOOD UTILIZATION BY OTTERS (*Lutra lutra* L.) IN THE OBERLAUSITZ PONDLAND IN SAXONY, EASTERN GERMANY

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Abstract: Feeding ecology of otters *Lutra lutra* in the Oberlausitz carp-pond area in Saxony, Germany, was studied between June 1994 and June 1995. 359 spraints were collected and analysed. Prey-fish availability was estimated by pond-stock data and electrofishing. The aim of the study was to investigate seasonal prey availability versus prey utilization by otters in the pondland. Otters are specialized feeders on fish throughout the year. They do not always feed on the most abundant prey (fish) but select in a special manner. Probably behaviour, distribution and/or nutrient value of the potential prey influences the otter's choice.
Keywords: otter, *Lutra lutra*, feeding ecology, pondland, food availability, food selection

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INTRODUCTION

Due to the severe decline of Eurasian otter (*Lutra lutra* L.) populations in many European countries the species is classified as highly endangered (Mason and Macdonald 1986). In Germany it is listed among the country's most endangered mammals and is classified in the "Red List" as "threatened by extinction" (Nowak et al. 1994). In north-eastern Saxony, a breeding otter population still exists. This might be a focus from which the species may expand to areas where it is currently extinct. This population which has a small distribution exists in the Oberlausitz pondland (Ansorge 1994). Considering the current status of otters, Saxony has a high responsibility for the conservation of the species within its borders. In 1993 the Saxonian State Government implemented the "Otter Conservation Programme". The coordination lies with the Saxonian Department of Environment and Geology in Radebeul/Dresden.

As part of the "Conservation Programme", a study of the feeding ecology of otters in the Oberlausitz pondland was undertaken between June 1994 and June 1995. Spraints were collected in a fish-pond area and prey-fish availability estimated by pond-stock data and electrofishing. Such investigations on otter diet in an economically-used pond area had not been undertaken until now. Steps, to conserve the food resources and the wetland habitats of otters, are urgently required for the protection of the core populations in the Oberlausitz pondland.
The aims of the study were: 1. To record seasonal availability and dispersion of the main prey of otters in the pondland, 2. To determine seasonal food utilization by otters in the pondland.

STUDY AREA

The study area is located within the Biosphere Reserve "Oberlausitzer heath and pondland" in eastern Saxony. Since the Middle Ages the Oberlausitz pondland - the largest interconnected pond area in Germany - is characterized by carp-pond farming. Carp (*Cyprinus carpio*) are classified by age/size and stocked in different densities in the ponds. Beside carp, other species may be stocked but in much lower densities; these include pike (*Esox lucius*), tench (*Tinca tinca*), perch (*Perca fluviatilis*), pike-perch (*Stizostedion lucioperca*), wels (*Silurus glanis*) and grass carp (*Ctenopharyngodon idella*). On average the ponds are 1 to 1.3 m deep and their important characteristic is their regular draining during winter. There are a lot of carp-ponds with near natural shores and a wide system of ditches ensuring the necessary habitat structures with favourable feeding conditions for otters.
The study area covers 300 ha, contains 13 fish-ponds from 550 m² to 21 ha of size, totaling 75 ha of water surface. A small river (7 m wide, up to 1.5 m deep) runs also through the area. Both running and still waters of different sizes, bank structures and with diverse food availability are close together and otters can easily move between them.

MATERIAL AND METHODS

Recording otter signs and diet

The study area, particularly along pond and river banks, and ditches was searched for presence of otter signs such as spraint sites, spraints, tracks etc. An average of 130 "collecting sites" was visited over several consecutive days of each month, always in the same sequence. Only fresh spraints, less 24 h old, were collected, placed separately in polythene bags and stored deep-frozen. In the laboratory, they were oven-dried at 50°C for 48 h, weighed and soaked for 24 h in 0.2 l saturated solution of concentrated washing powder. This solution was sieved through a 1-mm-sieve, the remains transferred to filter paper in a Petri dish to dry. For spraint analysis the undigested remains (e. g. scales, vertebrae, bones, teeth, fur, feathers) were identified from reference collections and with special identification keys. Identification of fish remains in the spraints was mostly possible to species level. Cyprinids (*Cyprinidae*) could only be identified to species level if pharyngeal teeth, operculae, otoliths or, exclusive for carp, praemaxillare or dented fin rays were present. In the absence of these characteristic structures the fish was considered as "unidentified cyprinid".

The results of the analysis are presented as relative frequency of occurrence (number of spraints in which prey type occurs x 100/the sum of counts for all prey types).

Recording fish availability in the study area

1. Information on seasonal amount and composition of the fish stocked in each pond was obtained from the fish-farmer.
2. Data on the occurrence and composition of so-called "wild-fish", i. e. fishes that get into the ponds unintentionally by e. g. river water or stocking, were obtained after pond draining. Main "wild-fish" species in the ponds were perch, roach (*Rutilus rutilus*), Moderlieschen (*Leucaspius delineatus*), three-spined stickleback (*Gasterosteus aculeatus*), ruffe (*Gymnocephalus cernua*) and pike.
3. Data on the relative abundance and size composition of resident fish species in the river were obtained by electrofishing carried out seasonally on two sections of the river in the study area.

For comparison of fish availability in the river and in the ponds the recorded abundances of the different fish species were calculated as number of individuals per hectare area of water. The data are presented as percentage of occurrence for each fish species.

Jacobs Index of Preference (Jacobs 1974) was calculated to compare the proportions of prey fishes in the spraints to the available fishes in the environment, in order to assess the degree of preference for a fish category. Only fish categories presented in the diet and in the environment were used in the calculations. Jacobs Index of Preference (D) is defined as:

$$D = (r-p) / (r+p-2rp)$$

(r = relative proportion of prey category in the diet; p = relative proportion of the same prey category in the environment).
The index D varies from -1 to 0 for negative preference, from 0 to +1 for positive selection and 0 means no preference.
Data were divided into four seasons: summer (June-August), autumn (Sept-Nov), winter (Dec-Feb) and spring (March-May).

RESULTS

The results are based on the analysis of 359 spraints, collected between June 1994 and June 1995.

Fish, the dominate prey throughout the year, made up 88.5 % of the otter diet (Fig. 1). Crayfish (*Orconectes limosus*) was the next most important prey (4.8%). Other prey such as amphibians (2.3 %), insects (2.8 %), birds (0.9 %) and mammals (0.8 %) made a small contribution to the diet.

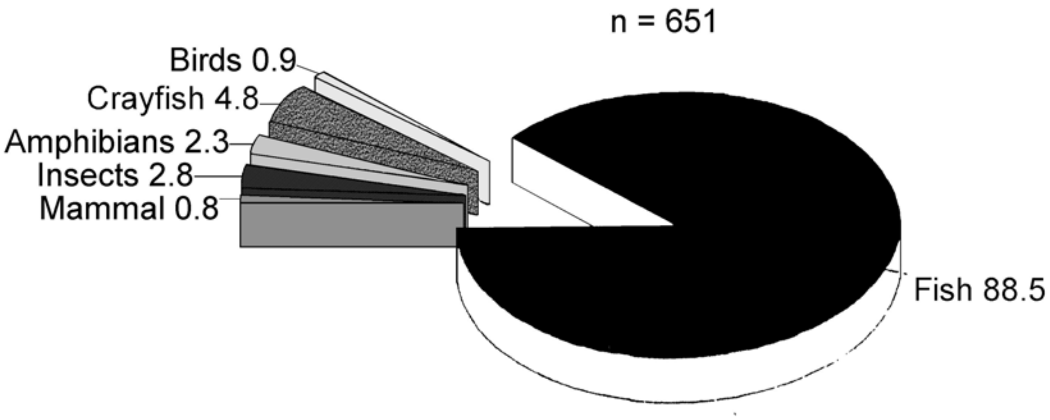

Figure 1: Percentage occurrence of prey categories in otter spraints from Oberlausitz pondland between June 1994 and June 1995. n = total number of occurrences.

The comparison between diet of the otters and prey fish availability is given in Fig. 2.1-2.4 for all four seasons.

Summer (Fig. 2.1)

Seventy per cent of all fishes in the study area were carp and were found most frequently (47 %) in spraints. Perch was found in 30 % of the spraints, though they made up only 4 % of fish population. Roach took the second most common fish availability (14.5 %) but it was found in only 4.5 % of the spraints. *L. delineatus*, small cyprinids, made up 9 % of available fish, i. e. more than twice as much as perch, but were represented in only 7.6 % of the spraints. In this season the otters prefered perch (Jacobs Index of Preference: D=0.72) and showed a negative preference for carp (D=-0.61), roach (D=-0.66) and *L. delineatus* (D=-0.23). Availability of other prey fish species was fairly low and were hardly found in the otter diet.

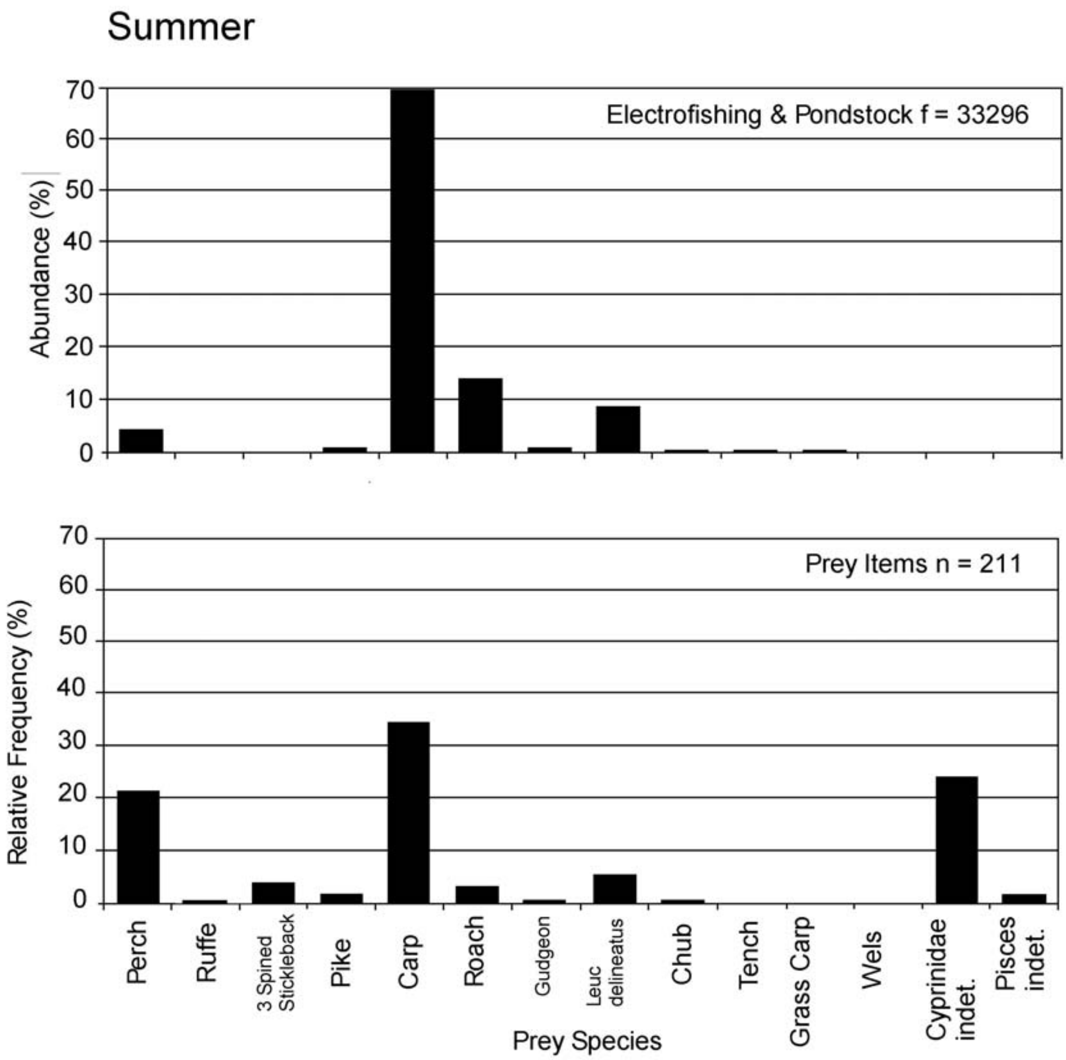

Figure 2.1: Availability of prey fishes in the study area (f = number of individuals per hectare area of water) and relative frequency of occurrence in spraints (n = total number of prey items in spraints) during summer.

Autumn (Fig. 2.2)

In the autumn several species were found more frequently in the diet than would be expected by the availability data. Again, carp (74 %) made up the biggest part of the fish population and found in about half the spraints. Although the small cyprinid species, *L. delineatus*, was represented in the diet almost as frequently as carp, it was not caught in the electrofishing. Perch and pike were found ten times more frequently in spraints than expected by availability. There was again a negative preference (D=-0.81) for carp and a positive preference for perch (D=0.69) and pike (D=0.67). Tench, though available, did not occur in the otter diet.

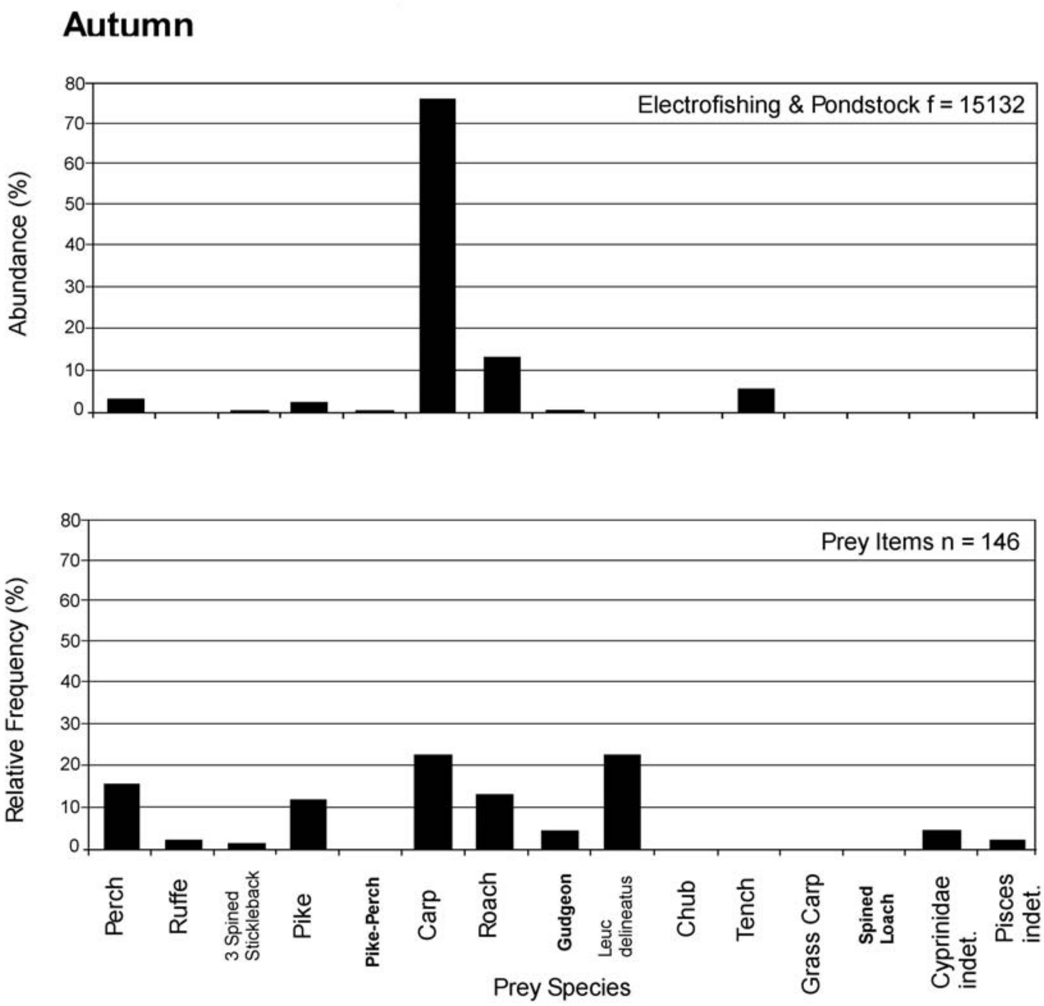

Figure 2.2: Availability of prey fishes in the study area (f = number of individuals per hectare area of water) and relative frequency of occurrence in spraints (n = total number of prey items in spraints) during autumn.

Winter (Fig. 2.3)
Even in winter carp (78 %) was most available in the study area because six ponds were stocked with carp in fairly high densities during the cold season. Perch (44 %) was found in almost the same number of spraints as carp (45 %). Pike occured five times more frequently in spraints than expected by availability. Also in winter, the otters seemed to prefer perch (D=0.82) and pike (D=0.51) to carp (D=-0.81).

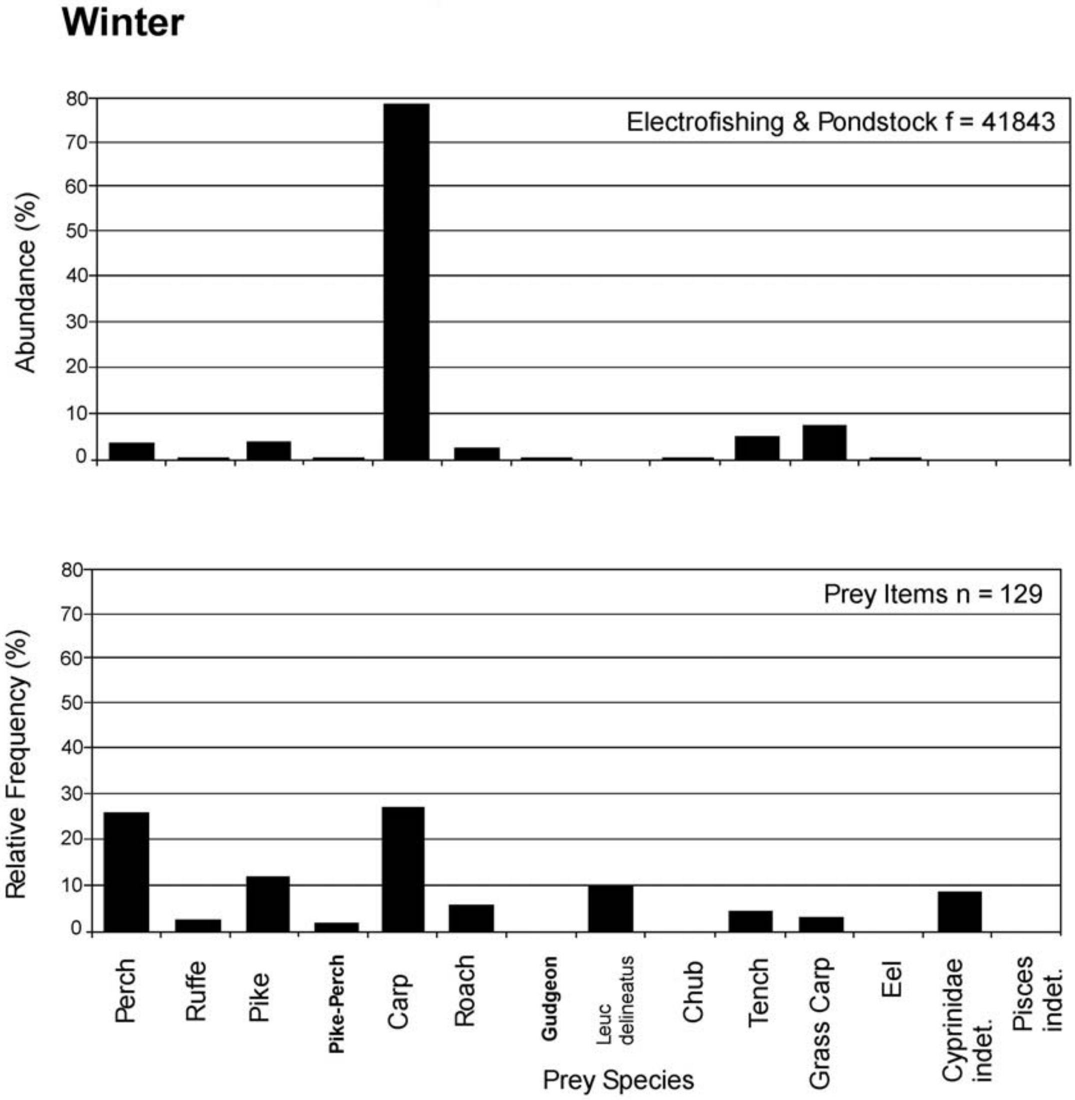

Figure 2.3: Availability of prey fishes in the study area (f = number of individuals per hectare area of water) and relative frequency of occurrence in spraints (n = total number of prey items in spraints) during winter.

Spring (Fig. 2.4)

In spring 93 % of all available prey fishes in the study area were carp but roach, only 4.6 % of available fish, was found just as much as carp in the otter diet. This displays a positive selection for the cyprinid species roach (D=0.78) contrary to carp (D=-0.94). There was a positive preference for perch (D=0.86) and pike (D=0.98), both species occured in more than 20 % of the spraints, though they were available only in quite low numbers in comparison to carp.

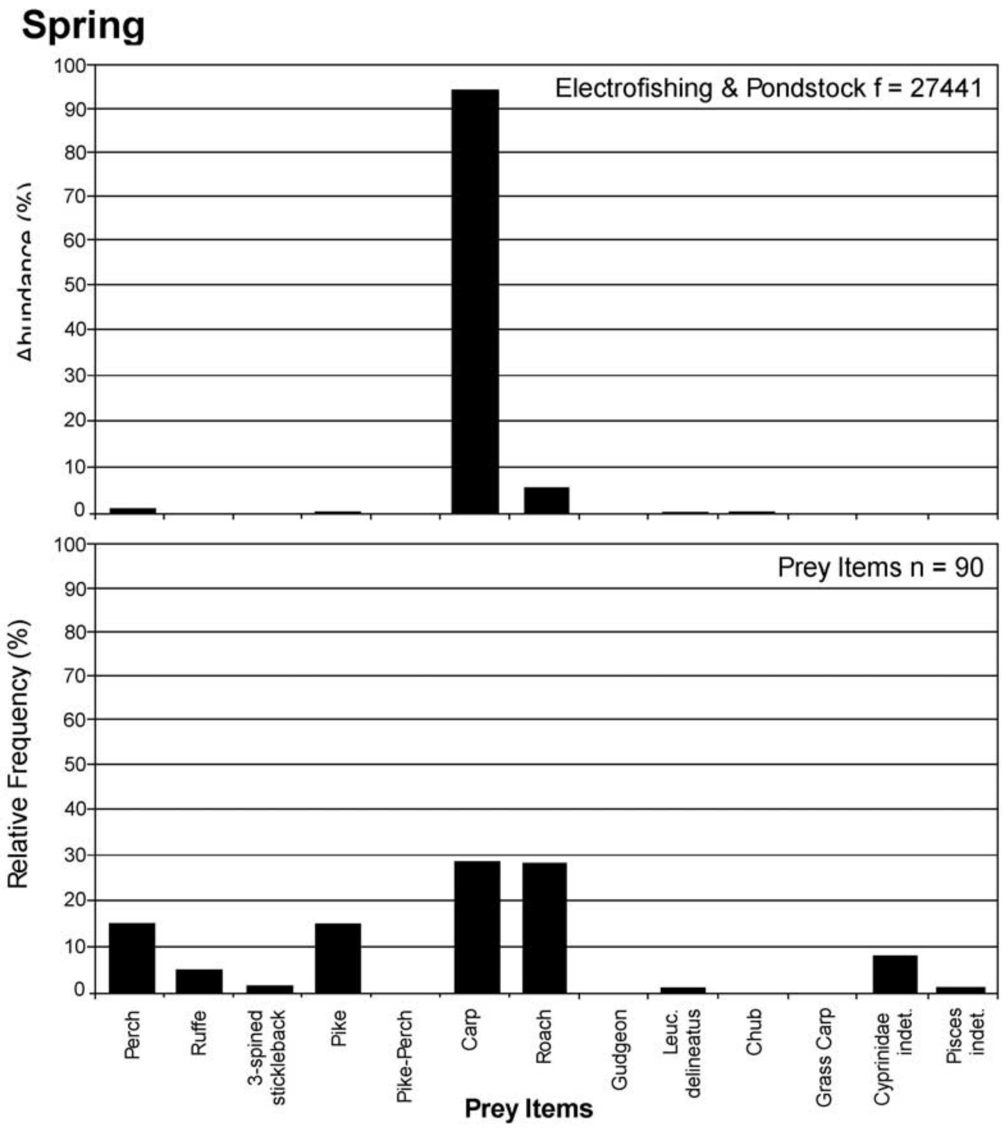

Figure 2.4: Availability of prey fishes in the study area (f = number of individuals per hectare area of water) and relative frequency of occurrence in spraints (n = total number of prey items in spraints) during spring.

DISCUSSION AND CONCLUSIONS

The results of spraint analysis of otters in the Oberlausitz pondland showed that fish is the most important prey item eaten in this fish-farming area during all seasons of the year. These results are similar to other studies from freshwater habitats in northern and central Europe (Erlinge 1967, Webb 1975, Wise et al. 1981, Hansen and Jacobsen 1992, Hofmann and Butzeck 1992, O'Sullivan 1994). In southern Europe other prey categories, like amphibians or crayfish, are an important contribution to the otter diet (Macdonald and Mason 1982, Prigioni et.al. 1986, Adrian and Delibes 1987). The diet of the otters in the Oberlausitz pond area consists mainly of individuals of the Cyprinidae, Percidae and Esocidae families. Out of 16 fish species which are found in the study area only five were eaten in an amount worth mentioning. The main prey fish, carp and perch, made up around 44 % of the total diet and 50 % of the fish diet of otters.

Crayfish are considered an important prey item for otters in other studies (Erlinge 1967, Hofmann and Butzeck 1992). In Spain, for example, Adrian and Delibes (1987) found up to 80 % in the otter diet was crayfish. In the present study, crayfish were indeed the second most eaten prey group, but they contributed little (4.8 %) to the otter diet. Possibly, crayfish occur in much higher densities in these otter study areas, and, therefore, are eaten by otters more frequently. No data of crayfish abundance or availability are given in these studies.

Amphibians, insects, birds and small mammals were only occasionally taken by the otters in this carp-pond area. These are considered important alternative prey if for instance fish abundance/availability is declining (cf. O`Sullivan 1994), however, this does not seem to be the case here.

Specimens of the Cyprinidae family are the major prey in the present study as in other eutrophic lakes and streams (Wise et al. 1981, Hansen and Jacobsen 1992, Hofmann and Butzeck 1992). Some studies (Erlinge 1967, Webb 1975, Hofmann and Butzeck 1992) have found cyprinids to be eaten less often in summer than during the rest of the year. This is not the case at this study. This is probably due to carp being available throughout the year. They made up 70-93 % of all prey fish in the study area and were found in over 40 % of spraints in all seasons. Carp are bottom-living fish and prefer to stay under overhanging bankside vegetation and aquatic plants. Because of the shallow nature of fish-ponds and, apart from a few reed beds nearly no aquatic vegetation, these slowly moving fish fall easy prey to otters. In other studies (e. g. Kruuk and Moorhouse 1990) slow-moving and bottom-living species are taken most by otters. In winter carp are stocked in the ponds in much higher densities than in summer. These densely packed and almost torpid carp are easy to capture. However, it has been observed that otters ate only the flesh and left the bony structures of large prey fish. This behaviour might be a problem with large carp and would lead to their importance being underestimated in spraint analysis. Remains of large fish were seldom found in the study area, might be because fish carcases abandoned by otters were quickly eaten by other animals like fox and heron (Geidezis 1995, pers. obs.).

In the study area the most common river fish is roach. Though available in higher numbers during the summer, their presence in spraints was the lowest recorded. This is probably due to the fishes' increased activity when water temperature is higher (Webb 1975), making them harder for the otter to catch. The seasonal variation in roach can also be influenced to their migratory behaviour at certain times of the year, e. g. they gather in shoals to overwinter and to spawn in spring. Shoaling may make them capture by otters easier. Also, in autumn pond-draining leads to an increase in fish numbers in the river for a short time. In the present study roach was taken by otters more frequently in autumn and spring than expected by availability data.

Otters ate *L. delineatus* in high numbers, especially in autumn. These small, shoal-living fish were found in 50 % of spraints, though, these species was not caught when electrofishing in autumn. As mentioned above, at the end of September pond-draining starts and at that time many *L. delineatus* and other species enter the river. When electrofishing was carried out at the end of November numbers of these fish species in certain areas of river were probably decreasing. It seems easy for otters to catch this fish (mostly under 5 cm long) because some spraints contained up to 30 individuals and nearly nothing else.

Tench, though, third prey availability in summer, autumn and winter, occured only in the winter otter diet. Tench stop feeding and hibernate in the bottom of ponds or rivers in winter, probably when they are least readily available to otters. This species, however, was only found in the spraints collected in winter. A reason could be, because tench were stocked together with carp in two small winter-ponds (each around 550 m²), foraging otters in these ponds frightened the tench. Also, it could be possible that tench, hiding in the mud, are a particularly easy prey because of the "otter's sense" for prey (e. g. eel) in the mud. It is worth mentioning that no carp were left in these ponds but many tench were still present at harvesting in spring. Otters appear to prefer other prey fish species if they are readily available.

Perch was eaten more frequently by otters in all seasons, especially in winter, than expected by relative availability data. A tendency that percids are very important in winter was also found by Erlinge (1967), Webb (1975), Jenkins et al. (1979) and Hofmann and Butzeck (1992). Observations on foraging behaviour of otters in Otter-Zentrum, Hankensbüttel (Rogoschik 1995, pers. comm.) showed perch an easy prey for otters because of its anti-predator-behaviour - they became motionless when an otter approached and therefore easy for the carnivore to catch. Feeding trials carried out in the Otter-Zentrum, Hankensbüttel (Jurisch and Geidezis in prep.) showed that nearly all perch remains are defecated within 24 hours (cf. Carss and Parkinson 1996). The problem of overestimation of perch in spraint analysis is thus restricted.

Pike contributed only a small part to otter diet in summer but was taken more frequently than expected by availability data in autumn, winter and spring. Pike stays mostly between aquatic plants close to the bank and lies in wait for its prey. However, this species has only a low capability of sustained swimming. This is probably why it is not difficult for otters to catch. This is especially true in autumn and winter, when plant cover is missing.

In conclusion the results of the study, it seems that otters are specialized feeders on fish in this pond area, despite the presence of other prey such as crayfish, amphibians, small mammals etc. which are available in large numbers as found by regular trapping or counting. Of all fish species, carp was the most readily available during all seasons (70-93 %) but was found on an average in only 46 % of all analysed spraints, reflecting a negative preference for carp. On the other hand only 3 % of all available prey was perch but this species was found in 33 % of the spraints, signifying a positive selection for perch. The otter is considered as an opportunistic predator, taking whatever is available. But these results seem to show that otters do not always feed on the most abundant prey (fish) but are selective. Probably behaviour (flight behaviour, catchability), distribution (pond or river) and/or even nutrient value of the potential prey influences the otter's choice. The frequent occurrence of perch and pike in the otter diet was striking. These species are predators and probably show a different flight behaviour as for instance roach, which might facilitate catching by otters.

***ACKNOWLEDGEMENTS** - The project was financed by the Saxonian Department of Environment and Geology in connection with the "Otter Conservation Programme". I like to thank the staff of the Biosphere Reserve "Oberlausitzer heath and pondland" for support and possibility to carry out the field work. I am especially grateful to the staff of the Saxonian Fishery Authority, Königswartha, for their unrestricted help in the field work. I also wish to thank PD Dr. U. Gansloßer for his advice and comments, Jim Conroy for improving the English text and all the persons who supported this project in different ways.*

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ARTICLE

THE CURRENT STATUS AND DISTRIBUTION OF THE OTTER *Lutra lutra* L., 1758 IN SERBIA AND MONTENEGRO

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Abstract: A total of 358 reports of otters from Serbia and Montenegro were collected and plotted onto 194 UTM squares. The data here have been divided between those resulting from direct observations (57%) and those from indirect observations (43%). We consider that status of the otter population to be encouraging, and probably stable at present in Serbia and Montenegro.
Keywords: *Lutra lutra*, current status, distribution, Serbia and Montenegro

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INTRODUCTION

Otters are one of the most intensively investigated mustelid species in Europe (Mason and Macdonald, 1986). Knowledge of the species is traditionally widespread amongst rural peoples of Serbia and Montenegro (Yugoslavia), but there has been little formal scientific research. The otter is only mentioned in general terms in the catalogue of the mammals of Yugoslavia (Djulić and Mirić, 1967) and in the list of the mammals of Serbia (Petrov, 1979), but more detailed data are scarce. Information on otter distributions and estimates of population sizes for the regions of Serbia (Petrović, 1989, Mirić, 1981, 1987) and the whole of the former Socialist Federal Republic of Yugoslavia (Liles and Jenkins, 1984; Reuther, 1980) are also scarce. On the basis of these data (ibidem) it has previously been concluded that few otters inhabit the territories of Yugoslavia. However, the most recent report on the species (Paunović and Milenković, 1994) shows that the population status of the otter in this area is actually rather better than previously supposed.

MATERIAL AND METHODS

Data presented in this paper cover the period between 1970 and 1995. They were compiled in three ways:

a) by examining physical evidence (e.g. skins, taxidermic preparations, skulls, parts of skeletons, bacculae);
b) through field research conducted by authors (and based on finds of traces such as scats, food remains, holts);
c) through oral and written enquiries made to biologists, hunters, game wardens, water bailiffs, foresters, naturalists, farmers, etc.

Here, only data that could be validated and was considered to be valid by the authors were taken into account. The persons interviewed were later included into a network of contacts, who continuously reported on each subsequent find or observation made. Sites are represented by UTM 10 km squares, but the number of finds exceeds the number of UTM squares represented on the map.

RESULTS

A total of 358 reports of otters were collected and plotted onto 194 UTM squares (see Fig. 1). Empty squares and the low density of full squares, although signifying the presence of otters in certain areas, also reflect a lack of evidence and research rather than any actual absence of otters. There is a notable absence of otter data from the province of Vojvodina, from central Serbia (especially along the lower course of the River Velika Morava), from southern Serbia, and from western and central Montenegro.

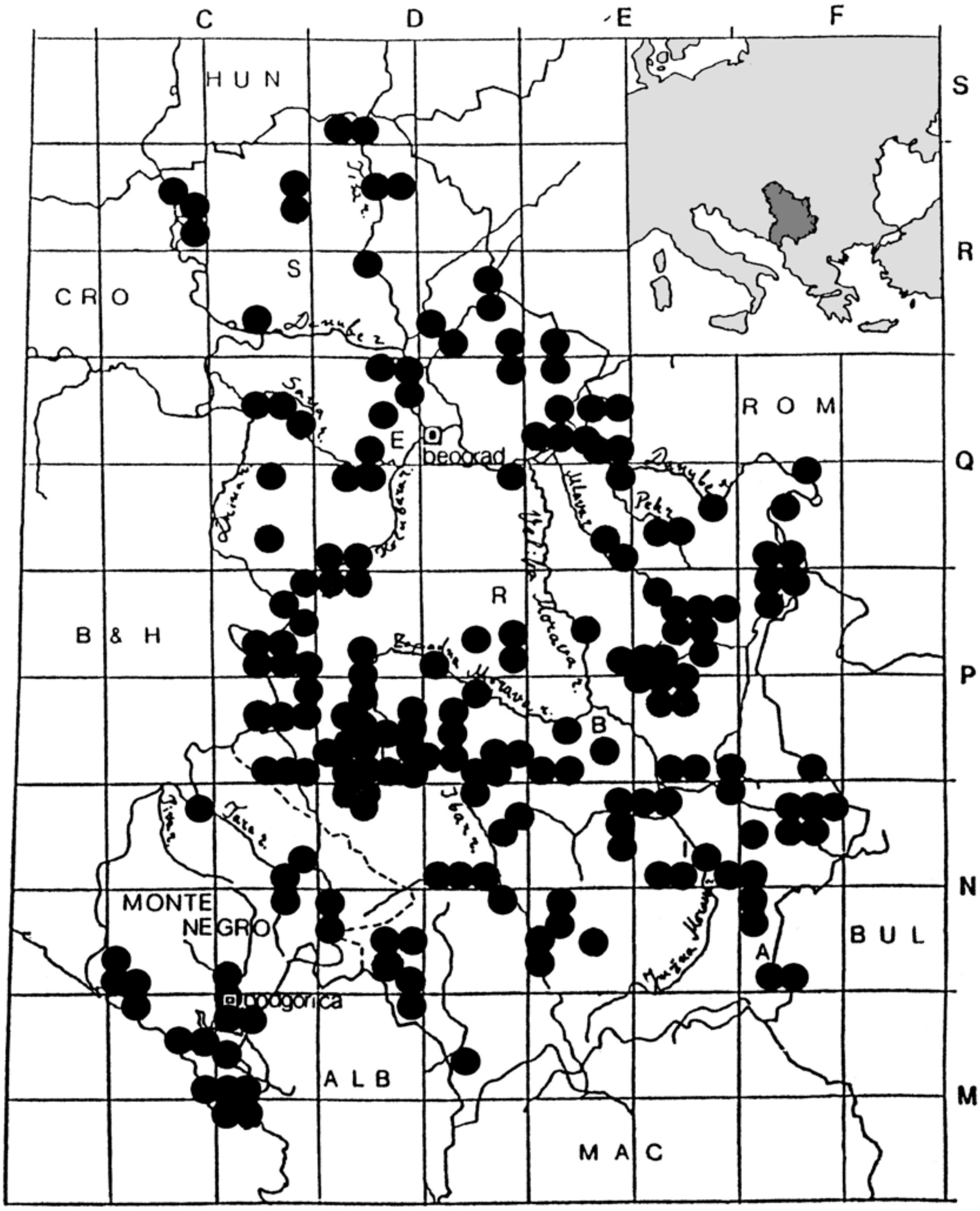

Figure 1: The distribution of otters in Serbia and Montenegro. Black squares indicate 10 km squares containing otters during the period of the survey. Empty squares may also reflect a lack of evidence and research rather than any actual absence of otter.

The data here have been divided between those resulting from direct observations (57%) and those from indirect observations (43%) (see Fig. 2).

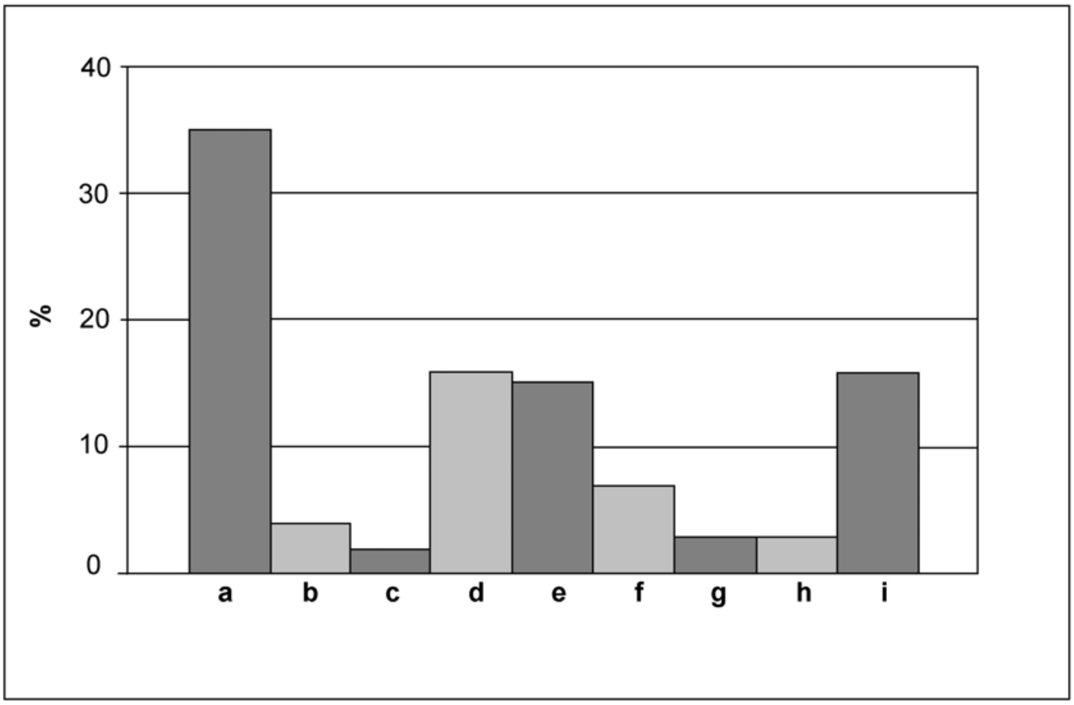

Figure 2: Percentage bars of types of "direct" (a, b, c, d) and "indirect" (e, f, g, h, i) evidence for the occurrence of the otter in the distribution maps. (a) from the direct observations of animals, (b). from physical evidence, (c) from road-traffic kills, (d) from other causes of death, (e) from spraints, (f) from tracks, (g) from food remains, (h) from holts, (i) from other types of evidence.

"Direct" data are considered to be those derived from the observation of animals in nature (126 records, 35%), data from physical evidence (14 records, 4%), from animals registered as having been killed by motor vehicles (7 records, 2%) or animals killed by various other means (58 records, 16%). "Indirect" data consist of data from spraints (53 records, 15%), tracks (26 records 7%), food remains (10 records, 3%), holts (8 records, 3%) and from other sources (56 records, 16%).

DISCUSSION

Within the study area the otter occurs in all types of natural wetlands, from lowland still-water habitats, to fast-flowing mountain streams and rivulets. It is also very common in reservoirs and other water bodies (e.g. ponds, pools, fish ponds) in which food is abundant and diverse. Its presence or absence appear to provide some indication of the degree of pollution in particular aquatic environments. The River Ibar, which has its source in western Montenegro, the main part of its course in northern Kosovo, and its confluence with the mouth of the River Zapadna Morava in central Serbia, provides a good example. In the 1970s, the River Ibar was polluted with various xenobiotics, including phenol, causing an almost complete disappearance of aquatic life. Once the discharge of pollutants was prohibited, aquatic communities began to regenerate. In 1982, the reappearance of the otter was reported in this river (Liles and Jenkins, 1984) and, during our research in 1994, the species was registered at two sites (UTM squares: DP 62 and DP 63). This shows the ecological flexibility of the otter, and its ability to respond readily to renewed favourable conditions in habitats from which it had previously disappeared.

In the coastal regions of Montenegro the presence of otters (although in very small numbers), was recorded in most of the water bodies found along the length of the seashore.

As far as vertical distribution is concerned, the otter occurs at altitudes ranging from sea level (0 m asl) along the shore of Montenegro and at 40 m asl in the very east of Serbia (on parts of the Valahian Plain), to 1,400 m asl in other parts of Montenegro and southern Serbia.

Within the study area the otter is protected within the framework of the hunting laws, within which it has been accorded protected status since 1976 in Serbia (Sl. glasnik 51/76), and since 1982 in Montenegro (Sl. list 36/82). The legislation on the prohibition of hunting is not always respected, but the positive effects of protection are noticeable. Hunting pressure is low, except in the vicinities of fish ponds, where the otter is considered to be a pest. It is well-known that the management authorities of a few fish ponds in central Serbia have demanded local suspensions of the prohibition on the killing of otters, but these requests have not be approved by competent institutions and the appropriate Ministry. Furthermore, although otters are hunted for trophies, they have no commercial value. More complete data on such trophies (mainly skins) are difficult to obtain, it being well-known that the otter is protected, and that the hunting of otters is subject to sanctions.

Otter road-kills are not uncommon on roads beside the larger water bodies, especially in lowland regions.

CONCLUSIONS

The results presented here provide a basis for the development of a more complete and realistic picture of the otter's distributional status within Yugoslavia, the otters being found to be widespread in all types of aquatic habitats in the study area. Its survival, status and presence in the territories of Serbia and Montenegro depend on the stability of the inter-relationships of the following factors:

- preservation of suitable habitats
- availability of appropriate food resources
- the provision of stricter and more rigorous legal protection for both the species and its habitats
- the intensity of road-traffic mortality

Although here are insufficient data for a more precise assessment of otter population size and trends, we may consider the status of the population to be encouraging, and probably stable at present.

We do not regard this article as being final, but only as an initial assessment of the otter in Yugoslavia. It is our belief that a special research project on the otter in Yugoslavia, supported by both national and international agencies and institutions, is desirable. This project would provide a basis for a thorough, comprehensive research programme, aimed at the provision of further data on the otter's biogeographical, ecological and taxonomic status, as well as on the issues of its preservation and protection in Serbia and Montenegro.

ACKNOWLEDGEMENTS

The making of the distribution map was made possible only with the data provided by our collaborators and colleagues. The authors are glad of the opportunity to thank them all for their assistance. Our special thanks go to our colleague and friend Slobodan Puzovi}, the curator of the Natural History Museum in Belgrade, and to Dr. Huw I. Griffiths (University of Hull) for revising the English text.

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A R T I C L E

ESTIMATING RIVER OTTER *LUTRA LONGICAUDIS* POPULATION IN IBERÁ LAGOON USING A DIRECT SIGHTINGS METHODOLOGY

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Abstract: The real status of the Neotropical river otter in Argentina is largely unknown. Heavy hunting pressure in the middle decades of the 20th century has subsided and the population is believed to be recovering, especially in protected areas. This study surveyed otters in the subtropical swampy Iberá lagoon using direct sightings. A high rate of otter sightings was found, indicating a good otter population in this area.

Keywords: *Lutra longicaudis* current status, distribution, Argentina

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INTRODUCTION

The neotropical river otter (*Lutra longicaudis,* Olfers 1818) has been poorly studied in its range, including Argentina. The species was listed as "vulnerable" in the IUCN/Red Data Book, but its real status is largely unknown in Argentina. It seems to have disappeared from some areas in the southern part of its original range, as a consequence of poaching, which was very intense during the middle of the century. Hunting pressure has shown a decrease since the eighties, and now this otter seems to be experiencing a population recovery, especially in protected sites, such as the present working area. However there is little information about this issue.

In Argentina we have broad surveys of *Lutra longicaudis*, reporting only “presence/absence” of the species, but never reaching a population density analysis in their goals (García-Mata, 1979; Parera and Bosso, 1991).

The main methodology employed for estimating otter populations in the world involve interpretation of signs (tracks and spraints mainly): for example "scent stations" in Georgia (USA), tracks in the snow in the Scandinavian Peninsula, radioactive spraints in Louisiana (USA) or inclusive "cold" spraints in Great Britain and other European countries (Clark et al., 1987; Skarén and Jäderholm, 1987; Shirley et al., 1988; Mason and MacDonald, 1986).

There are few population estimates based on direct observation of *Lutra* species (Lejeune and Frank, 1990; Ruiz-Olmo, 1996; Kruuk, 1995; Arden Clarke, 1986; Kruuk and Goudswaard, 1990), principally because otters are elusive animals.

In this work I employed a direct sightings sample method for estimating the otter population in a subtropical swampy lagoon.

MATERIAL AND METHODS

The work was carried out along the perimeter of the Iberá lagoon (28º 30' S, 57º 10' W), one of the most important water bodies (51 square kilometres) of the “Iberá swamps and lagoons system”, in the Iberá Provincial Reserve, Corrientes Province (Figure 1).

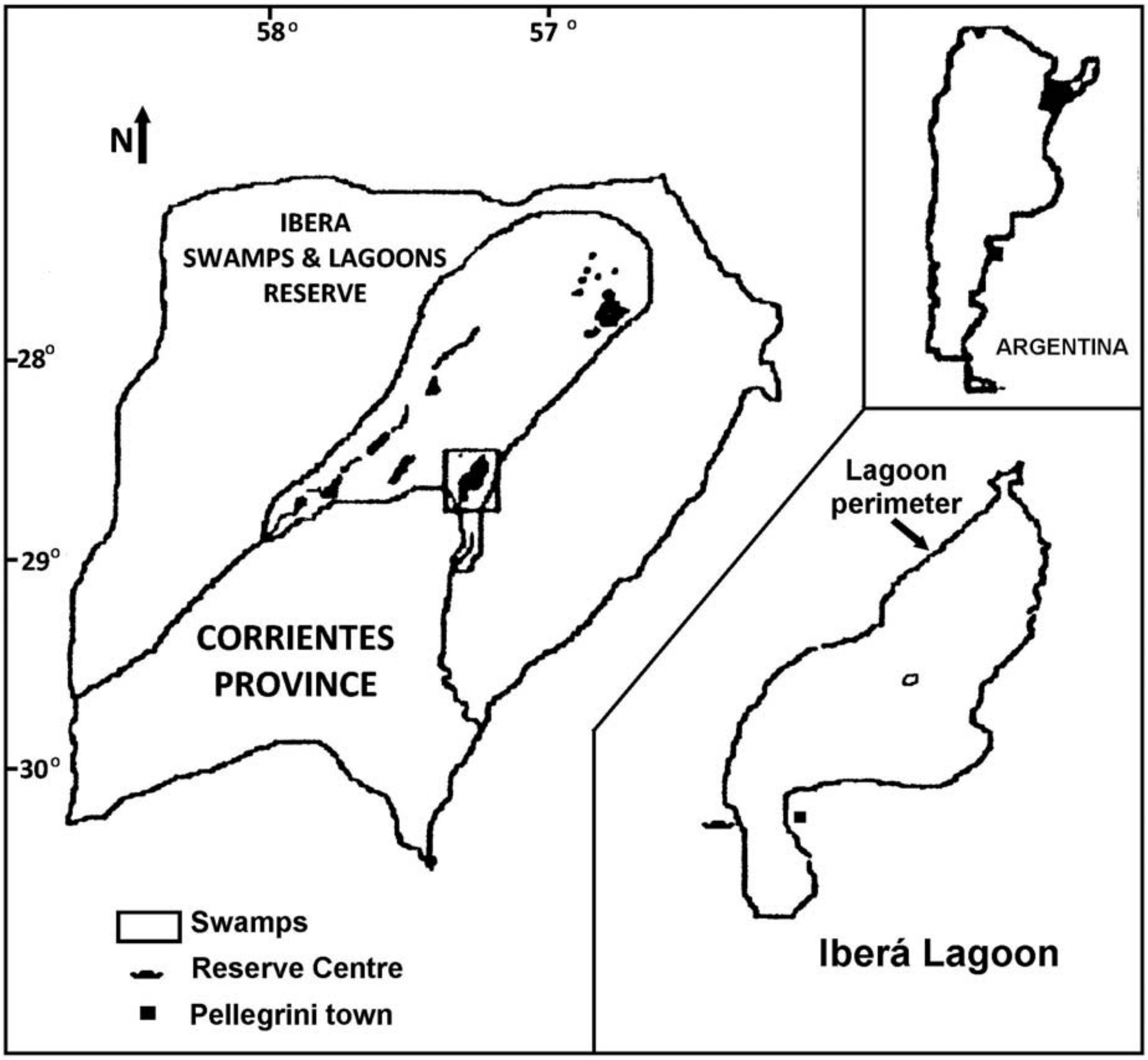

Figure 1: Iberá lagoon perimeter, and situation in Corrientes Province and Argentina.

The coastline consists of the "embalsado" (organic floating soil) with vegetation community largely dominated by plants of the genera *Thalia*, *Fuirena*, *Typha* and *Cyperus* (8 percent of the perimeter); embalsado with woody plants, mainly *Nectandra microcarpa* (Lauraceae) and *Erithryna crista-galli* (Papilionaceae) (10 %) and dry coast (2 %). Water depth varies from 1 m to 3 m along the census line, occasionally reaching 5m. Neiff (1981) offers a detailed description of this particular type of wetland.

Censuses were carried out using a silent "carpinchera" canoe, propelled by a large bamboo. Twenty four censuses (two observers each) were carried out between November 1989 and January 1992. For data analysis, I assume a constant otter density through the working period. Two of the samples covered the total perimeter (54 km) and the rest were partial, as is shown in Figure 2, totalling 222.3 km. Adults and subadult otters (recognized by their body size) were counted using 10 x 50 binoculars. Each otter was recorded only when it was clear that it had not been counted before in the same census (double counting avoided).

The total field work consisted of 389 hours of navigation and 331.3 linear kilometres of coast, considering total and partial census.

RESULTS

The total for all censuses was 251 sightings, implying 0.645 otters per hour navigated and a mean of 0.81 otters per coastal kilometre. The more successful of the total perimeter censuses (number 6 in Figure 2), reported 45 otters sighted. It was considered that the minimum number of otters along the lagoon perimeter was 0.82 otters per coastal kilometre. In partial censuses, higher values were obtained (Figure 2).

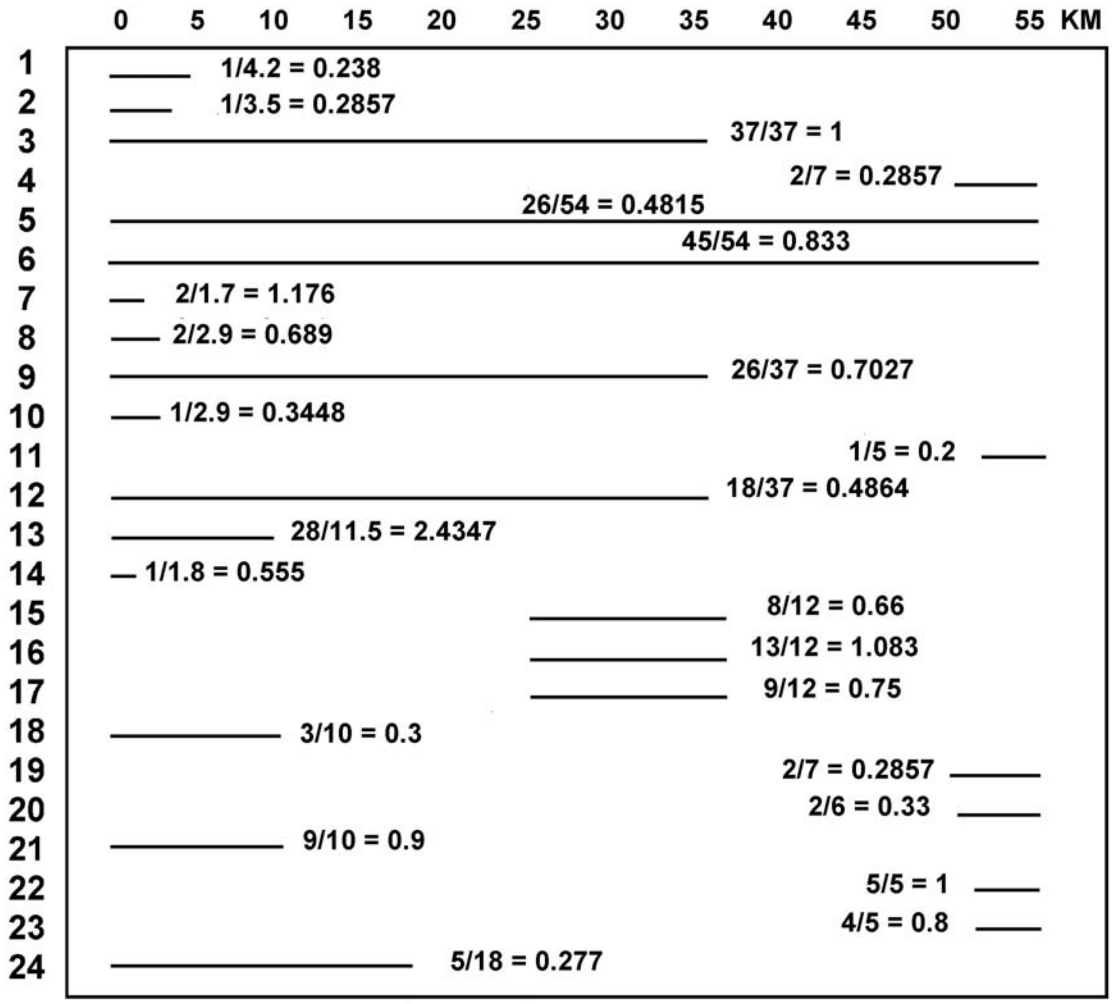

Figure 2: Length and relative location of the samples ("census"). The X axis represents the length of the perimeter with "0" in the "Interpretation Centre" of the Reserve (see Figure 1), advancing in clockwise sense. The 24 samples are indicated along Y axis. Census 5 and 6 covered the total perimeter. The formula indicates "otters/km=density observed".

Using these partial censuses, a range of "more accurate" density values was estimated. The lower value of this range of densities was obtained by summing the partial results of the coastal segments showed in Figure 3. This produced an estimate of 80 otters for the total perimeter (1.48 otters/coastal km). The segments in Figure 3 were defined using environmental considerations (such as vegetation type, coast irregularities) and having consistently spaced start and end points for the transects. The top of the range was estimated extrapolating the more successful partial census, which was number 13 in Figure 2. This indicated a maximum of 131 otters (2.43 otters/km x 54 km) for the total lagoon perimeter.

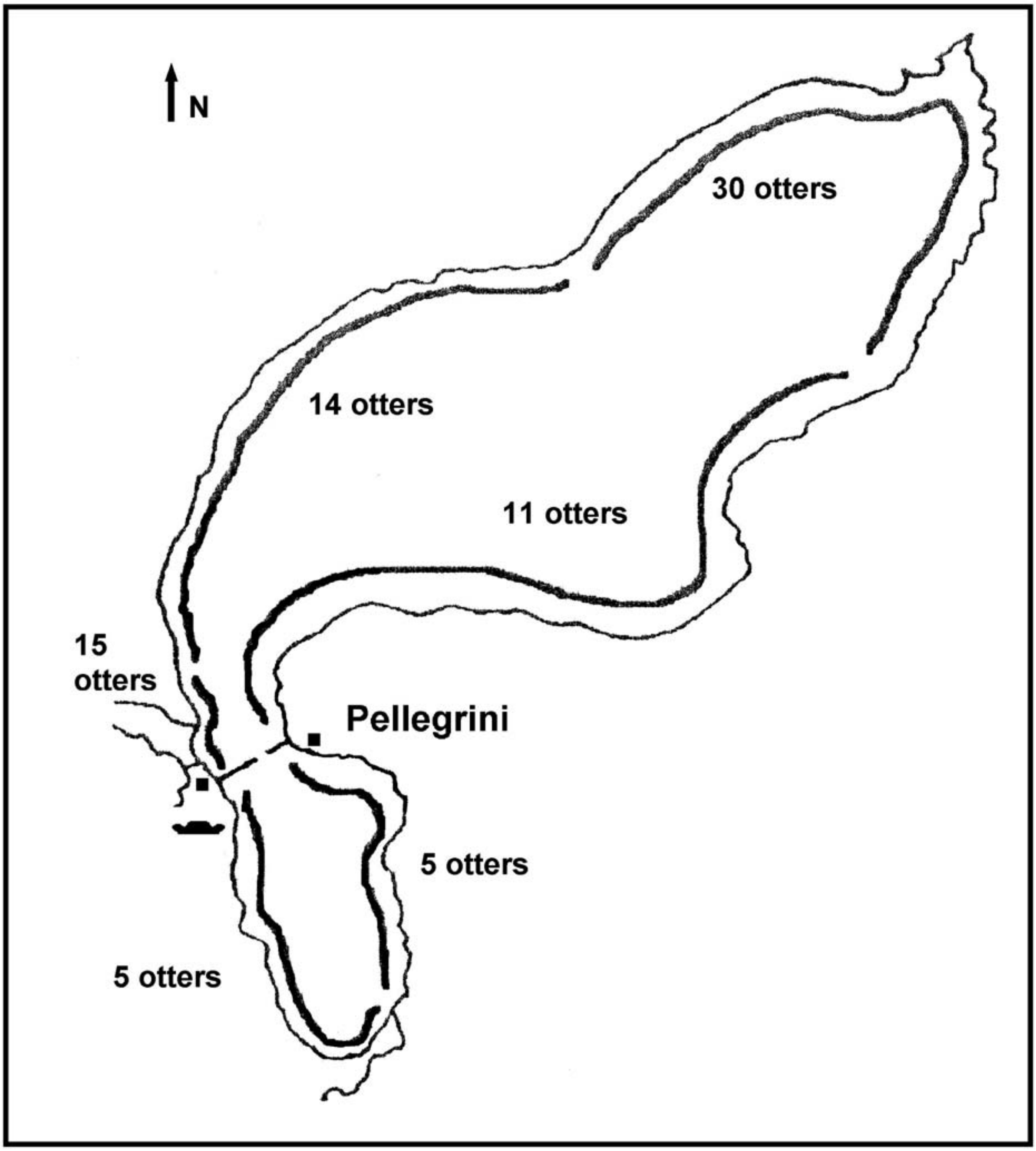

Figure 3: Iberá lagoon perimeter divided in six segments with a minimum reliable number of otter for each.

Thus, the "more reliable range" was between 80 and 131 otters (1.48 – 2.43 otters/km). This range is listed in Table 1 with other numbers obtained for wild otter densities by other authors.

DISCUSSION

At least in this part of its range and in this type of habitat, where otters show high levels of diurnal activity, direct counts can give a good estimate of population numbers. Most of the discrepancy between the values in the sample results could be attributed to climatic conditions, mainly wind, which makes sightings of swimming otters difficult, and different activity patterns or habitat use of the species throughout the year, and also on a daily basis.

The density figures obtained here are amongst the highest reported for *Lutrinae* (the comparison among different species of genus *Lutra* is generally accepted, see Mason and Macdonald, 1986; Kruuk, 1995; Ruiz-Olmo, 1996). For example, in marine habitats of the northern Hemisphere - where the numbers reported are considered the highest – the densities reported reach approximately one otter per linear kilometre of shoreline (see Table 1).

Table 1: Some examples of otter density reports in other parts of the world.

Species	District	Habitat	Density	Method	Source
Lutra canadensis	Alaska	Marine coast	0.47-0.53/km	Telemetry	Larsen (1983)
	Alaska	Marine coast	0.85/km	Telemetry	Woolington (1984)
	Alberta	Lake	0.1-0.06/km	Telemetry	Reid (1984)
	Idaho	Mountain river	0.26/km	Telemetry	Melquist & Hornocker (1983)
	Texas	Swamp	1 otter per 71 -106 ha	Telemetry	Foy (1984)
	Louisiana	Swamp	1 otter per 86 ha	Radioactive Scats	Shirley et al (1988)
Lutra lutra	Shetland	Marine coast	0.10-2.61/km	Direct counts + otter dens	Kruuk et al (1989)
	Shetland	Marine coast	~1/km	Direct counts (tagged otters)	Kruuk & Moorhouse (1991)
	Sweden	Lake & river	0.2-0.5/km	Tracks	Erlinge (1968)
	Byelorussia	Rivers, lakes, channels	0-0.6/km	Tracks	Sidorovich & Lauzhel (1992)
	Spain	Rivers	0.1-0.91	Direct counts	Ruiz-Olmo (1995)
Lutra maculicollis	Tanzania	Tropical lake	0.9-1.0/km	Direct counts	Kruuk & Goudswaard (1995)
Lutra longicaudis	Argentina	Subtropical lake	1.48/2.43/km	Direct counts	This study

This fact probably reflects the high productivity of this type of subtropical lagoon set in a swampy matrix. But, on the other hand, it is important to consider that this is not an entirely linear habitat, due to an interface existing between the water body and the swamps, rich in ponds and creeks, that maximize the habitat supply (i.e. prey and shelter). Thus the values obtained here, if presented in a linear sense, are probably over-estimated. I have no data about how far the otters from the shoreline in the water body or swamps, so the data cannot be presented in surface terms.

This present communication contributes a first estimation of the *Lutra longicaudis* density in this type of habitat. I believe this area is quite representative of nearby similar environments with low human impact in the central portion of the Corrientes Province, Argentina.

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ARTICLE

FISH FARMING REGIONS AS KEY ELEMENTS FOR NATURAL RECOLONISATION ALONG AN OTTER EECONET

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Abstract: High density otter populations currently exist in fish farming regions in central Europe. Migrating otters from these expanding populations can help recolonise depleted otter ranges in Western Europe. However, conflicts between fish farming interests and predating otters puts the latter at risk. Killing or relocating otters and large scale fencing (in effect habitat destruction) to protect fishery interests will disrupt the surplus character of these otter populations. A joint international effort is proposed to find the political and financial means to help solve this problem.

Key words: otter, fish farming, recolonisation

INTRODUCTION

The otter (*Lutra lutra*) is critically endangered or extinct within the industrialized core of western Europe. However, in several East European countries viable populations still exist (Macdonald and Mason, 1994). Opinions as to the means of repopulating depleted areas in western Europe vary from rapid recolonisation by artificial reintroduction to a much slower recolonisation as a result of natural dispersal. Such factors were discussed at a workshop on Ecological Networks during the 1994 Seminar on the Conservation of the European Otter (Council of Europe, 1996). Wolters (1996) envisioned the development of the European Ecological Network (EECONET) as a necessary tool in otter conservation and recolonisation. Reuther (1996) argued for natural migration as the soundest way of recolonising and presented suggestions on the possible routes for reconnecting the isolated otter populations in different countries in the form of a European Otter Habitat Network.

The present article will elaborate that for a successful natural recolonisation the fish farming regions of Central Europe play an, as yet undervalued, key role by harbouring locally expanding otter populations. It is recognised that the present high density otter populations in those regions inflict economic damages upon fish farming and this will continue if the fish farming regions are to continue in their role as otter suppliers. At present the possibilities of damage compensation are scarce and do not offer a final solution. The authors argue that the otter populations in fish farming regions should receive extra protection and a mechanism to compensate for the damages they inflict should be established on an international level to enlist the full cooperation of the fisheries in our effort to secure the expanding character of these otter populations.

Surplus populations

A really natural recolonisation of depleted areas in the Czech Republic and in western Europe requires the presence of high density, expanding otter populations which can function as otter sources (surplus populations) (Dulfer and Plesnik in prep). Evidence from several countries in the Central European region indicate that the presence and survival of such high density otter populations in Germany, Poland, the Czech Republic, Austria and Hungary is linked with commercial fish farming. The highest density is found in the vicinity of fish ponds, with lower densities in the surrounding areas (Ansorge, 1994; Bodner, 1996b; Janda,

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1991; Kemenes and Nechay, 1990; Kemenes, 1991; Kokes and Andera, 1994; LfUG, 1996; Reuther, 1996a; Toman et al, 1996; Wlodek et al, 1989).

A simple habitat selection model, modified from Fretwel (described in Krebs, 1994, p 70), assumes that a habitat with a high suitability for a species will be characterized initially by immigration exceeding emigration and a higher reproductive success than less suitable habitats. This will result in an increase in density and eventually in overcrowding of this habitat. The model predicts that the suitability of the good habitat will decrease to a point at which it becomes equally or even more profitable for an individual to live in the adjacent, initially less suitable but less crowded, habitat (Krebs, 1994). The fish pond areas in the central European region have developed into semi-natural landscape elements, characterised by a high species diversity in flora and fauna (Biodiversity hot-spot) (Pecharova and Plesnik, in press, Franke and Bayer, 1995; LfUG, 1996). With high food availability throughout the year and ample cover for breeding and resting, the ponds can be considered as extreme good or even optimal otter habitat. According the mentioned habitat selection model the increase in otter density in the pond habitats should eventually result in overcrowding and subsequently individual otters will disperse towards the adjacent habitats which have a much lower suitability due to the lower food availability. Several studies mention that recent years in and around the central European fish farming regions most of the otter populations are or seem to be expanding and the populations in the adjacent regions are considered to originate from, or be sustained by, the surplus from the populations in the fish ponds (Ansorge, 1994; Bodner 1996a,b; Brezinsky and Romanowski, 1996; Janda, 1991; Kemenes and Nechay, 1990; Kemenes, 1991; Kokes and Andera, 1994; Kranz, 1995; Reuther, 1996a; Wlodek et al., 1989; Reuther, pers. comm.). Dispersal was also observed in our investigations in the Czech Trebon Biosphere Reserve. A radio-tagged sub-adult male migrated from his release-site in the most optimal habitat of the Reserve with the highest otter density to the less occupied and presumable less suitable region just outside the Biosphere Reserve (Dulfer, unpubl. res.).

As such, that what we would like to achieve with the concept of surplus populations as part of an OTTER EECONET already, unintentionally and without human interference, seems to be happening: a really natural dispersal toward less populated areas.

The conflict of economy and ecology

To ensure that the process of natural dispersal continues toward a reconnection of the otter populations in Eastern Europe and towards a westward dispersal, one first and utmost important prerequisite should be met. This first prerequisite of all scenarios of nature conservation and of a proper functioning of any ecological network has to be to protect the existing valuable habitats and viable populations (Bennet, 1994; MacDonald and Mason, 1994; Reuther, 1996A; Wolters, 1996). This was expressed for the otter in the IUCN Otter Action Plan (Foster-Turley et al., 1990) and more strongly stressed by MacDonald and Mason (1994): *'It is essential that the otter and its habitat be protected rigorously in those areas where viable populations still remain. All the money and goodwill available in Western Europe for national but isolated, contaminated and fragmented populations will achieve nothing if real strongholds are allowed to perish unseen'*.

Presently there is, however, a tendency to the opposite in Central Europe as a result of the ongoing privatisation of fish farms. In several countries, economic damage inflicted by otters on fish farming, and for that matter angling waters, is becoming a serious problem. With large and state-owned fisheries, the damage inflicted by otters was mostly neglected because production was defined as fish measured over a large number of ponds. Where large pond complexes remained within one company after the privatisation, otter damage is still regarded as less important, as is the situation with the Czech Trebon Fisheries Ltd. (managing 7,000 ha). However, a lot of ponds were restored to their former owners and at present there are a lot of small owners or owners' associations in central Europe who manage one or more relatively small ponds (0.5-50 ha) and build their existence on fish farming. For example, in the Czech Republic fish farming is the only agriculture activity in which incomes have not declined since 1989 (Pecharova and Plesnik, in press). It is here that the otter inflicts the largest relative economic damage. Here, a single otter foraging on a small pond can take away all profit or even threaten the existence of the business. This is the most common situation outside of South Bohemia. Complaints from these owners are rising rapidly and, because there is no damage compensation or funds for taking preventive measures, the tolerance toward the otters is declining with the same speed. An acceptable solution has to be found as quickly as possible for these owners because it is here that the otter runs the biggest risk of being killed illegally (Bodner, 1996b; LFUG, 1996; Dulfer and Roche, 1996; Kemenes, 1991; Romanowski 1996, pers. comm.).

Legal Protection for Otters causing Damage

Theoretically, the otter, being an endangered species, has sufficient protection in the central European countries under different national laws and international conventions like the Bern Convention. Otters in Germany and Austria enjoy additional protection through the so-called E.U. Habitat Directive (European Union, 1992). However, most national laws, and even the Bern Convention and the E.U. Habitat Directive allow for removal or killing of protected animals under specific conditions, in particular in the case of local high densities combined with ‘problem animals causing what is considered to be excess economic damages’.

In Poland, otters are fully protected but permission for live-catching and relocating animals causing excessive damage in fish ponds are granted by special permission of the Ministry of Environment, Natural Resources and Forestry. Shooting permits can be applied for under the same law but have never been granted and illegal killing around fish ponds is thought to be substantial (Romanowski, 1996 pers. comm.). In Hungary, otters are fully protected but problems with otters around fish farms are large. Special permits are issued for shooting otters around fish farms (Macdonald and Mason, 1994) and illegal killing is thought to happen regularly (Kemenes, 1991; Macdonald and Mason, 1994). In a recent workshop on otters and fish farming in Austria it was suggested that it should be possible to discuss the option of shooting otters in Austria as well and the latest amendments to the Czech hunting law brings this possibility frighteningly close in the Czech Republic.

Removal of Otters Causing Economic Damage

There are strong arguments against following such a course. It can easily be predicted from the same habitat selection model mentioned above (Krebs, 1994) that legal or illegal killing or removal of otters in a high density otter population around fish ponds will have a counter-productive effect with respect to this natural dispersal.

Killing will lower the otter density in the optimum fish farming region, crowding of this habitat will cease and free space for additional otters becomes available. It can be predicted from the earlier mentioned model that otters in less optimum habitats will move toward the optimum to fill the free space until a new equilibrium is established. The farmer is again confronted with otters and will again kill them, until finally most otters in the entire region are killed. The option of killing - and for that matter removal and re-location of otters - is therefore counter-productive with respect to the protection of viable populations and with the success of natural recolonisation.

Fencing to Prevent Economic Damage

Fencing would normally be considered the solution if the easiest and cheapest solution of killing otters cannot be used. It can be argued that complete fencing of all ponds is equally undesirably and counter-productive for two reasons.

The first reason is that the fish ponds are the main food source for the otter. The 2-4 year carp production cycle, and in particular the associated growth of non-commercial fish species, guarantees a year-round food supply for the otter, since ponds which harbour fish during winter are kept partly ice-free. Fencing would very efficiently reduce the food availability and hence reduce the habitat quality substantially.

The second reason is that the fish ponds, in general, provide excellent habitat features for otters. Most fish farming ponds in Central Europe were constructed up to 4-600 years ago and they now have become almost natural elements in the landscape (Pecharova and Plesnik, in press; Janda, 1994; Kvet, 1992). In particular the reed stands and the vegetation resulting from the filling and terrestrialisation processes in the shallowest parts of the ponds developed into a very suitable habitat, offering ample cover for breeding females. The practise of clearing the bottom and creating deposit islands from cleared sediment provided another potentially good shelter for otters. Fencing would block the access to large parts of this habitat and should be regarded as a form of habitat destruction.

Fencing therefore results in a strong decrease in habitat quality as a result of food depletion, less suitable breeding conditions and habitat loss. Following the habitat selection model (Krebs, 1994) one can predict that a rapid reversal from optimum to poor habitat would result in an otter exodus, very likely followed by a rapid decline of otter numbers in the entire region, especially if, as in the case of the Hungarian, Austrian and South Bohemian otter populations, survival of a metapopulation is largely dependent on the continuing breeding success of a core population around the fish pond.

Apart from the direct negative effects that fencing might have on the otter population, it may also conflict with other conservation programmes (CHKO Trebonsko 1996 pers. comm.). Finally, this measure is impractical and too expensive, certainly in the case of the professional fish farming industry in the Czech Republic: the ponds simply are too large and, with approximately 20,000 fish ponds in the Czech Republic (Pecharova and Plesnik, in press), too numerous for that.

Present Systems of Damage Compensation

It must be stressed that all parties involved recognize that otters do cause economic damage, in particular in the winter season (Ansorge, 1994; Bodner, 1996b; Dulfer and Roche, 1996; Kemenes, 1991; LFUG, 1996; Wodlek et al., 1989; Romanowski, 1996 pers. comm.). A system of straight forward damage compensation or funds for preventive measures presently exists in a few countries, but a clear legal back-up for these payments is often missing (de Klemm, 1996). Most countries still regard the otter as *res nullius* (nobody's property). Even those countries who accept that the otter is, or should be, *res omnium* (the property of all), are hesitant to follow this line of reasoning to its logical end, i.e. a State liability which would offer a legal basis for damage claims (de Klemm, 1996). In Austria damages are compensated through a so-called ‘otter account’, funded by 4 NGOs. Payments are made voluntarily and there is no legal mechanism for claiming from it (Bodner, 1996b). In Sachsen (Germany) damage is not compensated for, but funds from the county are available for preventive measures. However, there is no legal mechanism for making claims on such funds (Thiem, 1996). In Hungary a grimmer situation exists without any legal mechanism for damage claims and no available funds at all for damage compensation or preventive measures (Kemenes, 1991). Poland has a system for relocating otters (Romanowski, 1996 pers. comm.) without compensation. The Czech Republic presently has no formal system of compensation but the problem is being studied; some compensation for damage to angling waters has been paid by the State in the last year and a new ‘Act on damage inflicted upon private property by Specially Protected Species’ is under preparation. It is recognised in all of the mentioned countries that the currently used systems for compensation are not satisfactory and that a better solution has to be found rapidly in the light of the increasing complaints and the decreasing tolerance of fish farmers towards otters causing damage.

Toward a Solution

This brings us back to the point stressed earlier regarding the ‘protection of viable populations’. As argued above, shooting and relocating otters or complete fencing as prevention against economic damages in central Europe is undesirable from the point of otter conservation and recolonisation of former otter range in central and Western Europe. Given the seeming decline in effective legal protection and tolerance toward the otter it might therefor indeed be necessary to protect these populations literally ‘at all costs’, at least for the short term, to buy time until more effective measures can be established and take effect.

In this respect we would like to take the reasoning of the otter as *res omnium* beyond a State liability and argue that the protection of surplus otter populations is of international importance. If the otter in east and central European countries is to help recolonise the west European countries, finding, and in particular funding, a solution for the conflict between the economic interests of the fish farmers and the conservation interest of the otters is a matter of all countries involved. To simplify the matter: the countries (better, the fish farmers) in central Europe have the otters but not the money for any conservation solution, the countries in west Europe (assembled in the European Union) have the money for solutions but not the otters. It is our opinion that a joint effort could help those in need, be it of actual otters or of money for otter conservation.

Let us stress here that none of us believe that simply paying the fisheries whatever the damage claimed is the solution for the problem - on the contrary. But every solution suggested now or in the future will cost money which is not available yet and some damage will always remain which has to be paid for. West Europe should help solve the problem of these damage claims in such a way that otters do not become the next victim of privatisation. Only then can the thriving populations in central Europe really become the surplus populations providing the otters necessary for a natural recolonisation of presently depleted otter ranges.

CONCLUSION

The recolonisation of depleted otter ranges, in particular in Western Europe, depends largely on safeguarding the expanding character of otter populations in the central European fish farming regions. The tendency toward issuing permits for killing or relocating otters around fish ponds or fencing the ponds therefore should be reversed as quickly as possible and with all possible means if a natural recolonisation is to have any chance of success.

To be able to reverse this process a joint strategy of the central European countries involved is needed to find different practical and political solutions to minimize damage and to find funds to pay for these measures and for compensation of remaining damage. A first step could be that otter experts concerned with damage aspects in Poland, Hungary, Austria, Germany (Sachsen) and the Czech Republic prepare a joint statement summarizing the problem and develop a joint strategy including recommendations for State Authorities to approach the problem. A meeting to this effect has been scheduled in Trebon for early December. We will argue at this meeting for an internationally (E.U.) paid damage control and compensation scheme. This scheme could operate under the auspices of, for example, the Bern Convention, which could ensure a coordinated effort to help natural recolonisation along the OTTER EECONET.

In the long run, such an international scheme may well be relatively cheap compared with the large and costly reintroduction attempts that have already been undertaken in some Western European countries, especially if these then have to be followed, in a few decades or even less, by similar reintroduction projects for the then threatened or extinct otter populations in the fish farming regions because no money was made available presently for their protection.

Finally, it must be stressed that all measures can only be successful when strongly backed by good education and information campaigns both among the general public and some target groups (e.g. fish farmers, hunters, schoolchildren) to obtain the support of local people. As such practical international support will raise a lot of essential goodwill.

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OSG NEWS

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During 15-16 March 1996, OSG members (Asian chapter) from eight countries, namely India, Indonesia, Korea, Japan, Malaysia, Singapore, Sri Lanka and Thailand met at the Asian Institute of Technology (AIT), Banglok, Thailand, to discuss matters pertaining to otter conservation in Asia. The meeting was convened by the IUCN/SSC Otter Specialist Group (Asian Chapter) and the Otter Research Group in Japan. It was hosted by the IUCN-South and Southeast Asia Regional Co-ordination Office in Bangkok.

The main objectives of the meeting were as follows:

1) To identify the present status of otters in Asia, particularly in countries such as Laos, Cambodia, Korea, Myanmar where there is a dearth of information on otters.
2) To discuss research priorities and prepare a draft work plan for conservation of otters in Asia.
3) To discuss the proposed OSG meeting scheduled to be held in November 1996 in Japan as part of the 2nd International Symposium on the CO-EXISTANCE OF LARGE CARNIVORES WITH MAN.
4) To set up a secretariat in the region to strengthen the network among those keen on otter research and conservation.

Information pertaining to otter conservation in various countries in the region was presented by the participants. Much attention was paid to fund raising activities for otter research and the implementation of the Otter Action Plan, which was drawn up a few years ago. Research priorities were listed for discussion at the OSG meeting in Japan. It was decided to include new members from Asian countries, where the OSG is not represented at present. Sri Lanka was unanimously decided as the venue of the proposed Otter secretariat in the region. The proceedings of the meeting are beeing edited by Dr. Charles Santiapillai (University of Peradenyia, Sri Lanka). Dr. Hiroshi Sasaki, General Secretary of the Japanese Otter Group will publish them in the near future.

The OSG, subsequently, met on 22 November 1996 during the 2nd International Symposium on the CO-EXISTANCE OF LARGE CARNIVORES WITH MAN held from 19-23 November in Tokyo. The regional co-ordinators of Europe, North America, South America and several other members from the Asian region attended this meeting. As decided earlier in Bangkok, the establishment of the IUCN/SSC Otter Secretariat (Asian Section) in Sri Lanka was confirmed. The Japanese NGO group, FRIENDS OF JAPANESE OTTERS (FJO) extended it´s full support to the establishment of the Secretariat, which will come into operation from January, 1997.

Regarding otter research in the region, the members felt that the general surveys of otters in various countries, where there is a dearth of information on otters, should be given priority. Also it was decided to give special consideration for research on rare species of otters such as *Lutra sumatrana*, of which hardly any information is available.

The opportunity was also taken to review the progress made for the VIIth International Otter Colloquium, which is scheduled to be held in 1997. After lengthy discussions, the venue of the colloquium was changed to Poland and Claus Reuther, the director of the Otter Centrum, Hankensbüttel, Germany undertook the responsibility for convening the colloquium in Poland. The time and location of the colloquium will be notified in due course.

Lastly, on behalf of the IUCN/SSC Otter Specialist Group, I wish to extend my sincere thanks to Dr. Hiroshi Sasaki and Motokazo Ando of the Japanese Otter Group, Japan, for their enthusiasm and untiring efforts in organizing the two OSG meetings in Thailand and Japan.

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CORRECTION:

In the last issue there was a mistake concerning a publication of **WWF SWEDEN**.
The correct citation is as follows:
WWF Sweden (1996). Uttern - en vattenakrobat. 16p. (Världsnaturfonden WWF, Ulriksdals Slott, 170 71 Solna, Sweden).

ARTENSCHUTZPROGRAMM FISCHOTTER IN SACHSEN
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Contributions cover various aspects of topics such as status of the otter in Saxony, ecology, hormon analysis in faeces, threats, mortality or protection strategies to name a few.
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In this publication serie of WWF Austria the third issue on the otter *Lutra lutra* is now published. Aspects covered are status of the otter in Styria, the problem of otters at fish-farms, and pollution of otters with PCBs. All articles are in German with an English summary.
The three reports on the otter published by WWF Austria are sold for the price of 30US$ + postage.
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- the latest developments in humane trapping, the fur industry, and European Union regulations

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