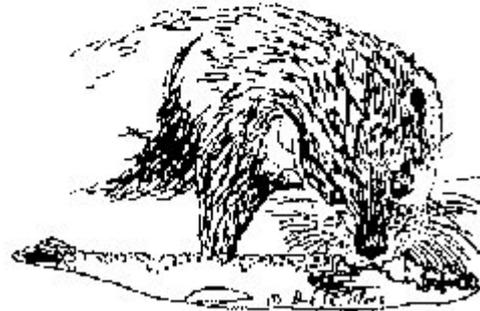


I.U.C.N. Otter Specialist Group



bulletin no. 3



March 1988

## CONTENT

### REPORTS

Otter Studies in Finland .....	2
The Otter ( <i>Lutra lutra</i> ) in Brittany .....	5
Causes of Otter Mortality in the Netherlands between 1963 end 1987	9
The Otter Trust and the River Otter Studbook .....	10
A Study of Otters in Lake Mikri Prespa, Greece .....	12
Otters in Western Greece and Corfu .....	17
Status and Distribution of Otters In the Amboro National Park, Bolivia .....	24
The Second Scottish Otter Survey .....	34
The Need for International Asian Otter Symposium .....	39
The New Otter Centre in West Germany .....	42
Research on the Otter in Italy .....	45

### OBITUARY

Elizabeth Lenton .....	47
------------------------	----

### LITERATURE

Literature .....	48
------------------	----

## REPORT

### OTTER STUDIES IN FINLAND

Uolevi SKARÉN

*Kp 2/82, SF-74300 Sonkajarvi, Finland*

**Abstract:** Interest in otters seems to be increasing in Finland. In order to get a general view of recent studies, I asked certain authors for information about their projects. Distribution surveys have been done. Caesium levels (following Chernobyl) have been assayed. Threats, captive breeding and reintroductions are reported.

Interest in otters seems to be increasing in Finland. In order to get a general view of recent studies, I asked certain authors for information about their projects.

#### **Distribution.**

Former data based on questionnaires have been briefly summarized in Skaren and Kumpulainen (1986). Results of two other questionnaires on otter distribution in Finland will be compared (1974/75 versus 1984/85) in the Zoological Museum, University of Helsinki and these data may be published in 1988 (T. Stjernberg, pers. comm.).

Another public inquiry was made via TV in spring 1987. The preliminary results indicate sparsest populations in Mid-Lapland and on the western and southwestern coastal area of Finland. Alternatively, people of these areas did not answer. However, positive observations were received from Utajoki, the northernmost part of the country, to Uusimaa, the southern coastal area (M. Helminen on TV 19th May, 1987).

Summer field surveys have also been done in the coastal area of Finland in 1986-1987. Otters were found e.g. on the southern Siuntio river, but signs were almost absent in the western coastal area (U. Cronstrom, pers. comm.).

Otter counts continued in North Savo, Central Finland, too. The distribution was surveyed in March 1986 and 1987. In the eastern, oligotrophic Nilsia river system, the proportions of positive sites were 36.7% and 33.3%, respectively. The corresponding values for the western, eutrophic Iisalmi river system were 61.3% and 31.%. The most probable cause of the crash of the western population is the exceptionally hard winter of 1986-1987, when there was very little snow but there may have been local difficulties in access to water. Local poaching is also possible (Skarén and Jaderholm, 1987).

#### **Toxic Chemicals in Otters.**

As yet, results of analysis of only one otter have been published. Only low levels of mercury and some chlorinated hydrocarbons were detected in this specimen (Skarén and Kumpulainen, 1986).

Recently 11 more otters (found dead in the 1980s) were studied in North Savo. Concentrations of many hazardous chemicals were very low (not depending on the age group of the animal) in the extractable fat of liver: alpha- and oxychlordan, HCB, Lindane, DDT, DDD, DDE, PCB and Dieldrin. Even the highest value (2.5 ppm of PCB) was relatively low. Mirex and toxaphene were totally absent using a minimum detection level of one ng/g (- 0.001 ppm).

The effect of the Chernobyl power plant explosion on 26th April, 1986, 1,300 km SSE from the study area, can be clearly seen in increased caesium levels in fishes and in otters. As a sample test two old male otters were analysed (Bq/kg):

**Table:** Caesium levels in old male otters in Finland

Date of Death	Cs-134	Cs-137
2 <sup>nd</sup> February 1986	20	250
28 <sup>th</sup> August 1986	560	1250

The half-life of caesium 134 is 2.1 years, so the Chernobyl effect is clear especially in the proportion of this isotope (Skarén, 1988).

According to Finnish law, public laboratories for the national health service must, gratis, analyse any food stuff a citizen may demand. Thus, if you claim you eat otters, they have to analyse them too. I tested this by taking an otter carcass to a public laboratory on 16th October, 1987. The animal was an old, lactating female killed by traffic five days earlier in Vieremä, North Savo. The total radiation level of this otter was very low, only 89 Bq/kg.

All three otters were found in 'zone II' which in Finland got a moderate dose of radiation, the caesium 137 fallout being 3,000 - 20,000 Bq/m<sup>2</sup>. We continue to check the radiation levels in fishes and otters in Finland. For the present it seems that the Chernobyl catastrophe had hardly any acute effects on our otters.

An analysis of heavy metals is also under way. The preliminary data indicate only low levels of mercury in otters in North Savo (E. Tulisalo, Department of Environmental Science, University of Helsinki). Material from other parts of Finland will be analysed later (T. Stjernberg, pers. comm.).

#### **Age Groups.**

40 otter skulls found in Central Finland were roughly age-grouped according to the skull structure using inter alia the ratio of interorbital:postorbital constriction. The age of most animals (52.5%) was estimated to be 1-2 years while 17.5% were younger and 30.0% were older specimens. The juvenile features seemed to be visible longer in the females compared to the males of the same age class (Skarén, 1987).

#### **Breeding in Captivity.**

The first - and as yet the only - otter cub was born 4th May, 1987 in Ranua Zoo Park. Altogether 3 otters were living in this park at the end of 1987 (E. Pykalainen, pers. comm.). At the same time seven otters were kept in Ahtari Zoo Park (J. Lahtinen, pers. comm.). There are no otters in Korkeasaari Zoo, Helsinki (I. Koivisto, pers. comm.).

Because otters are not protected in fish hatcheries, some owners of these establishments have tried to live-trap them for transfer to zoo parka. To make this easier, Canadian otter traps will now be obtained. A new zoo park including otters will be opened in Saarijarvi, Central Finland in 1989 (Anonymous, 1987).

However, not all the owners of fish hatcheries will cooperate and, for example, in one small pond in Nilslä, eastern Finland, several otters are killed every year (P. Reinikka, pers. comm.). Nobody knows the total number of these legally killed otters in Finland.

#### **Other Projects.**

Since 1986 the WWF Finnish Fund has supported studies to establish the present status of otters in Finland. One purpose is to help the reintroduction of otters to certain river systems, including the Swedish otterless areas. The first two otters, a couple, were released in the southern Finnish archipelago in May 1987 (Cronstrom, 1987).

Meanwhile the breeding status, causes of death, analyses of stomachs and so on are checked in every otter brought into the Kuopio Museum in Central Finland. Scat analysed in the field are also going on continuously.

## REFERENCES

- Anonymous (1987).** Vesielainpuiato Saarijarvella. *Kulkuri*, 7:24.
- Cronstrom, U. (1987).** Utterpar aterfick friheten. *Finlands Natur*, 45:23.
- Skarén, U. and Kumpulainen. J. (1986).** Recovery of the otter *Lutra lutra* (L., 1758) population in North Savo, Central Finland, with an analysis of environmental factors. *Lutra*, 29:117-140.
- Skarén, U. and Jaderholm. K. (1987).** Otter (*Lutra lutra*) count in Central Finland in 1986-1987. *Memoranda Soc. Fauna Flora Fennica*, 83:101-104.
- Skarén, U. (1987).** Skull structure in different age groups of otters (*Lutra lutra*) in Central Finland. *Kulumus*, 9:42-47.
- Skarén, U (1988)** Chlorinated Hydrocarbons, PCBs and Caesium Isotopes in Otter (*Lutra lutra* L.) from North Savo, Central Finland. Manuscript, 13 pp.

## REPORT

### THE OTTER (*LUTRA LUTRA*) IN BRITTANY

Alain-Jacques BRAUN

*Étude Loure, 56370 Le Tour du Parc, Le Mare, Brittany, France*

Brittany (NW France) is a massive, low-lying peninsula with a highest altitude of only 390m. The drainage system is dense but rivers are usually short, few exceeding 100 km in length. The climate is oceanic, mild and with moderate rainfall. Brittany covers 34,077 sq km with a population of 3,530,000 (104/km<sup>2</sup>).

Until the mid 1950s the otter was common and locally abundant throughout the province and exploited all available habitats from small oligotrophic streams (less than 2m wide) and large eutrophic rivers to wetlands, sea coasts and islands. Regarded as a pest, it was intensively trapped and hunted, frequently with packs of hounds in the British manner but in a less organised way. Tallies for otter hunts ranged from 5 to over 60 animals per year during the period 1930-1970. Poisoning with strychnine also occurred in the Loire area, in the south, but with negligible results. It has been estimated (Braun, 1986) that during the period 1930-1970, between 16,000 and 40,000 otters were destroyed or captured.

A decline was first noted by otter hunters and trappers during the 1950s and early 60s. We cannot say if it coincided with the appearance of pesticides or not (see Chanin & Jefferies, 1978). Very few fish have been analysed recently for pesticides and heavy metals (only 49 samples). One sample from the Ille at Vilaine departement contained 0.595 mg/kg fresh weight, which is higher than the maximum level of 0.5 mg/kg set by the National Academy of Sciences (USA). Mercury was found in fish from several rivers in all the departements of Brittany.

While industry in Brittany has remained on a small scale, slaughter houses, canning factories, fish farming and poultry units have grown tremendously and have generated locally high levels of pollution. Many streams are in a state of neglect, obstructed by dead vegetation and which results in low biological productivity. Some streams are being reconstituted by conservation groups. However, at present, the general situation of rivers is relatively good, especially by comparison with other regions, e.g. the north and east, of France.

The present distribution of *Lutra lutra* is not accurately known because of a lack of specialists and due to differing and uncoordinated survey methods. According to our own information (from field surveys and informants), the species has disappeared from most of the islands and sea coast but is still found inland, especially in headwaters in the central part of the region. In the southern regions of Morbihan and Loire Atlantique otter populations live in coastal marshes and sometimes use the sea shore and estuaries. Breeding occurs regularly in 4 departements - Finisterre, Cotes du Nord, Morbihan and Loire Atlantique. In Ille et Vilaine breeding seems to be very irregular. The largest and most healthy population appears to live in Morbihan. Records collected since 1970 show that the mean number of young per litter in Brittany is 3.2 (n = 13) (Braun, 1986 and unpublished).

Between 1970 and 1987 causes of otter mortality in Brittany were recorded (Braun, 1986 and unpublished). The results are given in the table below

**Table 1: Causes of Otter Mortality in Brittany**

<b>Cause of Death</b>	<b>No of Otters</b>	<b>% Total (n=78)</b>
Collision with vehicle	30	38.4
Trapping	13	16.6
Shooting	9	11.5
Drowning (fish net)	7	8.9
Destruction of holt by public works	6	7.6
Poison	5	6.4
Killed by dogs	4	5.1
Killed by beavers	2	2.5
Collision with boat	1	1.2
Illness	1	1.2

The figures for traffic accidents appear very high compared to other European regions - c.f., for example, 18% in Czechoslovakia (Barus and Zejda, 1981) or 10.6% in the German Democratic Republic (Stubbe, 1980). Could this be due to a higher density of otters in our region? In 22 cases (73.3%), the otter was killed on a road/bridge crossing a wetland or separating two wetlands. In 25 cases (83.3%) the accidents occurred in areas where the species is considered as breeding regularly.

Trapping to control "pest species" such as muskrat (*Ondatra zibethicus*), coypu (*Myocastor coypu*) and mink (*Mustela vison*) is widely practised. Since the last 10 years the American mink has colonized most of the suitable habitats in 3 départements -Morbihan, Finistere and Cotes du Nord. Locally the species is abundant and this has led to an increase in trapping. The use of gin traps, even when these are modified (a law requires the teeth to be filed off or covered with plastic or rubber) is still a threat to otters as well as to the highly endangered European mink (*Mustela lutreola*) which survives in very low numbers in Brittany. Evidence of *Mustela vison* was found in over 65% of the sites used by otters in Morbihan. Proposals made by the author in 1983 to use cage traps in areas frequented by *Lutra lutra* and *Mustela lutreola* were approved by the Morbihan Hunters Federation in 1987. It is hoped that this will soon be extended to other departments.

All recorded otter deaths by drowning occurred in southern Brittany (Morbihan and Loire Atlantique) where eel nets are commonly set. Braun (1983) recommended the use of excluders on fyke nets but no decision has been reached.

Poisonous baits (poison type unknown) were laid to get rid of muskrats over a large marsh in Morbihan, resulting in the death of an entire family. Dogs also cause problems especially during the breeding season. The 4 otters killed by dogs were estimated to be aged 3-4 months old. *Castor fiber* was introduced in Finistere in the 1960s and 70s. Fights between beaver and otter occurred twice, each time an otter being killed. Braun (1986) suggests that otters should not be re-introduced in areas where beaver exist.

In conclusion, while the situation of the otter in Brittany seems much better than in many other regions of France, it appears that many threats still exist. Some could be stopped or substantially reduced with the enacting of laws such as mandatory use of cage traps and excluders for fyke nets. Education and training of shooters and trappers should emphasize the conservation of *Lutra lutra* and *Mustela lutreola* and include methods for selectively trapping only target species. Traffic accidents could be reduced by installing reflectors near bridges and by modifying culverts. A study of this problem has been carried out by the author on behalf of the Regional Road Department which should lead to some conservation measures being taken in 1988. Finally, 3 otters are being analysed for organochlorines since we know little of the effects of pollution on our population.

Conserving the otter in Brittany is a real challenge for naturalists but unfortunately specialists are few and funding is very restricted. More studies should be made as well as a complete and well organized regional survey. Informing the public is another task which the author initiated in 1982. His slide programme has been shown to over 10,000 people all over Brittany and a large exhibit was organized

at the Museum of Natural History in Nantes (10,000 visitors). The WWF-France has given financial assistance to the author but more money is needed if we are to save this fascinating species!

#### REFERENCES

- Barus, S. and Zejda, J. (1981).** The European otter (*Lutra lutra*) in the Czech Socialist Republic. *Acta Sc. Nat. Brno.* 15: 1-41.
- Braun, A.-J. (1983).** Repartition de *Lutra lutra* L. dans la zone du Lac de Grandlieu (Loire-Atlantique). Premiere phase 1981-82. Unpublished internal report to WWF-France. 15 pp.
- Blanchon, J. J. and Braun, A.-J. (1983).** Statut de la loutre sur la basse Vallee de la Bouzanne (Indre). Groupe Loutres Sfepm/Direction Departementale de L'Agriculture/Delegation Regionale a l'Architecture & a l'Envlrormement, Region Centre. 13 pp.
- Braun, A.-J. (1984).** A brief history of *Lutra lutra* in Brittany. Unpublished report (in English). 12 pp.
- Braun, A.-J.** Causes de mortalite chez *Lutra lutra* en Bretagne & propositions de mesures destinees a reduireles pertes: 1970-1986. Unpublished report to WWF-France. 9 pp.
- Braun, A.-J. (1986).** Causes of otter mortality in Brittany (1970-1985). Unpublished report to Vincent Wildlife Trust (In English). 7 pp.
- Braun, A.-J. (1986).** La loutre en Bretagne. Statut et repartition. Impact des aménagements, en particulier en riviere. Propositions de mesures de sauvegarde. Delegation Regionale a l'Architecture & l'Environnement, Rennes. 45 pp.
- Stubbe, M. (1980).** Die Situation des Fischotters in der D.D.R. In Reuthar, C. and Festetica, A. (1900). Der Fischotter In Europa - Verbreitung, Bedrohung, Erhaltung. Selbatverlag, Oderhaus and Gottingen. pp. 179-182.

**SHORT COMMUNICATION**

**CAUSES OF OTTER MORTALITY IN THE NETHERLANDS BETWEEN 1963 END 1987**

G.C.M. van Moll

*Vereniging Das & Boom/Staatbosbeheer can ordered from Vereniging Das & Boom, Rijksstraatweg 174, 6573 DG Beek-Ubbergen, The Netherlands.*

During 1986-87 the society Das & Boom collected data on the cause of death of 93 otters found in The Netherlands between 1971 and 1987. The main cause of mortality was traffic (40%) followed by drowning in fyke nets (28%). Throughout the period dead otters were recorded in 6 provinces. However, during the last 10 years (since 1978), dead otters were found in only 2 provinces, 1 in the province of North-Holland and 15 in Friesland. Friesland would seem now to hold the last remnants of a species once found nationwide. The estimate for otter numbers used to be 150-300 but the new estimate is, at a maximum, only about 20. The data are summarized in the tables below.

**Table:** Otter Deaths by Province in The Netherlands

Province	No. Records	Date of Last Record
Friesland	62	1987
Gröningen	3	1975
Overijssel	22	1976
Utrecht	2	1971
N.-Holland	2	1978
Z.-Holland	2	1976

**Timetable**

1965	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
13	12	9	4	2	11	6	5	3	0	7	5	0	1	3	2	2	3	1	1	0	2	1
N = 93																						

It is concluded that, in the short term, only 2 provinces offer the possibility of otter rehabilitation. In this respect our report analyses the management requirements necessary in various areas of Friesland and in the adjacent province of Overijssel. Measures are also proposed for various (state) nature reserves. The present study was supported financially by the State Nature Conservancy. For further information, our report "De otter, *Lutra lutra* L. in Nederland", Vereniging Das & Boom/Staatbosbeheer can ordered from Vereniging Das & Boom, Rijksstraatweg 174, 6573 DG Beek-Ubbergen, The Netherlands.

## REPORT

### THE OTTER TRUST AND THE RIVER OTTER STUDBOOK

Colin J.O. HARRISON

*Chairman, Scientific Advisory Committee, The Otter Trust, Earsham, near Bungay, Suffolk, U.K.*

In his article in the IUCN Otter Specialist Group Bulletin No. 2 Dr. Klaus Robin suggested that the Chairman of the Otter Trust, Mr. Philip Wayre, had failed to co-operate in the keeping of a studbook for captive otters held in zoos. This seems to highlight a misunderstanding of the Trust's function in keeping and breeding European Otters *Lutra. l. lutra*.

The Trust has envisaged its function insofar as this species, and sub-species, is concerned as conservation through publicity, through the encouragement of refuge creation and through the study of the animals. Because the destruction of otter populations has resulted in numbers in many regions falling below that which will allow natural re-establishment if and when conditions improve, the Trust holds a number of breeding pairs of European Otters specifically to provide individuals for re-introduction. However, it is a conservation organisation, not a zoo, and these otters are not intended as part of a permanent captive-breeding and captive-bred population spread among zoos and necessitating the kind of studbook maintained for such circumstances.

The Trust has never disposed of any of our native otters at any time to any zoo, either in the United Kingdom or Europe, nor has it at any time received any otters from any zoo either in the United Kingdom or Europe. It does not foresee any likelihood that it will become necessary for it to do so. It works in close co-operation with the Nature Conservancy Council and qualified scientific staff are responsible for keeping accurate records both of the Trust's breeding operation and of its other conservation work including its re-introduction programme.

All the Trust's European Otters descend from animals taken from the wild in Britain, many of them before such action required a licence issued by the Nature Conservancy Council. In addition, in recent years the Trust has been fortunate in receiving under licence several orphaned otter cubs which have helped to ensure a wide range of unrelated animals for breeding purposes. Naturally in order to regulate breeding pedigrees are maintained for all otters in the Trust's collection and in order to ensure that the genetic identity is maintained the Trust has never at any time cross-bred otters of the nominate race with animals of any other sub-species. These pedigrees are in slightly different format to that used by the zoo studbook. The Trust has offered these pedigrees of all the European Otters in the Trust's collection at Earsham and at its branch at North Petherwin in Cornwall to Dr. Robin although, as indicated, they may have little relevance to the zoo studbook. Where captive otters are concerned the Trust's real contribution would seem to be the knowledge it has gained on the keeping and breeding of these animals.

As far as is known the Otter Trust is the only place in the world where the European Otter is bred regularly and in sufficient numbers to ensure an annual programme of re-introduction into the wild using young otters bred by the Trust.

The first such re-introduction took place in 1983 when one young male and two females were released on a river in East Anglia after the selected site had been subjected to a very thorough scientific investigation by scientists of the Nature Conservancy Council and of the Otter Trust to ensure that it satisfied all the criteria necessary for the otters' survival, including the whole-hearted co-operation of all the landowners on that particular river system.

The male of the first release carried a radio transmitter on a harness which was designed to disintegrate after a few weeks. In fact it disintegrated and was recovered seven weeks after the animals had been set free. During this time almost nightly monitoring had provided a detailed record of the animals' movements and it was clear that they had become shy, secretive and nocturnal and were behaving in all respects like wild otters, including the establishment of individual territories.

Prior to their release young otters at the Trust are maintained for a period of several months in large pre-release enclosures in a private part of the Trust's grounds where they are disturbed as little as possible so that they become shy and nocturnal and are able to adapt quickly to life in the wild.

The first proof of successful breeding in the wild of released otters occurred on 14th August, 1984 when the Trust's Conservation Officer, during one of her regular checks, discovered the tracks of an otter cub following those of an adult showing clearly in the mud beneath a road bridge in the known range of one of the released females.

Three further re-introductions to the wild of young otters, totalling eight animals bred at the Trust were made in 1984 and 1983 and already one male has been released in 1987 and a young pair is destined to be set free later this summer.

Regular monitoring has shown that the released animals have bred and successfully reared cubs in the wild every year since 1984 with 1986 being a bumper year when six of the re-introduced bitches are known to have bred and to have successfully reared their cubs in the wild. The success of this project means that the released otters and their progeny must now constitute the major proportion of wild otters in East Anglia.

This re-introduction programme will be continued annually wherever suitable habitat can be found and with its newly established branch in Cornwall it is anticipated that the Trust will, before long, look for suitable re-introduction sites in southern and southwestern England.

## REPORT

### A STUDY OF OTTERS IN LAKE MIKRI PRESPA, GREECE

Evangelia-Eleni DELAKI, George KOTZAGEORGIS, Vassiliki IOANNIDOU and Argyria STAMOPOULOS

*25 Kyklados Street, Agia Paraskevi, 15341 Athens, Greece.*

#### INTRODUCTION

Greece is one of the few European countries where otter (*Lutra lutra*) populations are, despite decreases over the last decade, still thriving. The aims of our study were to investigate the food habits of otters in Lake Mikri Prespa in relation to season and to try to determine the status of the population in the area.

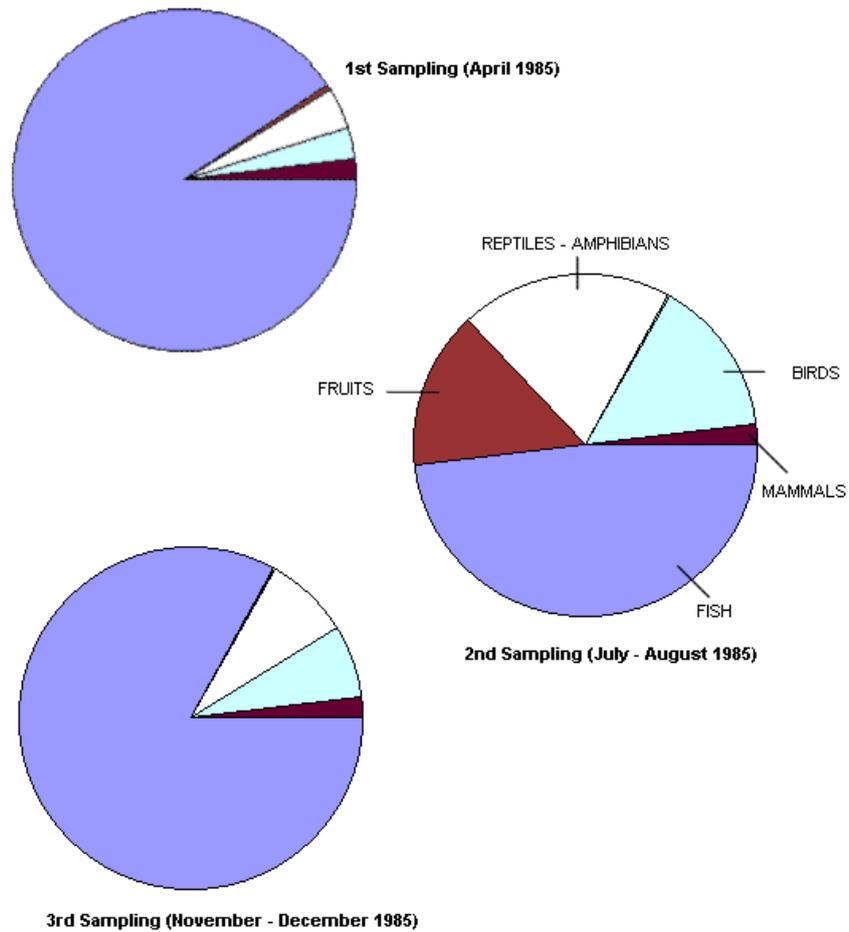
Lake Mikri Prespa is situated in north-west Greece at an altitude of 853 m. It is mesotrophic but is rapidly becoming eutrophic. The total length of shore-line is 46 km and water passes from the lake into Lake Megali Prespa. It is one of the most important wetlands in Europe for its fauna and flora and, in 1974, was declared a National Park.

Our study was carried out between April 1985 and August 1986. Spraint collections were made in April, July-August and November-December 1985 and in July-August 1986.

#### RESULTS

##### Otter diet

Fish comprised 50% of the diet in Mikri Prespa during June-September and 90% in other months (see Fig. 1). Due to hibernation, amphibians and reptiles may be less available in winter and birds are not so numerous from mid-autumn to late spring. On an annual basis fish formed 75% of the otters' diet.



**Figure 1:** The participation of the major prey groups in otter diet in Lake Mikri Prespa

*Cyprinidae* were the most common prey items since, of the 13 species of fish found in Mikri Prespa, 10 belong to this family. Table 1 gives the percentage frequencies for each species. Fish species were taken in proportion to their relative abundance in the lake, with *Alburnus alburnus*, the most numerous fish, occurring most frequently in spraints. *Rutilus rubilio* is also common and is frequently eaten.

**Table 1:** The percentage frequency of otters' prey items in Lake Mikri Prespa at three seasons in 1985

<b>Food Items</b>	<b>April</b>	<b>July-August</b>	<b>November-December</b>
<i>Barbus prespensis</i>	3.39	22.22	6.98
<i>Alburnus alburnus</i>	54.24	33.33	62.02
<i>Rutilus rutilus</i>	25.42	11.11	20.93
<i>Chondrostoma nasus</i>	61.02	4.17	10.85
<i>Phoxinellus adspersus</i>	3.39	3.47	18.60
<i>Alburnoides bipunctatus</i>	1.69	5.56	8.53
<i>Cyprinus carpio</i>	0	0.69	3.10
<i>Leuciscus cephalus</i>	1.69	2.78	8.53
<i>Carassius auratus</i>	0	2.08	3.10
<i>Anguilla anguilla</i>	0	0	0.78
<i>Cobitis taenia</i>	0	0	0
<i>Alburnus X Rutilus</i>	8.47	9.73	16.28
Unidentified Fish spp.	16.95	16.67	27.91
Amphibians	0	11.11	0.78
Lizards	10.17	12.50	2.33
Fruits	3.39	17.36	2.33
Insects	15.25	27.78	4.55
Mammals	1.69	4.17	1.55
Birds	1.69	19.44	5.43
Watersnakes	0	28.47	4.65
Molluscs	0	2.08	3.10

The occurrence of some species in the diet varied with season. For instance, the percentage frequency of *Chondrostoma nasus* in spring was 60% but only 4 and 10% in the summer and autumn/winter respectively. This difference may be explained by the fact that *C.nasus* breeds from mid-April to the end of May when they are abundant and easily caught round the rocky coasts of the lake. Most of the spraints we collected in the spring were found along the rocky shores. *Barbus plebejus prespensis* was similarly found commonly in spraints during its breed season (July-August). The results indicated that the otters fed mostly close inshore even though the lake has a maximum depth only 7.5 m.

Most of the fish taken by otters were 10-25 cm in length. Very few large fish like *Cyprinus carpio*, *Leuciscus cephalus* or *Carassius auratus gibelio* were eaten. *Anguilla anguilla* was almost absent from the diet but we have little information on eel populations in the lake. When schooling species such as *Alburnus* or *Phoxinellus adspersus* were the prey, then the remains of more than one individual (often 2-4) were usually found in each spraint.

As can be seen from Table 1, water snakes (*Natrix natrix* and *N. tessellata*) and birds (mostly *Fulica atra*) were important components of the food during the summer. Surprisingly, fruit was also eaten in the summer, especially fruits of *Cornus mas*, *C. sanguinea* and *Prunus mahaleb*.

### Signs of Otters

During our periods of field work, spraints and other signs were searched for daily. Most evidence of otter activity was found along the rocky shores of the lake especially in areas where rocks or vegetation offered ample cover (areas A, C and D in Fig. 2). Flat shores with cultivated areas behind and with dense reed beds contained fewer signs except at openings to the lake.

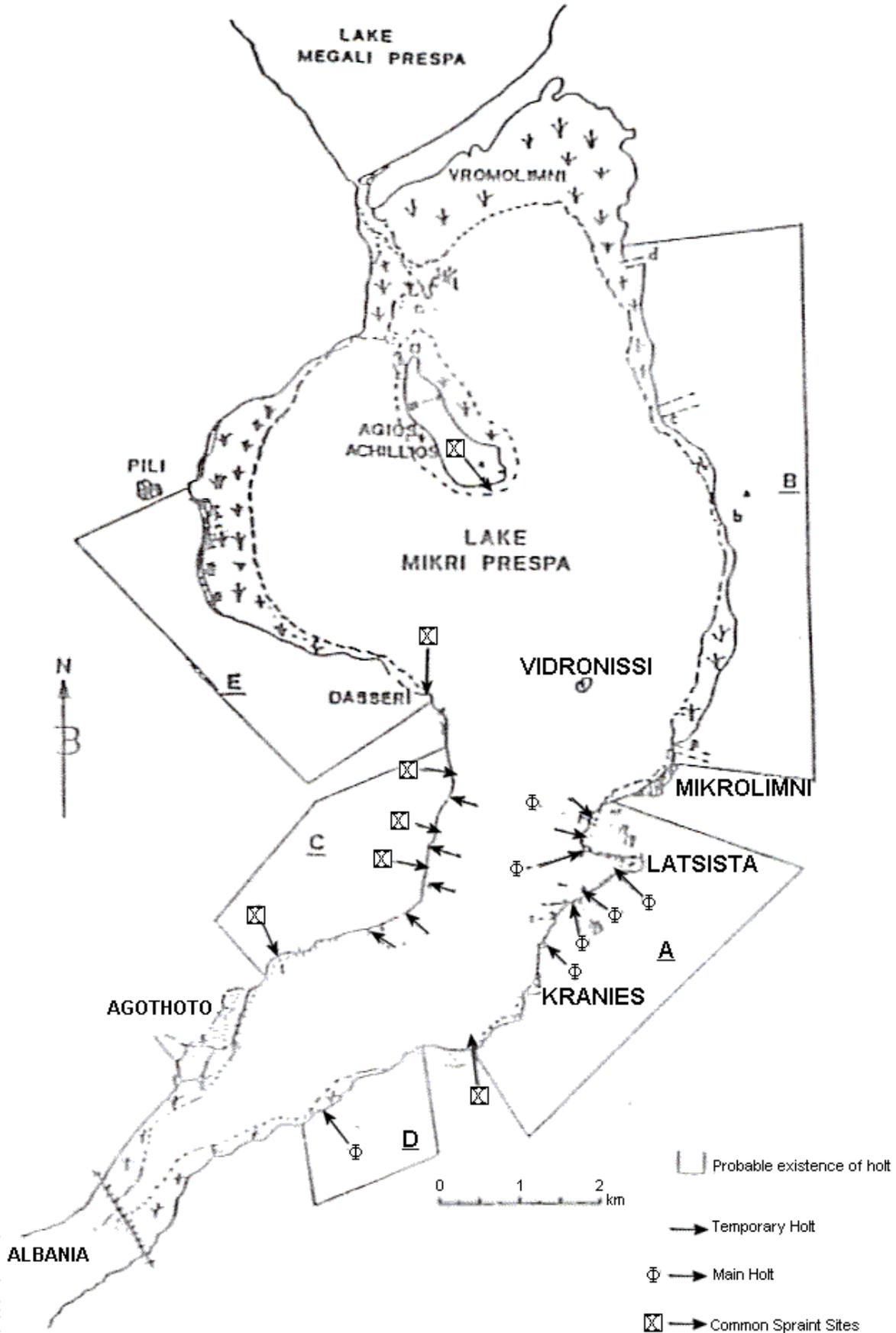


Figure 2: Lake Mikri Prespa showing study area and some results

In area A two main holts, thought to be used for breeding, were found 800m apart. Both were marked with large accumulations of spraints. These holts comprised large caves with several entrances and intercommunicating chambers and were protected behind by 10m vertical rock faces. The holts were located close to rich inshore feeding areas. Thirteen other lying-up sites (temporary holts) were identified mostly in simply shaped rock caves, reed beds or amongst tree roots. In the proximity of holts or lying-up places the number of spraints found increased. In area C, high numbers of spraints were also found mid-way between neighbouring lying-up sites.

It is thought that the otters were not territorial except perhaps for the males during the mating period (early winter). Females with cubs do, however, appear to have priority in choice of range. The availability of shelter provided by vegetation or rocks appears to be a significant factor in determining which areas are used by the animals. *Phragmites*, *Rubra* and *Rosa* are important for cover as are fig and oak trees.

Twenty years ago otters were frequently seen by the local people and fishermen on the lake. Today this is rare. The decline seems to have occurred largely within the last ten years although food availability has not changed. Evidence suggests that the otter population is well below the potential carrying capacity. It is suggested that the misuse of fertilizers and pesticides may be to blame and that the resulting levels of pollution together with increased human disturbance have led to a decline which may well prove irreversible.

## REPORT

### OTTERS IN WESTERN GREECE AND CORFU

Martin GAETHLICH

*42, Neighy Str., Ano Palissia, 111.43 Athens, Greece*

#### INTRODUCTION

Recent field surveys in Eastern and North Eastern Greece proved the presence of healthy otter populations (Macdonald and Mason 1982 & 1985). However the information available on the distribution of the species in Western Greece was limited. (Reuther and Festetics 1980). This report presents the preliminary results of a field survey currently underway in this area. It also includes the results of a similar study in Corfu.

#### STUDY AREA

Western Greece, with eastern edge Pindos mountains, occupies an area of 17,500 Km<sup>2</sup> and is divided in two major regions: Epirus and the west-central mainland. Both are primarily mountainous with only a few plains, the most important being those of Arta, Ioannina, Kalamas Delia, Messolongi and Agrinion. In the lowlands, agriculture is largely arable. Maize, cotton, tobacco and clover are the main cultivated crops in the irrigated plains. Oranges, lemons, olives and wheat are also locally important. Since the 1970s, land reclamation and mechanization have been advancing rapidly, particularly in the lowland and coastal areas.

Goat and sheep grazing is widespread while cattle grazing is rather local and generally in small numbers. It should also be noted that during the last decade large pig units have been installed throughout the country and in some areas (e.g. Northern Ambrakikos area) are responsible for severe organic pollution of waterways.

Although deforestation due to overgrazing and fires has denuded the major part of the Greek countryside. W. Greece and especially the N and NW part could still be considered well wooded.

Throughout Greece most of the major rivers have been harnessed for hydroelectric power. In contrast Sarandaporos, Kalamas, Acheron and Evinos are among the few remaining rivers with HEP dams. The dam in Mornos River forms a reservoir which supplies Athens with drinking water. Some river beds

are used for sand and gravel extraction, but large scale exploitation is limited to a few places. In Western Greece there are also a few natural lakes most of them eutrophic, but still free of toxic (or persistent) pollutants.

Corfu occupies an area of 592 Km<sup>2</sup>. The economy of the island (with a population of 99,477 inhabitants in 1981) is largely dependent on tourism. Olive groves cover the major part of the agricultural land while orchards and gardens are less widespread.

## METHODS

The survey is divided in three parts: in the first carried out between June 1985 and March 1986, the interest was focussed in the lowland plains and two pilot areas (Ambrakikos gulf and Messolongi area) have been selected for a further comparative study. During the second part, which lasted from April 1988 till March 1987 all stations in the pilot areas were regularly visited and also many suboptimal upland habitats were searched for otter signs. This second part included a survey in the island of Corfu which was carried out between 1 and 6 of May 1986. There is also a third part, still in progress, which includes surveys in restricted upland habitats and in some other Greek Islands.

During the first and the second part, a total of 106 sites in W. Greece and of 8 sites in Corfu were visited including rivers, streams, drainage ditches, lakes and marshes. Stations were chosen for ease of access e.g. a bridge, or a place where a river ran close to a road etc. At each station a minimum distance of 200m of bank was searched for spraints and footprints of otters, and the species was assumed absent if no signs were found after a search of 600m. Notes were made on visible pollution, disturbance etc. Spraints were collected from sites distributed throughout the study area, with a special interest in the two pilot areas, for further examination. The study on the diet of otters in W. Greece will be concluded by the end of spring 1988. In addition, a sample of spraints will be analyzed with collaboration with the National Center for Marine Research for heavy metals as described by Mason and Macdonald 1986.

## RESULTS

In W. Greece 106 sites were visited in total and otter signs were found at 70 (66%). In Corfu 8 sites were searched and otters were present at four.

A further five sites indicated on maps as perpetually flowing streams were found dry. In Epirus 35 of 52 stations proved positive (67.3%). Sarendaporos is the only river with no negative stations. In the Aooos catchment 71.4% of the stations produced signs of otters. Kalamas proved to be less favorable, with 58.3% positive stations. At three out of five negative sites of this river, sand and gravel extraction was the only serious disturbance factor, and in two sides the impact on the riparian vegetation was significant. In this region the presence of otter signs seemed to be strongly associated with good bankside condition. It should be mentioned that otters were present even in Ioannina lake, near the city of the same name (with a population of 44,829 inhabitants according to 1981 records), but were isolated in the southern and eastern part of the lake, where tracts with dense reedbeds still exist.

In the plain of Arta (Northern Ambrakikos gulf) 80% of the stations proved positive. In this area drainage ditches and canals comprised the 50% of the positive sites. In Ambrakikos gulf otters have also been found in both brackish and coastal habitats. The same was observed in Messolongi area where otters occur in the lagoons of Aetoliko and Klissova.

In the whole area of Messolongi wetlands (including Messolongi lagoons, lower Acheloos and lower Evinos) 73.7% of the stations produced signs of otters. As in the N. Ambrakikos area, otters were frequently found in drainage ditches. In this kind of habitat brambles (*Rubus* sp.) reeds and reedmace play an important role by providing shelter and cover. Similar irrigation ditches with this kind of bankside vegetation are also typical for NE Greece (Macdonald and Mason 1985).

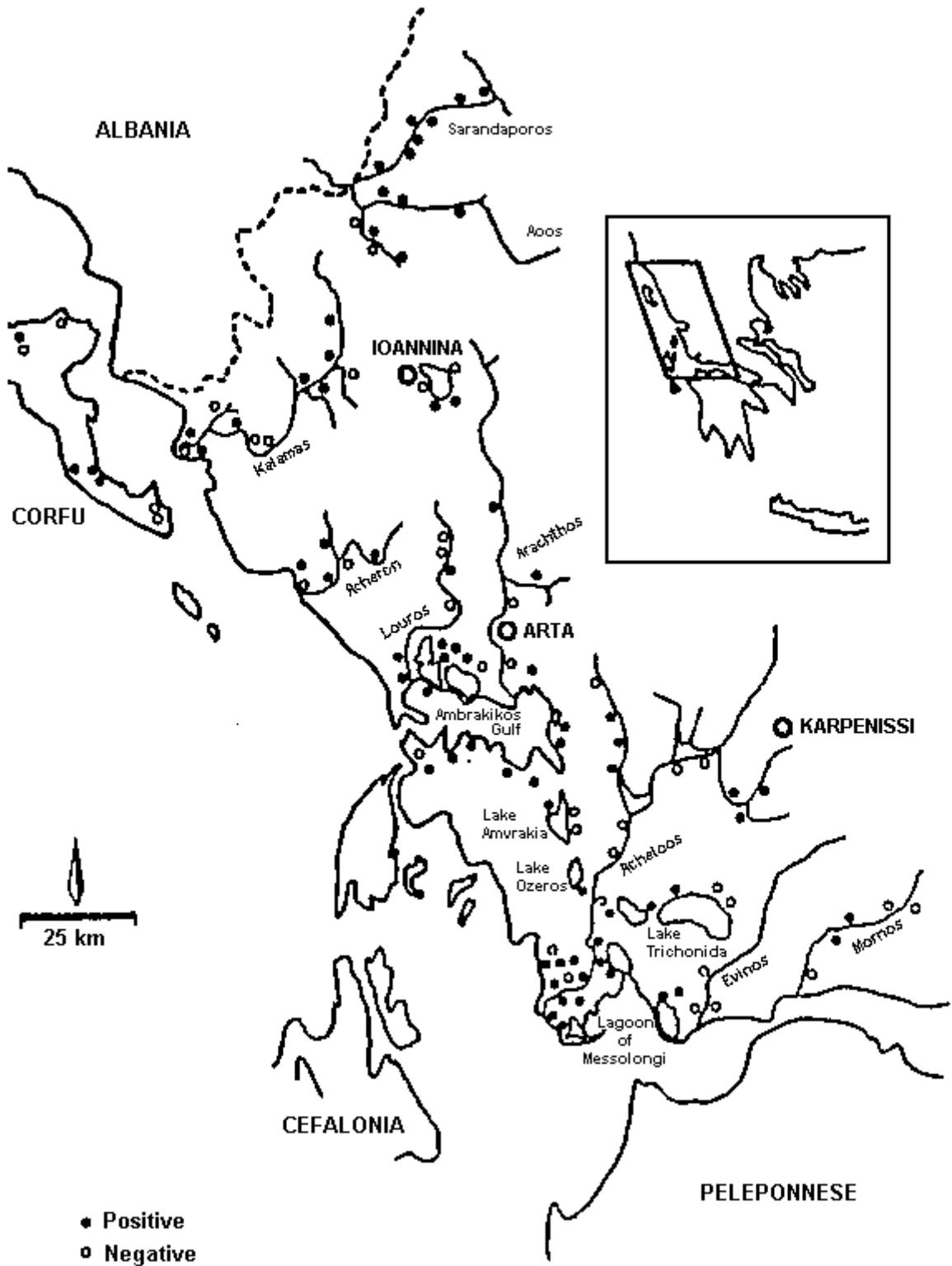
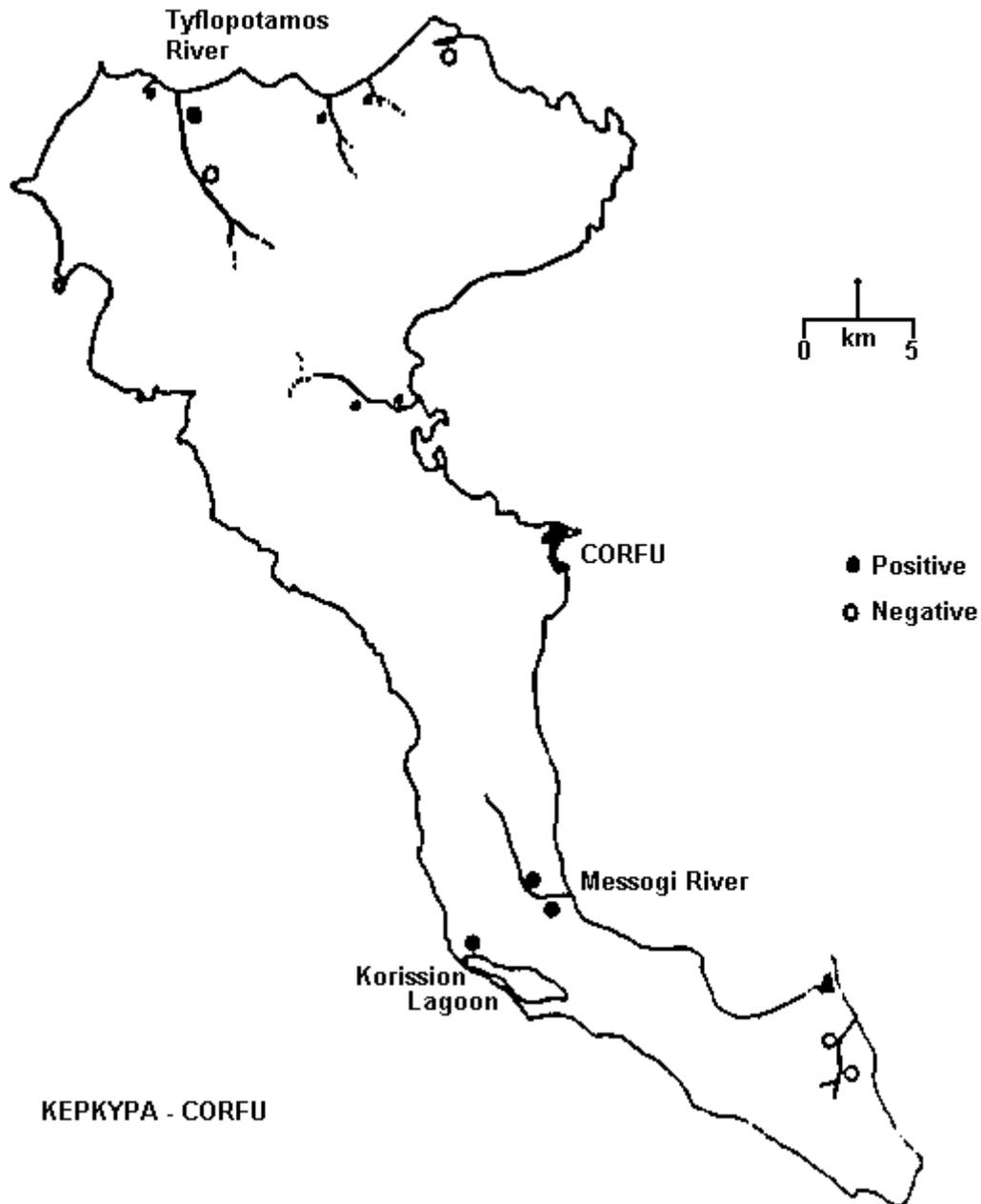


Figure 1: The area surveyed for otters showing sites visited



**Figure 2:** Corfu: Distribution of sites surveyed for otters

It is remarkable, however, that otters are absent from HEP reservoirs as is also recorded from similar surveys in Portugal (Macdonald and Mason 1982b). There was only one exception in Louros dam where otters were present in the reservoir. In this particular reservoir bankside cover consisted mainly of dense beds of reedmace. On the other hand otters exist in all natural lakes of Western Greece.

During the second part of the survey some of the sites previously thought negative proved to be positive. This may suggest that otter populations in these places are not resident or that the species exist at a very low density. Another point which should be taken into account is that at places where bankside vegetation was very dense (sometimes impenetrable), the 600m. searching distance was rather inadequate. Rain and flooding further impair this problem. However, regular visits seemed to insure reliable results.

Measurements of tracks, found on mud or sand, indicate in several cases the presence of otter cubs (tracks less than 45mm across the five toes). Cub tracks were found at six sites (three of them in lowland and three in upland habitats). In particular, cub footprints have been found in the lower and upper Acheloos in the Eastern Ambrakikos gulf. In the lower Kalamas, in Aaos and in Sarandaporos, bankside vegetation on 4 of the above sites could be considered as good while in the rest two sites, as moderate.

## DISCUSSION

Western Greece holds a good otter population and this agrees with the results of previous surveys in Eastern and Northeastern Greece (Macdonald and Mason 1982a, 1985) as well as with evidence coming from the neighboring Albania (Prigioni et al 1986). This field survey in W. Greece also revealed that otters occur in brackish and coastal habitats.

Otters were also present in Corfu but this isolated population is very threatened. Increasing building activity and indirect pollution effects (due to olive pressing units) are the major causes.

Thriving populations were found in the plains of Messolongi and Arta. It should be stressed that the retention of bankside vegetation is essential for the effective conservation of the species in these lowland habitats.

Finally, it should be mentioned that information concerning pollutant burdens of fish and otter tissues from Greece are extremely important. In the past, tissues from only one Greek otter have been analysed (Gaethlich and Mason 1988). This otter was found dead near Aetolikon (Messolongi area -Western Greece). The results showed low levels of chlorinated hydrocarbons and metals. However, because few otter corpses are likely to become available in the future (from road kills, drownings in nets e.t.c) on indirect method of assessing pollutant burdens in otter populations is the analysis of spraints. (Mason and Macdonald 1986). Research based on this method is now in progress in W. Greece and the results will allow a general assessment about pollutant burdens in the diet of otters.

## REFERENCES

- Gaethlich, M. and Mason, C.F. (1986).** The pollutant burden of a Greek otter. *Nature (Bulletin of the HSPN)* **3**: 50-52.
- Macdonald, S.M. and Mason C.F. (1982a).** Otters in Greece. *Oryx* **16**: 240-244.
- Macdonald, S.M. and Mason C.F. (1982b)** The otter in Central Portugal.
- Macdonald, S.M. and Mason C.F. (1985).** Otters: their habitat and conservation in northeast Greece. *Biol. Conserv.* **31**: 191-210.
- Mason, C.F. and Macdonald, S.M. (1986).** Levels of cadmium, mercury and lead in otter and mink faeces from the United Kingdom *Sci. Total Environ.* **53**: 139-146.
- Prigioni, C., Boglani, C. and Barbieri E. (1986).** The otter *L. lutra* in Albania. *Biol. Conserv.* **36**: 375-383.
- Reuther, C., Festetics A. (1980).** Der Fischotter in Europa - Verbreitung, Bedrohung, Erhaltung. Selbstverlag, Oderhaus and Göttingen.

## REPORT

### **STATUS AND DISTRIBUTION OF OTTERS IN THE AMBORO NATIONAL PARK, BOLIVIA**

Nigel Dunstone and Robert Strachan

*Department of Zoology, Durham University, South Road, Durham City, DH1 3LE, U.K*

#### **BACKGROUND**

During 1986, at the invitation of Prodena Bolivia (Bolivian Wildlife Society), I accompanied a group of U.K. and Bolivian students on a visit to the Amoro National Park to conduct faunal surveys. It became obvious that there were good populations of otters present, and that these were potentially at risk from the activities of the campesino population. During the summer of 1987 we returned with a team of 14 people to undertake further survey work on the otters. The following resume is based on approximately 560 man-days in the field during the period July-September 1987.

The Park is bounded by the Rio Surutu and the Rio Yapacani on the northeast and northwest respectively and extends southward to latitude 17° 31', encompassing a pianigrific area of approximately 180,000 hectares. Amoro is situated at the bend of the eastern slope of the oriental Andean range and divides the cooler and drier southern Andes from the wetter and more humid Eastern Andes in Bolivia. The Park is divided topographically into one-third lowlands ranging in height up to 490m and two-thirds upland foothills of the Andes extending to 2330m. The lowland area consists of primary rainforest interspersed with areas of cultivation and secondary forest, whilst the serrania is covered with primary humid rainforest.

Annual precipitation varied between 2000 mm and 3500 mm per year with the bulk falling between December and March. The Surutu and Yapacani are the principle rivers draining the Park ([Figure 1](#)) and flow into the Rio Mamora a major tributary of the Amazon. The Rio Saguayo and its tributary the Yapoje flow into the Surutu approximately 10 km from its confluence with the Yapacani. The rivers Pitasama, Macunucu, and Semayo are also tributaries of the Surutu running southwest to northeast. The Rio Colorado is the major tributary of the Yapacani before its junction with the Surutu.

The rivers are primarily spate-rivers fed by the rain falling on the Serrania. The upper reaches are characterised by boulder-strewn rocky gorges whilst the lower stretches are slow flowing, silt-laden, and shallow during the dry season. A small number of ox-bow lakes (coriches) occur on the lower reaches of most rivers.

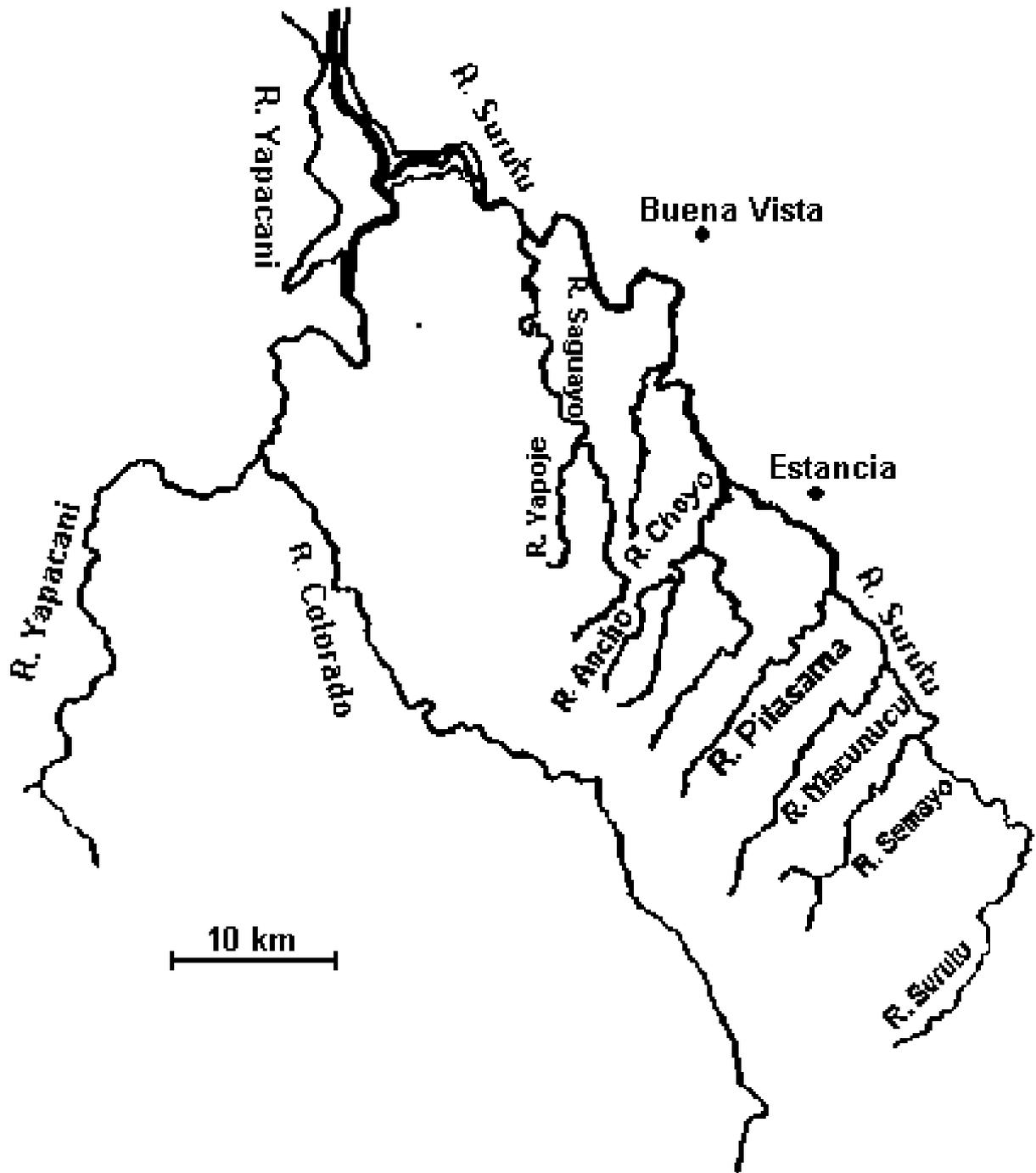


Figure 1: The Study Area

There is little published information regarding status and distribution of otters in South America (Thornback and Jenkins, 1982; Duplax, 1978) and there is a dearth of information concerning otters in Bolivia. The species most likely to be encountered are the neotropical river otter *Lutra longicaudis* sp. complex, and possibly the giant Brazilian river otter *Pteronura brasiliensis* since this species is present on the Rio Mamora into which the Yapacani drains.

Anderson (1985) records both species as present in Bolivia but does not give locations or range. Riddle (1986) in a preliminary survey of the mammal fauna of the Amboro Park conducted in 1985 does not report the presence of *Lutra* or *Pteronura*. Nevertheless abundant signs of the neotropical river otter were recorded during our 1986 visit and evidence was collected locally that *Pteronura* had existed in

the Park and may still be an occasional visitor. This was supported by an unverified report of a captive pair of *Pteronura* at the Santa Cruz Zoo, which were believed to have been captured locally. Anderson (pers. comm.) reports seeing an old *Pteronura* pelt. at the village of Beuna Vista on the edge of the Amboro Park from which it had presumably been collected.

Tello, in a report of a survey commissioned by IUCN, found *Lutra longicaudis* to be widely distributed below 3000m in Bolivia but to be much reduced in numbers. He reported this species in all of Bolivia's National Parks including Amboro. In contrast he considers the distribution of *Pteronura* to be restricted to isolated populations in and around the Reserve Nacional de Fauna Manuripi-Heath in the Pando province.

The object of this study was to determine the status and distribution of otter species along the principle rivers of the Park and to identify and assess the main factors affecting their distribution. The second part of the study sought to investigate the diet of the otters, and a qualitative assessment of the fishing activities of the campesino population in terms of areas fished, methods of fishing, species and numbers taken.

The rivers Saguayo, Yapacani, Colorado, Surutu, Pitasama, Macunucu and Semayo were all surveyed with particular attention being paid to the upper and lower stretches of the Saguayo. This river was extensively mapped and exhaustively searched for den sites and sprainting stations. Representative sections of the other rivers were then compared. In total 50km of river were surveyed, see Figure 1 for the extent of the area surveyed. Over 500 faecal samples were collected and their occurrence along the river courses mapped to give an indication of the relative density of otters. Figure 2 shows the deposition of otter spraint recorded between the 8-12th August along a 20km stretch of the Saguayo and the Yapoje. The majority of sprainting sites were located on sand bars where the faecal material was characteristically deposited in a scrape occasionally excavated to a depth of 20cm. Other sites included midstream rocks, promontories, fallen tree trunks, tree-root cavities, in hollows under boulders and in riverside caves. Rarely were more than four spraints found together in open locations whereas in sheltered underground sites as many as 20 spraints might be found. This was attributed to the activities of coprophagous hymenopteran insects (sweat-bees and ants) which were shown to be capable of dismembering and removing all trace of a 20g spraint in 6-24 hours.

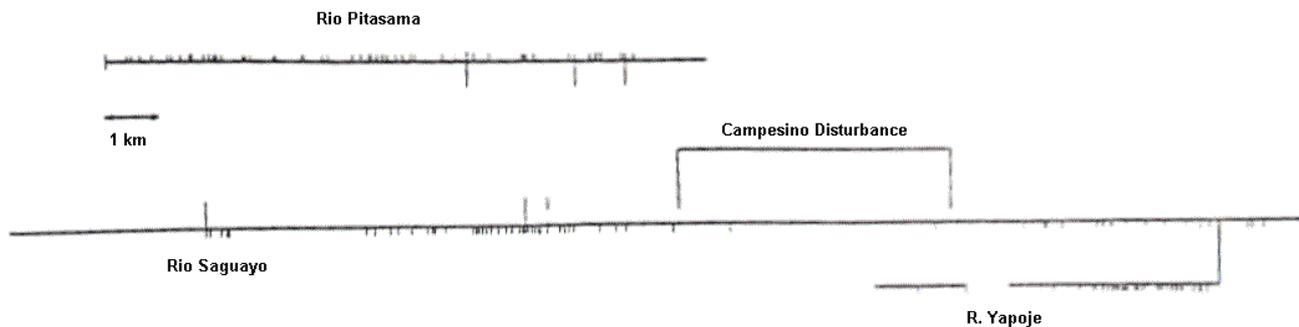


Figure 2: Otter spraint deposition survey results

Given the high density of spraints and their short longevity we consider the density of otters on the Rio Saguayo to be very high. The Pitasama was the only other river where a comparable density of spraint was recorded. It was not possible to estimate the number of otters present or any details of their spacing pattern. Single otters were sighted on three occasions and breeding was confirmed by the observation of cub-tracks on both the Saguayo and Pitasama rivers.

To compliment the dietary analysis a survey of the fish species was carried out on the Rio Saguayo using fyke nets, gill nets, fish traps and rod and line. Twenty-one different species of fish were returned to the British Museum (Natural History) for identification. The species collected fell into five categories known to the local campesino fishermen under the general names of sardines and sabalo (Characins), bagre, caracha and surubi (silurid catfishes) and benton. All these groups of fish were noted to occur in the faecal deposits of the otters, but the relative proportions of each type in the diet remains to be determined. Sabalo, surubi, bagre and benton are the species most commonly taken by fishermen.

Although fishing activities within the Park are subject to control there is inadequate policing and the dynamiting and poisoning of rivers is commonplace (pers obs). Neither is there any control on the size of mesh employed by netsmen or any form of restriction on the fishing season.

### **Major threats to otters**

It is common practise for poachers to dynamite pools for the shoaling species of characins e.g. sabalo. Large quantities of fish obtained in this manner were offered for sale. We also received a report of an otter being killed when a pool was dynamited. Shock waves from the explosions have led to considerable bank erosion and collapse of holt sites. There was an absence of otter signs in areas that had been recently dynamited and for several kilometres up and down stream. Dynamiting was a nightly occurrence on some of the rivers. Interviews confirmed the use of both natural compounds, extracted from plants, and weed killer to poison fish in pools.

Despite a recently signed convenio between the campesino population and the CDF forbidding the felling of any tree within 100m of the river banks inside and bounding the Park, we found this practice commonplace. Similarly the cutting of chucio (*Cana brava*) for roofing continues. Since the roots of these plants bind together the sandy soil their destruction leads to severe erosion of the river banks. A number of government (servicio de caminos) and commercial companies are exploiting the sand and gravel for road building. This is causing considerable disturbance from lorries and the villages which have been set up to house the workers. Due to the impenetrable nature of the serrania the river corridors are used extensively as thoroughfares for the movement of crops e.g. rice, maize and coca from the campesino farms to collection points on the Surutu and Yapacani serviced by lorries. The number of campesinos allowed to farm in the Park is state controlled but there is no adequate policing with widespread clear-felling as new farms are developed even up to 14 km into the park. Furthermore the campesinos invariably have dogs which rely on scavenging and hunting for their subsistence. Dog tracks were found on most rivers and packs of semi-feral animals were observed. The farmers and hunters eat the meat of agoutis, peccaries, armadillos and tapir killed in the park. Evidence was also collected indicating that forest-living felids, including ocelot, jaguar and margay, are occasionally hunted for their pelts. Interviews suggested that otters are no longer hunted in the park because there is no market for their skins. No otter pelts were observed for sale or in caches confiscated by CDF officials.

Potential natural predators such as jaguar and puma are common in the park and their tracks were encountered alongside those of otters. No observations of anaconda or caiman were made although both species are reputed to occur. Dogs probably pose the most significant "natural" predator.

### **Status of otters on the rivers surveyed**

This rivers Saguayo and Yapoje hold good populations of otter in the middle stretches. The higher reaches of the river have small populations of fish, particularly sardines, whereas the lower stretches were found to be heavily disturbed by campesinos and their dogs. A considerable area (c. 5km) in the middle reaches was denuded of fish due to dynamiting. The Yapoje was found to be relatively undisturbed providing ideal habitat with pools containing abundant fish, considerable bank-side cover and suitable holt sites. Despite being overfished and disturbed in 1986 the Rio Pitasama has recovered and now holds considerable stocks of fish, particularly sabalo and caracha. Abundant signs of otters were encountered and the status of this river has improved considerably since the original visit in 1986 when dynamiting was commonplace. Disturbance has been much reduced by the cutting of a new access route through the forest to farms which obviates the need to travel along the river valley. The rivers Semayo and Macunucu were only briefly visited, here few signs of otters were encountered probably due to excessive disturbance. The Rio Surutu is the major thoroughfare into, and around, the park. It is subject to considerable bank-side clearance for agricultural purposes and the river is used for bathing, recreation and livestock wander freely. The river is commonly dynamited during the rainy season. Extensive gravel removal is occurring at a number of locations on the river. Nevertheless, otter signs were found throughout the length surveyed but were very sparsely distributed and most common at the confluence with feeder rivers. The Yapacani is the major river of the area; it is deep and fast-flowing even during the dry season. For this reason it is not used as a route into the park although it is crossed at frequent intervals. Gravel extraction is causing considerable disturbance at a number of locations. Otter signs were found throughout the area surveyed but more commonly on coriches and feeder rivers than on the main river. An attempt to survey the Rio Colorado, the major tributary of the Yapacani, failed due to its steep-sided gorge topography and the extremely deep water. The area is

further protected by hordes of miraoque (blackfly, Simuliidae) which discourage even the peasants from venturing there. † The Yapacani is extensively fished by netmen.

## Discussion

From our interviews with hunters and campesinos it soon became evident that there is considerable confusion, both in the literature and in conversation over the species of animals that are present and the vernacular names they are given. The campesinos refer to 'El Lobito del Rio' (the Small River Wolf) this is the colloquial name for the giant water opossum (*Chironectes minimis* : Marsupialia) which occupies a sub-aquatic niche similar to that of the otter. 'El Lobo del Rio' (The River Wolf) this is the colloquial name given to the neotropical river otter (*Lutra longicaudis*). 'Londra' refers to the Giant River Otter (*Pteronura brasiliensis*). Unfortunately these names are often used interchangeably and consequently considerable care has to be taken when attempting to determine presence/absence information from interview. Even the specimens purporting to be Giant Otters in the Zoological Gardens were in fact *Lutra longicaudis*. It is clear from analysis of tracks and signs, and interviews conducted with local poachers, hunters and campesinos that the Giant Otter (*Pteronura brasiliensis*) is a very rare visitor to the Amboro National Park. The interviews suggest that the animal occurred commonly in the Park up until 10 years ago, and was hunted for its pelt until 15 years ago. The species of otter which was commonly encountered was the neotropical river otter (*Lutra longicaudis*). This is a species complex whose taxonomy is not clearly understood, and since no attempt was made to capture otters in the present study, we are unclear of the precise species present in the Park.

Otters have not fared well in the presence of man, both species have been extensively hunted for their pelts. In recent years an even greater threat is posed by the dynamiting and poisoning of rivers and clearance of bankside vegetation. Amboro is a relatively new National Park and should be regarded as a showpiece for Bolivia. The foresight of the Government, C.D.F., Prodena Bolivia, and particularly Reginald Hardy and Robin Clarke in getting this venture off the ground and for their continuing support is commendable. Considerable problems remain however, paramount of which, is the hunting of animals for food, for live export or for skins. Ample evidence of this practise has been found on both visits to Amboro. As far as the otter populations are concerned, direct persecution is now minimal since there is no market for their skins. However the practise of fishing using dynamite or poison should be actively discouraged if the good populations of these animals are to be maintained.

*Acknowledgements* - We wish to thank the Vincent Wildlife Trust, Percy Sladden Trust, British Ecological Society, British & Foreign Schools Society, Gilchrist Educational Trust, Rothley Trust, Whitley Animal Protection Trust, Durham University and the Mammal Society for financial assistance towards this project.

We gratefully acknowledge the assistance provided by Robin Clarke (CDF), Reginald Hardy (Prodena Bolivia) and the University of Santa Cruz de la Sierra. Particular thanks are due to Joanna Copley, Kate Hlarrlson, Gill Hinchcliffe, Mark Ireland, Sarita Montes, Kate Watson, and Darwin, Lucho and Modesto for assistance with fieldwork.

## REFERENCES

- Anderson, S. (1985).** Lista preliminar de mamíferos Bolivianos. Publ.Museo Nacional de historia natural. Zoologia 3. La Paz
- Duplax, N.(1978).** (ed). Otters- Proceedings of the first working meeting of the IUCN/SSC Otter specialist group Surinam- 27-29 March 1977. IUCN. Switzerland
- Riddle, B. R. (1986).** Report of mammal collections from the vicinity of Cerro Amboro National Park, Santa Cruz Department, Bolivia July-September 1985. (Unpublished)
- Thornback, J. & Jenkins. M. (1982).** The IUCN Mammal Red Data Book. Part 1. 516pp. IUCN, Switzerland

# REPORT

## THE SECOND SCOTTISH OTTER SURVEY

R. and J.Green

*Barjarg, Barhill, Girvan, Ayrshire, KA26 0RB, Scotland*

In common with the other British national surveys of 1977-81, the second Scottish otter survey occurred seven years after the first, in 1984-85. Effort was limited to 2650 of the original 4636 sites, excluding those administrative regions (Highland plus all the main island groups) which had produced greater than 90% positive results in the first national survey. Independent evidence from these areas suggested that they continued to form the stronghold of otters in Scotland and, hence in Britain as a whole. About two-thirds of mainland Scotland was resurveyed in 1984-85, covering most habitat types but concentrating on those areas where there was some previous evidence of a decline in distribution.

**Table 1:** Positive Sites

Region	Total Sites	1977-79		1984-85		Change	
		Number	%	Number	%	Number	%
Grampian	494	381	77	390	79	+ 9	2
Tayside	410	251	61	311	76	+ 60	15*
Central	146	71	49	97	66	+ 26	17*
Strathclyde	716	376	52	424	59	+ 48	7*
Fife	88	4	5	20	23	+ 16	18*
Lothian	103	0	0	7	7	+ 7	7*
Borders	279	87	31	108	39	+ 21	8
Dumfries & Galloway	414	341	82	360	87	+ 19	5
<b>Totals</b>	<b>2650</b>	<b>1511</b>	<b>57</b>	<b>1717</b>	<b>65</b>	<b>+ 206</b>	<b>8*</b>

\* statistically significant change

In all of the eight administrative regions which were investigated there was an increase in the number of sites at which otters were present (Table 1). The increase was statistically significant in five of these regions. Whereas, in the first survey, 16% of the ten-kilometre squares surveyed on both occasions produced no evidence of otters, in the second the figure was 10%. Twenty-one of the 33 newly positive squares were located in eastern Scotland from Tayside south, through Fife and Lothian to Borders region (Map). This is an area with a relatively dense human population coupled with intensive agriculture, which had produced rather poor results in 1977-79. For Fife the improvement in survey results was independently substantiated by the occurrence of the first recorded otter road mortalities since 1969, plus a marked increase in otter sightings.

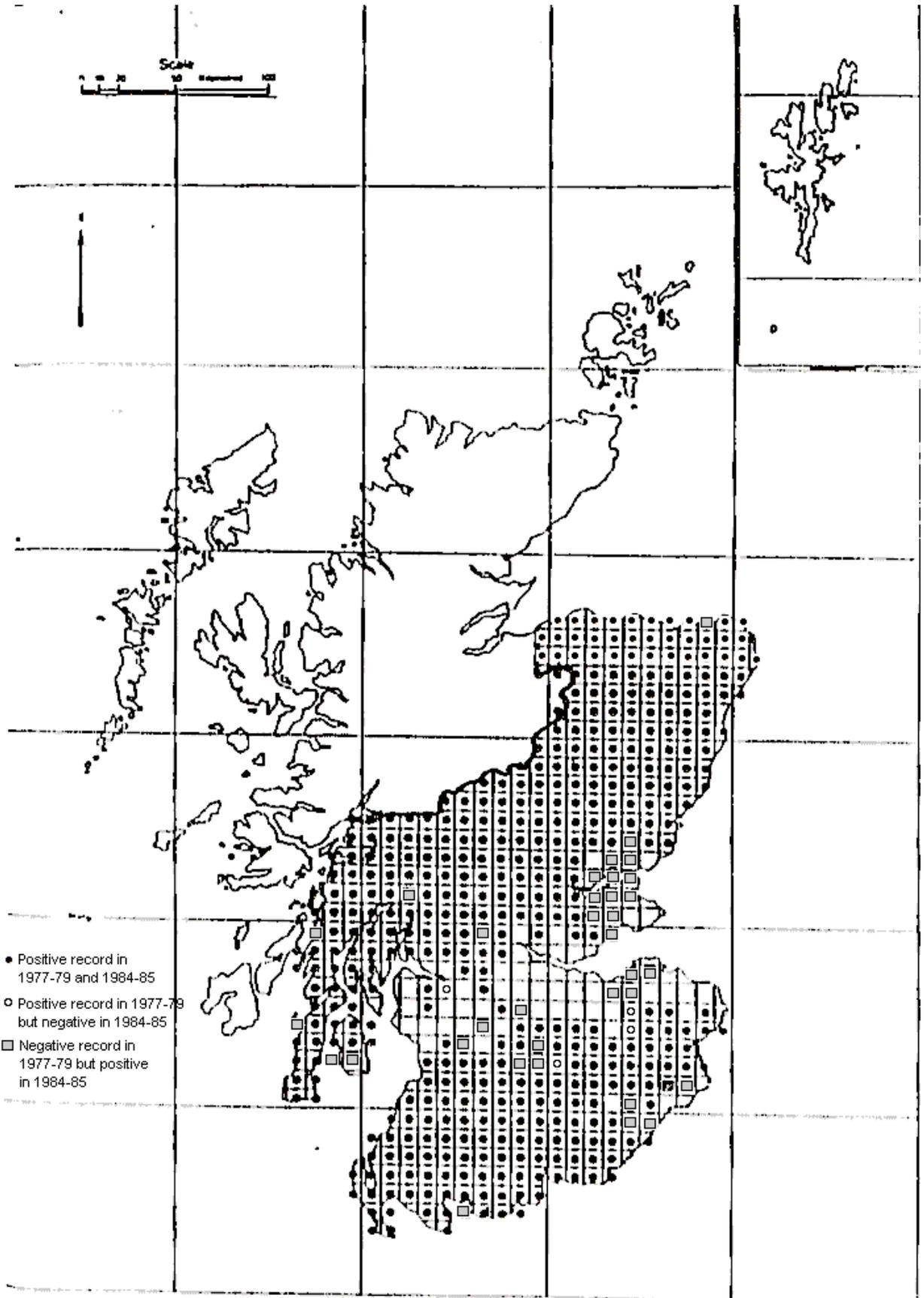
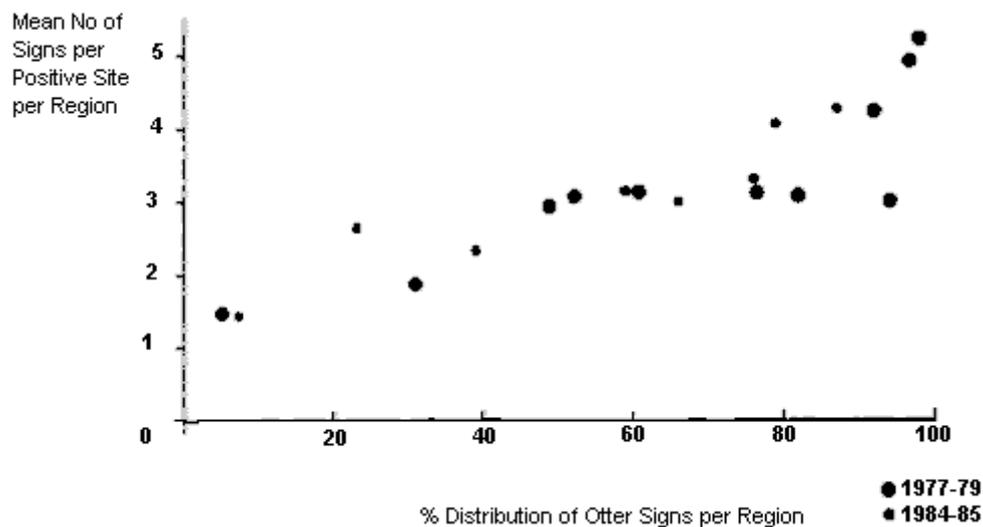


Figure 1: The Survey Area showing findings for 1977-79 and 1984-85

The number of sites which were positive in the first survey but negative in the second was small, at less than 3. 5% of the overall total. This equates with the perceptible margin of error in the survey technique identified after the first survey. Most of the new negatives were randomly distributed unlike the new positives, which tended to occur in clusters. The only possible indication of a decline in distribution was recorded in a small area of south-west Scotland where increasing acidity has damaged fish stocks. This apart, the south-west has a healthy otter population whose future prospects are linked with those of lowland Scotland generally and with adjacent regions in England.

Despite unavoidable environmental variations, the two Scottish surveys produced a broadly similar pattern of results in terms of the percentage distribution of successful sites per unit area. This was also true for geographical variations in otter spraint density. The relationship between spraint numbers and percentage distribution of otter signs was analysed regionally, using Spearman's Rank Correlation Test. For both surveys, a close and similar correlation was established between the mean number of spraints found per successful site, per region, compared with the associated percentage of positive results (Figure 1). For 1977-79 the results were  $r_s = 0.80$ ; 9df;  $p < 0.01$  : for 1984-85,  $r_s = 0.95$ ; 6df;  $p < 0.01$ .



**Figure 1:** The Relationship between the Frequency and Distribution of Otter Signs for the 2 Scottish National Surveys

The results of the second Scottish otter survey are modestly encouraging and parallel indications of a similar, modest improvement in status in Wales and parts of England. However, in all the areas of apparent improvement the otter probably remains a rather scarce animal whilst environmental change continues to affect otter habitat in an unplanned and sometimes explosive fashion. Of particular concern in Scotland at present is the extension of blanket forestry into wetland habitats in the north and the rapid development of a marine fish farm industry amongst the finest otter habitat in Britain.

Further details of the survey are to be found in:-

Green, J. & Green, R. (1987). Otter survey of Scotland, 1984-85. Vincent Wildlife Trust, London. The map and figure in this article are reproduced from the above report.

## REPORT

### THE NEED FOR INTERNATIONAL ASIAN OTTER SYMPOSIUM

Pat Foster-Turley

*Deputy Chairman, IUCN Otter Specialist Group, Marine World Foundation, Marine World Parkway, Vallejo, CA 94589, USA*

Otters are charming, charismatic animals with wide public appeal; they are also indicator species for the health of aquatic ecosystems. Otters can only live in clean water that is rich in aquatic prey and unpolluted by pesticides or industrial contaminants, where there is adequate bankside cover, and where they are unmolested by humans. Fewer and fewer places in the world meet these basic criteria.

The four species of otters in Asia are virtually unstudied in the field. Most of our information on them stems from brief sightings, museum specimens and captive studies. Undoubtedly, like river otters throughout the world, their distribution and ranges are rapidly shrinking. For instance, Peninsular Malaysia was once solidly in the historical range of the hairy-nosed otter (*Lutra sumatrana*); this species has not been positively sighted in recent years. A similar statement can probably be made about the Eurasian otter (*Lutra lutra*) in Thailand. As of July 1984, all species of otters in Peninsular Malaysia were classified as totally protected.

Throughout Asia, a similar situation of shrinking distribution and population is no doubt also occurring. In India, it is known that three species of otters occur, but little is known about their status, distribution or ecology. The most recent published distribution maps indicate that two species, the Eurasian otter (*Lutra lutra*) and the small-clawed otter (*Aonyx cinerea*) are found primarily in the south and in the northern areas bordering Nepal, Bhutan, Kashmir and Assam. The third species, the smooth-coated otter (*Lutrogale perspicillata*) is thought to be more generally found in these regions and throughout India. Despite this general agreement, otters not listed in some areas are nonetheless reported there. A case in point is the 1979 report in the Journal of the Bombay Natural History Society of a Eurasian otter positively occurring in Maharashtra. Unfortunately, even where otters are most likely to occur throughout India, sightings are infrequent and population numbers are unknown.

One reason for the confusion about the status of otters in Asia is the lack of organised research with these species. Another is the confusion in the identification between them. To the unschooled observer, two of the three species look very similar, and even a trained observer might have difficulty making a positive identification based on a fleeting glimpse. Unless field conditions are absolutely perfect, the signs of all three otters would be virtually indistinguishable. Not enough is known about the variable ecology and behaviour of these three species to enable such factors to differentiate them. Much work is needed with these species throughout their ranges in India and Southeast Asia to determine their status and the relative size of their populations. Because otters, as high-order carnivores, are very susceptible to the pressures of human population, trapping, and habitat destruction, and because they do not survive in waters that are polluted, there is reason to suspect that in many areas of their so-called range throughout Asia they are in trouble. Unless status surveys and ecological research is begun soon to document their status, we may not know in time.

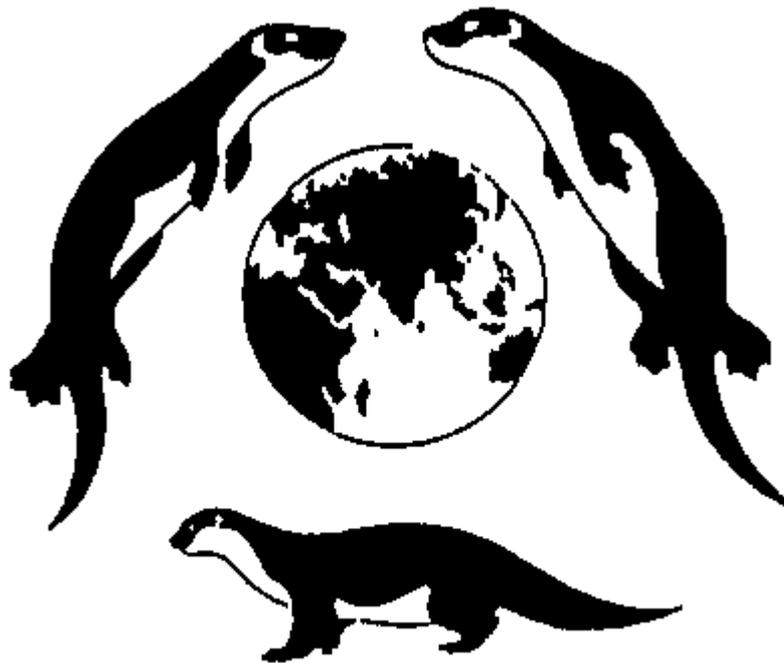
For these reasons, throughout Europe and North America, there have been years of concern and concentrated survey research efforts with the otter species found there. In South America and Africa, there are a handful of studies underway and more are proposed. It is only in the vast Asian region that our knowledge of otter biology is sorely limited.

For all of these reasons, it is important that an effort be made immediately to heighten the awareness of Asian biologists and conservationists into the plight faced by otters and their habitat in this region. Holding an International Asian Otter Symposium in India will serve this purpose and hopefully stimulate more research and conservation efforts with these species.

The International Asian Otter Symposium is planned to include delegates from around the world with considerable expertise in the conservation and biology of other otter species. Delegates from all Asian nations with otter populations and from all states in India will also be invited. Formal papers will be

presented on otter research in other parts of the world to give examples of the types of studies that can be undertaken. Formal papers are also planned on captive Asian otter research and breeding and reintroduction projects. Survey techniques that have been developed and applied in Britain and throughout Europe will be described and demonstrated in the field. Workshops will be conducted in otter identification through sightings, skulls, and field signs, and the Delegates from Asian nations with otter populations and from all Indian States will present status reports on otters in their region. Together all delegates will develop a survey strategy for the Asian region, and will formulate an Action Plan for Asian Otter Survival which will be published and distributed by the IUCN Otter Specialist Group.

The anticipated results of such an International Asian Otter Symposium will have a far-reaching effect and enhance the conservation of these charming, but fragile animals. The main consideration at this time is to start the otter conservation ball rolling in Asia before it is too late.



**INTERNATIONAL ASIAN OTTER SYMPOSIUM  
Bangalore, India  
October 14 - 18, 1988**

The first International Asian Otter Symposium is sponsored jointly by the IUCN Otter Specialist Group and the Government of India to increase the knowledge and conservation of the otter species and their habitats throughout Asia. Wildlife and zoo biologists, conservationists and governmental representatives from throughout Asia are strongly encouraged to participate.

The program will include formal summary papers on otter research and conservation throughout the world, sessions on captive breeding and husbandry of Asian otters, workshops on Asian otter identification and survey techniques and reports on the status of otters throughout India and Asia. Members of the IUCN Otter Specialist Group and other participants will together help formulate the IUCN Action Plan for Asian Otter Survival.

Following the formal symposium, a post-conference tour of the National Parks of Karnataka will include the study of otter habitats and the chance of viewing wild gaur, elephants and maybe even tigers. This tour will include special VIP attendance at the Dussera procession in Mysore, one of the largest processions of ceremonial elephants in Asia.

Papers are invited on all aspects of Asian otter biology and conservation. Survey papers are especially encouraged from all Asian regions. Please contact Pat Foster-Turley as soon as possible if you would

like to present a paper. More information on the International Asian Otter Symposium can be obtained from

<b>Conference Chairman</b>	<b>Indian Conference Coordinator</b>
Pat Foster-Turley	Mr M.K. Appayya
IUCN Otter Specialist Group,	Chief Wildlife Warden
Marine World Foundation,	Aranya Bhavan, 18th Cross
Marine World Parkway,	Malleswaran
Vallejo, CA 94589, USA	Bangalore, 560 003, India

## REPORT

### THE NEW OTTER CENTRE IN WEST GERMANY

Claus Reuther

*Aktion Fischotterschutz e.V., OTTER-ZENTRUM, Postbox 1216, D-3122 Hankensbüttel, West Germany*

The decision of the forest department of Lower Saxony to close the Oderhaus Otter Research Enclosure in December 31st, 1987 made it necessary to find a new organisational base for the German AKTION FISCHOTTERSCHUTZ.

Since July 1987 the organisation has built a new otter centre in Hankensbüttel (50 km north of Braunschweig, 15 km west of the border to the GDR) . The otter centre will be opened at the end of April 1986. It has four main departments:

#### 1. Research

In this field the scientific work of the Oderhaus Otter Research Enclosure will be continued. It has three objectives:

- A new research enclosure for otters and other Mustelidae of 15,000 square metres, where mainly ethological work will be done.
- A laboratory for water analysis and morphological or physiological research.
- Field research on otters and other Mustelidae in the neighbourhood of the otter centre.

#### 2. Conservation

Beside the different conservation projects in Northern Germany (e.g. the Lower Saxony otter habitat protection programme) the main aim of the otter centre is the reconstruction of the river system of the River Ise. This river (40 km; inclusive its tributary rivers more than 100 km) was canalised between 1950-1970. Since then the otter disappeared from the area.

The AKTION FISCHOTTERSCHUTZ will try to reconstruct this river system and to close the distribution gap between the otter populations in the north-western parts of the GDR and the eastern parts of Lower Saxony (FRG).

#### 3. Education

On a 55,000 square metre education area the otter centre will realise a new didactic conception. By using different species of Mustelids (badgers, otters, stonemartens, pinemartens, polecats) the problems of different habitats will be explained (hedges, rivers, urban areas, forests, swamps). Therefore, in very large and specially constructed enclosures these Mustelids will be shown. Additional special problems and information will be explained by games and experiments. Following the motto of the otter centre

"Play and learn", the visitors will get no information without doing something ("See, feel, taste, smell, hear nature and understand the problems of nature conservation").

#### **4. Fundraising**

The otter centre will get no governmental support. It has to finance its work on its own. So fundraising is the basis for the points 1-3. At this time the otter centre employs a staff of more than 50 people. The yearly budget amounts to more than one million DM. It is covered by membership dues, sponsors (business enterprises), donations and the income from the entrance-fee, the restaurant and the gift-shop of the otter centre.

An information prospectus in German can be ordered from:

Aktion Fischotterschutz e.V.,  
OTTER-ZENTRUM,  
Postbox 1216,  
D-3122 Hankensbüttel,  
West Germany

#### **Art auction for the benefit of the German otter centre**

Forty-three artists from W. Germany, the Netherlands, Hungary and Rumania have donated 61 works of art to the otter centre, Hankensbüttel (W. Germany). This collection includes sculptures (cast iron and bronze), drawings, lithographs, water-colour paintings and oil-paintings of different styles and techniques. Most of them show otters.

Everybody can bid for the works of art until May 29th, 1988. The profit of this auction will be used to 100% for the work of the otter centre Hankensbüttel.

A 112-pages catalogue showing all works of art in colour and including a bid list can be ordered from the above address.

Please enclose a cheque for DM 15 for the catalogue plus DM 3 for forwarding expenses.

#### **5. INTERNATIONAL OTTER COLLOQUIUM**

Ten years after the 1st International Otter Colloquium in Gottingen the fifth meeting will be held in Germany again. The German "Aktion Fischotterschutz" invites all members of the IUCN Otter Specialist Group and all scientists or conservationists working with or on otters to the new OTTER CENTRE In Hankensbüttel.

It is planned to have a 4-5 days working meeting in the second half of September 1989. There will be plenary sessions and working groups on different problems of research, conservation and education (Proposals for topics are welcome). A first invitation paper will be mailed in March/April 1988. Interested otter people should contact:

Aktion Fischotterschutz e.V.,  
OTTER-ZENTRUM,  
Postbox 1216,  
D-3122 Hankensbüttel,  
West Germany

# REPORT

## RESEARCH ON THE OTTER IN ITALY

Claudio Prigioni

*Dipartimento di Biologia Animale, Universita di Pavia, Piazza Botta 9, 27100 Pavia. Italy*

In Italy, the distribution of the otter was surveyed by the "Gruppo Lontra Italia" (Cassola, 1986). The species presently occurs only in some rivers of Central and Southern Italy, except for a new population of otters which has recently been found in the Northern Apennines (Beseghi and Donati, 1987). The first data on the otter's diet were recorded by Arca and Prigioni (1987) on the river Fiora (Tuscany and Latium regions).

So far, the available knowledge on this reduced population of otters is very scarce and further studies are necessary in order to propose a conservation strategy for the species. A detailed research programme was undertaken in September 1987 on the five rivers (Rivers Sele, Calore, Agri, Basento, Fiora), which hold the most important populations of otters. Fifteen co-operators (University researchers and members of "Gruppo Lontra Italia") are working on this study, financially supported by the Environment Italian Ministry. The main aims of the study are:

- to analyse the sprainting activity of otters throughout the year; eight or nine stretches (1 km) were selected on each river, and the spraints and the sprainting sites are counted at monthly intervals; stretches are spaced 4-5 km from one another;
- to study the seasonal variations of the otter's diet by the analysis of spraints;
- to analyse the factors affecting the use of habitat by otters surveying sprainting activity; bottom type, shore type, bankside vegetation cover, disturbance, water pollution, food supply are the main variables estimated;
- to obtain information about holts and the breeding of the species.

The water quality of each river is being assessed, using chemical criteria and by surveying the macro-invertebrate community. Sampling of fish is carried out by electrofishing, and fish are analysed for heavy metals and chlorinated hydrocarbon pesticides.

In connection with the field research, a study programme on captive otters has been started at the Faunistic Park "La Torbiera" (Northern Italy), where 4 pairs of otters, born in captivity, are held in suitable enclosures (Table 1). This study aims to obtain useful information for the field research on the otter. Sprainting activity, the seasonal production and the composition of the "anal jelly" for both sexes are studied. In addition, the characteristics of otter's footprints on differing substrata (sand, mud of differing compactness) are examined.

**Table 1:** Otters held at the Faunistic Park "La Torbiera" (report start date: 10th January, 1988)

Sex	Age		Origin
	Years	Months	
Male	3	6	Norfolk Wildlife Park, UK
Female	3	4	"
Male	1		"
Female	1		"
Male	2	4	Bern, Städtischer Tierpark Dahlholzli
Female	1	9	Zurich, Zoologischer Garten Zurich
Male	1	5	"
Female	1		"

At "La Torbiera", the "Gruppo Lontra Italia" has made a permanent exhibition on the otter. The public is informed about biology, ecology and conservation problems of the species, and a pair of otters is visible in an enclosure.

The first data of the field survey and captive research on the otter will be available at the end of 1988.

## REFERENCES

**Arca, G. and Prigioni, C. (1987).** Food of the Otter (*Lutra lutra*) on the Fiora river (Central Italy). *Acta Theriologica*. 32. 134-140.

**Beseghi, A. and Donati, M. (1987).** La Lontra *Lutra lutra* L., nelle province di Parma e Reggio Emilia. *Atti Soc. Ital. Sci. nat. Museo civ. Stor. nat. Milano*, 128, 67-79.

**Cassola, F. (ed.) (1986).** La Lontra in Italia. Ceneimento, distribuzione e problemi di conservazione di una specie minacciata. Serie Atti e Studi, no. 5, W.W.F.

## OBITUARY

### ELIZABETH LENTON

Libby Lenton died in December. 1987. She was interested in all mammals but had a special affection for otters and was one of the first people in Britain to study them in the wild. She carried out all the field work for the 'Otter Survey of England 1977-79' and subsequently spent several years safeguarding and improving otter habitats in S.W. England. Libby was tireless in her work for conservation and, as a teacher, inspired many youngsters with her love and wide knowledge of plants and animals. She is very much missed.

## LITERATURE

**Adrian, M.I. and Delibes, M. (1987).** Food habits of the otter (*Lutra lutra*) in two habitats of the Donana National Park. SW Spain. *J. Zool., Lond.* **211**: 399-406. (Author's address: Estacion Biologica de Donana, CSIC, Apdo. 1056, 41080-Sevilla, Spain).

**Adrian, M.I. and Moreno, S. (1986).** Notas sobre la alimentacion de la nutria (*Lutra lutra*) en el embalse de Matavacas (Huelva). Donana, *Acta Vertebrata* **13**: 189-191. (Address as above).

**Anon. (1987).** Sea otters reintroduced to southern California. *Mar. Poll. Bull.* **18**: 577.

**Arca, G. and Prigioni, C. (1987).** Food of the otter on the Fiora River (central Italy). *Acta Theriol.* **31** (10): 134 - 140. (Assessorato Programmazione, Ufficio Parchi e Riserve Naturali, Regione Lazio, via C. Colombo 212, 00145 Roma, Italy).

**De Jongh, A.W.J.J. (1986).** Possible evidence for underwater chemoreception in the European otter *Lutra lutra* (L., 1758). *Lutra* **29**, 141-144. (De Laan 22-3, 9712 AV Groningen, The Netherlands).

**Delibes, M. and Adrian, I. (1987).** Effects of crayfish introduction on otter *Lutra lutra* food in the Donana National Park, SW Spain. *Biol. Conserv.* **42**. 153-159. (Address as Adrian).

**Estes, J.A., Underwood, K.E. and Karmann, M.J. (1986).** Activity-time budgets of sea otters In California. *J. Wildl. Manage.* **50**, 626-636. (Fish and Wildlife Service, Institute of Marine Sciences, University of California, Santa Cruz. CA 95064, U.S.A.).

**Irons, D.B., Anthony, R.Q. and Bates, J.A. (1986).** Foraging strategies of Glaucous-winged Gulls in a rocky intertidal community. *Ecology* **67**, 1460-1474. (United States Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, Alaska 99503, U.S.A.).

**Jefferies, D.J. (1987).** The effects of angling interests on otters, with particular reference to disturbance. In: 'Angling and Wildlife in Fresh Waters', eds. P.S. Maitland and A.K. Turner (ITE Symposium No. 19). Grange-over-Sands: Institute of Terrestrial Ecology, 23-30. (Nature Conservancy Council, Northminster House. Peterborough, U.K. )

**Keymer, I.F., Wells, G.A.H., Mason, C.F. and Macdonald, S.M. (1988).** Pathological changes and

- organochlorine tissues residues in wild otters (*Lutra lutra*). *Veterinary Record*, **122**, 153-155. (Central Veterinary Laboratory, MAFF, New Haw, Weybridge, Surrey, U.K.)
- Kruuk, H. and Conroy, J.W.H. (1987)**. Surveying otter *Lutra lutra* populations: a discussion of problems with spraints. *Biol. Conserv.* **41**, 179-183. (Institute of Terrestrial Ecology, Hill of Brathens, Glassel, Banchory, Scotland)
- Madsen, A.B. (1987)** Erfaringer med anvendelse af stopriste i aleruser - 1986 (Experiences of using stopgrids in eel traps) 17 pp (Foreningen til Dyrenes Beskyttelse, Alhambravej 18, 1826 Frederiksberg C, Denmark).
- Madsen, A.B. and Mason, C.F. (1987)**. Cadmium, lead and mercury in hair from Danish otters *Lutra lutra*. *Natura Jutlandica* **22**: 81-84. (Address as above).
- Mason, C.F. and Macdonald, S.M. (1987)**. The use of spraints for surveying otter *Lutra lutra* populations: an evaluation. *Biol. Conserv.* **41**, 167-177. (Department of Biology, University of Essex, Colchester. Essex, U.K. ).
- Mason, C.F. and Macdonald, S.M. (1987)**. Acidification and otter (*Lutra lutra*) distribution on a British river. *Mammalia* **51**, 81-87. (Address as above).
- Somers, J.D. (1986)**. Pesticide and PCB residues in northeastern Alberta otter. 35 pp. Alberta Environment Centre, AECV85-R4, Canada.
- Vincent Wildlife Trust (1987)**. Report 1986. 48 pp. Baltic Exchange Buildings, 21, Bury Street. London EC3A 5AU.
- Welch, R.C. (1987)**. *Dytiscus semisulcatus* - food for otters. *The Balfour-Browne Club Newsletter*, October, 1987, **16**. (Institute of Terrestrial Ecology, Monks Wood Experimental Station, Huntingdon, U.K.).
- Whilde, T. (1987)**. Additional otter *Lutra lutra* records. *Ir. Nat. J.* **22**, 322. (Corrib Conservation Centre, Rosscahill, Co. Galway, Eire) .
- Wren, C.D., Cloutier, N.R., Lim, T.P. and Dave, N.K. (1987)**. Ra-226 concentrations in otter, *Lutra canadensis*, trapped near uranium tailings at Elliot Lake, Ontario. *Bull. Environ. Contam. Toxicol.* **38**: 209-212. (Institute for Environmental Studies, University of Toronto, Toronto, Ontario, M5S 1A4, Canada).
- Wren, C.D., Stokes, P.M. and Fischer, K.L. (1986)**. Mercury levels in Ontario mink and otter relative to food levels and environmental acidification. *Can J. Zool.* **64**: 2854 - 2859 (Address as above)
- Zejda, J. and Vookar, J. (1987)** Taxonomy of the European Otter (*Lutra lutra*) in Czechoslovakia. *Folia zool.* **36**: 111 - 120

Note: All publications on otters (or references thereto) will be gratefully received for future issues of the Bulletin to maintain this section as complete as possible - Editor.

**ADDRESSES**

**Chairman of I.U.C.N. Otter Specialist Group:-**

Dr Nicole Duplaix,  
South Florida Water Management District.  
3301 Gun Club Road,  
West Palm Beach,  
Florida 33402,  
U.S.A.

**Deputy Chairman:**

Pat Foster-Turley,  
Marine World-Africa U.S.A.  
1000 Fairgrounds Dr.,  
Vallejo,  
CA 94590,  
U.S.A.

**Co-ordinators:**

**North America:**

Pat-Foster Turley (address above)

**Europe:-**

Claus Reuther, OTTER ZENTRUM Postbox 1215 D-3122 Hankensbüttel West Germany.	Dr Sheila Macdonald, Department of Biology, University of Essex, Wivenhoe Park, Colchester C04 3SQ, U.K.
--	--

**Latin America:**

Dr. Claudio Chehebar,  
Administration de Parques Nacionales,  
Santa Fe 690,  
1059-Buenos Aires, ARGENTINA.

**Africa:**

Dr. David Rowe-Rowe,  
Natal Parks, Game and Preservation Board,  
P.O. Box 662,  
3200 Pietermaritzburg, SOUTH AFRICA.

**Sea Otters:**

Dr. James Estes, Institute of Marine Sciences, University of California, Santa Cruz, CA 95604, U.S.A.

**DEADLINE FOR NEXT ISSUE: 1st February, 1989**