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NOTE FROM THE EDITOR

At first I would like to thank Aksel Bo Madsen who organised the contact with the MINISTRY OF ENVIRONMENT AND ENERGY - NATIONAL ENVIRONMENT RESEARCH INSTITUTE, DENMARK, the sponsor of this issue. Additional funds were contributed by DEUTSCHES TIERHILFSWERK, FRANK GIESE, Ronald PICHLER, Gabriel PRETUS, DONALD REID, Christy VANFRAECHEM, and Anja ZOGALL.

In this issue you will find a VIEWPOINT of Chris Mason on the problem of PCBs and declining otter populations. He held this lecture a view days ago in Switzerland at a local otter workshop. Once again the problem of PCBs and otters was subject of long and controversial discussions.

We have now a first circular for the VII. International Otter Symposium which will be held in the Czech Republic from 13.-20.3.1998. As the chairpersons have to finish the programme by the end of October no presentations can and will be accepted after that date. Authors will receive a notice on the acceptance not later than 15.1.1998. As you all will probably remember the theme of the last meeting in South Africa was „Otter Conservation is not just about Otters“. Keeping this in mind the organisers and the chairpersons greatly encourages you to invite „Non-Otter-People“ to give contributions on topics of general interest as this might add fruitful information for our otter-work.

I would like to express my sincere thanks to the „Otter Bulletin Team“ Barbara Gutleb-Rainer (Vienna), Hans van den Berg (Wageningen) and Els Hoogsteede-Veens (GRAFISCH SERVICE CENTRUM VAN GILS, Wageningen) for all their invaluable help. Tobias, thank you for your help with the envelopes.

Stubbe, Kutzer, Gemeiner, Gianazza, Ruiz-Olmo, Kranz, Conroy, Heggberget, Rowe-Rowe, Mason, Pechlaner, Melisch, Reuther, Dulfer, Kruuk, Green, Macdonald, Böhm, Schenck

VIEWPOINT

THE SIGNIFICANCE OF PCBs IN OTTERS: A REPLY

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The 'Viewpoint' by Chris Mason in the previous bulletin perpetuates a fallacy which should not go unchallenged, because it could affect conservation efforts. The points I will make here are that there may be effects of polychlorinated biphenyls (PCBs) on otter populations, but they have not been demonstrated, and that there are thriving otter populations in which most individuals carry concentrations of PCBs far in excess of the 'environmental standards' mentioned by Mason. By focussing solely on PCBs we may ignore other, harmful substances occurring in the same areas, and by applying the wrong 'environmental standards' we may declare large areas unsuitable for otters (and otter introductions) although they are, in fact, good otter habitat.

There is no doubt that several of the PCB congeners, in the concentrations at which they are sometimes found in the wild, can be severely deleterious to an otter's welfare and cause death (Leonards, 1997). Many other organisms are affected, and obviously every effort should be made to rid the environment of PCBs.

However, we should not overstate our case. PCB levels were probably high in at least several of the areas in Europe where otters disappeared. But we do not know that PCBs were the causal factor: in many, if not all of those same areas industry and agriculture between them shed a load of different pollutants (organochlorines and heavy metals), also lethal to animals and many of them appearing and disappearing with similar timing. Only few of these have been adequately studied. Since we cannot do experiments, we will never know for certain if there was only one culprit in the demise of otters, if so which one, or if there were several.

What makes me suggest that we have to be especially careful with the suggestion of PCBs as the culprit is
(i) other organochlorines such as dieldrin have been convincingly demonstrated as the cause of decline in many birds of prey and aquatic birds (e.g., Newton et al., 1993). They are therefore also likely to have been involved in the case of the otters (common declines, therefore common cause), and
(ii) PCBs probably do not accumulate in otters with increasing age, so the animals must be metabolizing or excreting them (Kruuk and Conroy 1996; Leonards 1997).

The effects which PCBs have on individual otters are a matter of concern as animal welfare. However, for conservation management it is more important to study the effects on populations, a point eloquently made by Newton (1988) for birds. Every ecologist knows that mortality effects in populations are not just additive: often we see compensation. To simplify this ad absurdum: if a lake has enough food for ten otters, and if there are ten animals and each year ten cubs are born, then half the population has to die or emigrate each year. From a population point of view it may be immaterial if this is achieved by starvation, or by emigration, or some other cause of death such as pollution.

The consequence is that if a habitat is sufficiently rich in resources, an otter population can sustain heavy mortality from whatever source, as long as the animals can reproduce fast enough.

The argument is not just theoretical: there is convincing evidence that otter populations can thrive in many of the areas with a high load of PCBs. We have demonstrated in Shetland in what must be one of the densest and largest populations in Europe, that the majority of otters carries almost twice the concentration of PCBs in the liver which Mason calls 'critical for survival' (Kruuk and Conroy 1996; Mason et al., 1992). It is disingenuous to suggest that this is caused by a single oil terminal on Shetland which acts as a poisoned sink for otters. Even if it were true, it would be special pleading to explain away a result which does not fit the hypothesis. The fact is that the terminal output is scrupulously monitored by independent observers and always has been, there is no local PCB hotspot, and otters everywhere on Shetland carry heavy loads of PCBs, on all the islands as far as they can be from the terminal. It has been demonstrated that many North Sea mammals have a very high PCB burden (hence people on the Faroe Islands are strongly advised not to eat the livers and blubber of pilot whales, Simmonds et al., 1994), because a very large area is polluted.

Shetland does not stand alone, but we showed that the average otter over large freshwater areas on the Scottish mainland also has a very high PCB burden, albeit somewhat lower than in Shetland, but still above the so-called 'critical concentration' (Kruuk and Conroy, 1996). These are areas such as the north-east, the north-central region and the south-west region of Scotland, mixed agriculture and woodland areas where otter numbers are high, they are everywhere, and numbers are either demonstrably stable or increasing. Similarly, there are several otter populations in continental Europe and Ireland (also referred to by Mason) which are thriving, whilst carrying high burdens of PCBs.

It will probably always be impossible to trace the exact cause of the crash in otter populations in previous decades, whether this was PCBs or some other contaminant. We now have to look ahead, and at what is happening at the moment. The welfare of individual otters existing with various pollutants is of obvious concern, and that would be reason enough to make every effort to rid our environment of PCBs. But when we are involved with conservation management, or with reintroductions of otters, one should assess population performance (e.g., reproduction versus mortality) and not just one single cause of disease or pollution. Such assessment cannot be achieved by just a few spraint counts.

Some otter populations are clearly able to thrive even if the environment is dirty: it is up to us to find out exactly what keeps their numbers down. So far, we have no convincing evidence that PCBs are the culprit.

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ARTICLE

HOW STANDARD IS THE STANDARD TECHNIQUE OF THE OTTER SURVEY?

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ABSTRACT
Many studies of otter distribution describe the method used as "standard" or "British" field survey. Surprisingly few studies in fact follow all the recommendations set by the early British field surveys. Many researchers propose some modifications to improve the efficiency of otter detection (additional spot checks and extended searches of river banks) or to reduce the amount of field work to reasonable time span by selecting fewer sites per 10 km square or fewer squares within a study area. All the modifications of field techniques and especially in the study design result in uncontrolled variation of results, that may range from 3.5-12% improvement in the otter detection when spot checks and extended searches are implemented, to several fold difference in results when single positive sites are referred to squares of increasing size. Since it seems impossible to set stricter criteria for the "standard" survey of otters, it is recommended that researchers show understanding of the consequences of any modifications in the study and that they describe in details the method used rather than call it "standard".

Keywords: otter, *Lutra lutra*, survey, method

INTRODUCTION

The field survey method, based on the search of otter signs, has been widely used in many studies of otter distribution (for references see Macdonald and Mason, 1994; Brzeziñski et al., 1996). It is often referred to as the "British" method since it was developed for three parallel studies of otter distribution in Great Britain, coordinated by the Nature Conservancy Council (Crawford et al., 1979, Green and Green, 1980; Lenton et al., 1980). The technique is also called the standard method because it was recommended to serve as such by members of the European Section of the Otter Specialist Group (Macdonald, 1990). It is broadly accepted that although the technique does not identify every stretch of river used by the animals, it is adequate for studying otter distribution over large areas (Crawford et al., 1979; Green and Green, 1980). There is also a substantial amount of evidence that the data collected in field surveys could be used as an index of broad population status of otters in the area, and as such the method is of primary interest for otter conservation (Mason and Macdonald, 1987).

One of the reasons behind the wide acceptance of the method is that "it represents the best compromise yet achieved between the necessities of accuracy and practicality" (Green and Green, 1980). However being this sort of compromise, the technique is often modified "to suit available time and financial support" (Macdonald, 1990). Many authors have given special attention to ways of improving the efficiency of the field technique, especially in areas with low numbers of otters and/or low numbers of otter signs (e.g. Lenton et al., 1980; Romanowski et al., 1996). We discuss how modifications of the study design and presentation of data additionally lead to significant variation in results of national surveys.

STUDY DESIGN

In a recent distribution of otters in Brittany (France) "more than one hundred people took part, most of them observing the standard survey method described by Macdonald (1990)" (Lafontaine, 1993). Such an approach in fact does not follow the recommendations of the standard survey, which "should be carried out by as few surveyors as possible in order to reduce any biases due to differing skills" (Lenton et al., 1980). Volunteers without great experience are likely to overlook the often very discrete signs left by otters e.g. small smears. Employment of only experienced, full-time workers (Macdonald, 1990) however sets limits to the number of sites that can be surveyed within reasonable time and requires decisions about coverage of the study area. As an example, Green and Green (1980) surveyed almost the entire area of Scotland and visited 4636 sites (average of 5.3 sites for each 10x10 km square) between 1977 and 1979. Such a detailed study is hardly possible in every case, especially for larger areas, and researchers will rather make a choice of: 1) selecting only part of the area with the aim of surveying many sites in each 10 km square; 2) investigating large areas at the cost of reducing the number of sites per 10 km square. Lenton et al. (1980) study of England is an example of the first approach, where approximately two 50 km squares in each 100 km square of the national grid were surveyed, with a mean of 6 sites per 10 km square. In later studies in Hungary and Denmark smaller number of sites (approximately 2 per 10 km square) were surveyed only in areas with otter habitats: lakes, rivers and streams (Kemenes, 1991; Madsen and Nielsen, 1986). In a recent study of Poland (over 310 000 km^2) only 1 site was surveyed in each 10 km square containing aquatic habitats (Brzeziñski et al*.,* 1996).

The obvious consequence of different study designs is that while Lenton et al. (1980) aimed at proportional coverage of all habitats within England, the other researchers reported above increased the probability of finding otter signs by selecting suitable habitats. The decision on the number of sites surveyed in each 10x10 km square additionally influences the results of the study. The 10 km squares do not offer an unlimited number of sites with many otter signs. The best otter habitats are always the first to be selected for the survey. Lower efficiency of the technique in habitats with low numbers of otters or potential sprainting sites (Lenton et al., 1980; Romanowski et al., 1996) results in decreased chances of finding otter signs in several out of e. g. 10 sites in 10 km square (as recommended by Lenton et al., 1980). So aiming at detecting otters in almost every river stretch improves the chances of recording its presence in a 10 km square, but paradoxically leads to a decrease in the overall percentage of positive sites recorded. This situation is illustrated with the results of the English and Danish surveys, where 5.8% of positive sites (with 6 sites visited per 10 km square) and 9.2% of positive sites (2.4 sites per 10 km square) resulted in a similar abundance of otters expressed as a percentage of positive squares (14.5 and 14.1 respectively, Lenton et al., 1980; Madsen and Nielsen, 1986).

PRESENTATION OF RESULTS

The studies typically present index of otter distribution in the form of a percentage of positive sites recorded among sites surveyed. However, depending on study design, “sites surveyed” may include only suitable habitats, or a representation of all habitats surveyed. In fact in a majority of studies in continental Europe only potential otter habitats were investigated, and such studies tend to report higher percentage of positive sites among sites surveyed, which does not enable direct comparisons with “classic”, pioneer British studies. Many studies additionally report the percentages of positive 10 km squares. Results presented in this form report substantially higher otter abundance compared to percentages of positive sites (as already illustrated in the example of English and Danish surveys). This is due to the fact that each 10 km square is assumed positive if at least one of the sites within it is positive. An even higher percentage of positive squares is reported for 50 km squares, again as the consequence of the assumption that even one 10 km unit makes a 50 km square positive. The difference is striking in the case of reports with lowest numbers of positive sites, e.g. in the study of England, where the result of 5.8% positive sites corresponds to 60.7% of positive 50 km squares (Lenton et al., 1980). Obviously the application of a 50 km grid generates a false picture of too high otter abundance. It is worth noting that the 50 km grid was chosen for presentation of distribution ranges in Atlas of European Mammals. It may be thus expected, that the Atlas will report too optimistic a range of the otter, since a 50 km square marked positive on a distribution map might have only one positive site in 2500 km^2.

CONCLUSIONS

In the case of many studies of otter distribution, especially those of a pilot character or covering rather small areas, the authors simply refer to the method used as “standard” and eventually stress that 600 meters of banks were searched for otter signs (e.g. Lafontaine, 1993). The technique from the very beginning was subjected to various modifications to improve the reliability of the survey in habitats with low numbers of otter signs. Spot checks at additional bridges, extended searches of river banks, or repeat visits produced some increase in the number (3.5 - 8%) of positive results in surveys of Wales, Scotland, England and Poland (Crawford et al., 1979;

Green and Green, 1980, Lenton et al., 1980; Romanowski et al., 1996). In several studies extending the search over 600m resulted in the increase of the number of positive sites by about 6-12% (Mason and Macdonald, 1987).

Intense discussions on surveying otters were also provoked by questions on whether spraints could be used as indicators of habitat quality, otter numbers or activity (Macdonald and Mason, 1983; Jefferies, 1986; Kruuk et al., 1986; Kruuk and Conroy, 1987; Mason and Macdonald, 1987; Green and Green, 1997). Surprisingly little attention however was paid to the importance of study design and to the variation that is generated by different ways of presenting results. While modifications of field techniques may result in an estimated 3.5-12% improvement in the reliability of the method, selecting the size of the grid could alone result in several fold difference in results. Direct comparisons of field surveys are possible only if similar study designs were applied, since studies with more sites investigated per 10 km square tend to report lower percentages of positive sites (but are more efficient in detecting presence of otters in 10 km squares), and surveys of only squares with aquatic habitats tend to report higher otter abundance. Examples of several national surveys mentioned above show also that every time the single positive record of otter is related to larger geographical unit (e. g. 10 and 50 km squares), this results in the increase of reported otter range and abundance. It is not possible to judge at this point whether percentage of positive sites or positive squares serves as a better index of otter abundance in the area. It is possible that the percentage of positive sites is more directly associated to otter numbers. On the other hand results related to 10 km squares give an opportunity to estimate the coverage of the study area.

It is not possible to set stricter criteria for the "standard" survey of otters and it is the surveyors responsibility to fully understand all the recommendations of the method. It is also of great importance that researchers are aware of the consequences of any modifications in the study design i.e. surveying only selected squares and surveying a different number of sites per square. Describing the study design in more details rather than just calling it "standard" or "British" method and reporting results in the form of percentage of positive sites as well as squares greatly improves the possibilities of comparing results of different surveys.

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ARTICLE

REINTRODUCTION OF OTTERS - A SUCCESSFUL CONSERVATION STRATEGY?

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(received July 10th; accepted July 21st)

ABSTRACT

British otter populations had declined so much by the mid 1970s that fears of imminent extinction were rife. A working group was set up to assess the situation and studz measures to safe the otter. The 1st National Otter Survey results showed that only 5.8% of 2.940 survey sites in England were occupied by otters. Reintroduction of otters to areas from which they had already been lost was investigated. Captive bred otters were released in 1983, followed in 1985 by animals rehabilitated from the strong populations in Scotland. By the time the techniques of releases, monitoring and the neccessary safeguards were developed the results of the 2nd National Otter Survey were available, showing some natural improvement in the situation, so the emphasis changed from repopulating large empty areas to one of restocking. The programme aimed to strengthen fragmented populations, to demonstrate that causes of decline had been correctly assesseed and that rivers were again safe for otters, to aid recolonisation and hasten the end point of recovery. Releases took place in 3 ways; scattered groups on adjoining catchments, concentrated releases on large catchments and placing small groups ahead of active recolonisation by wild otters. Success is measured by the survival and expansion of breeding populations. Insufficient time has elapsed to judge any but the earliest releases, however those show promising results. The 2 areas involved have had enough breeding success and expansion of range to show up clearly on the 3rd National Otter Survey as isolated populations, distinct from natural recolonisation. Radio tracking showed the otters´ behaviour was comparable with wild otters. Monitoring has shown that breeding takes place within the first year and the population expands steadily. Mortality has been low and from usual causes. We are cautiously optimistic that value of the techniques have been demonstrated and could be applied elsewhere in Europe.

Keywords: otter, reintroduction

INTRODUCTION

The otter *Lutra lutra* population has declined over most of Europe, especially since 1950. By the 1970s the English population had dwindled to a point where fears of imminent extinction were rife. The Joint Otter Group was, set up in 1976 to study the situation and consider remedial action. It initiated National Otter Surveys to collect systematic data on otter distribution and made recommendations on legislation, habitat conservation, prevention of accidental mortality and action to improve otter populations. Among the last was a recommendation for a feasibility study for reintroductions, (O'Connor et al., 1979).

The first National Survey showed an English situation (Lenton et al., 1980) quite as bad as had been feared, with only 5.8% of sites occupied by otters, mostly in Norfolk, the south west, or the Welsh and Scottish borders. Wales (Crawford et al., 1979) and Scotland (Green and Green, 1980) had better results with 20% and 73% respectively of sites occupied. As a result of the English Survey preparations were made for a reintroduction programme to eastern England already, or expected soon to be, devoid of otters.

DESIGNING THE RELEASE PROGRAMME

A. Aims

1. To demonstrate that local causes of decline had been correctly assessed and that rivers were safe for otters.
2. Reintroductions - to repopulate areas from which otters had become extinct.

3. Restocking

    a. to strengthen existing fragmented populations

    b. to help colonise new areas in the van of natural recovery

    c. to hasten the end point of recovery

B. **Otters**
There are 3 sources of otters for such a programme:

1. Wild caught animals from strong populations, an option considered and rejected in Britain, but used in Sweden, (Sjöasen, 1996).

2. Captive bred animals. Britain was fortunate to have a successful breeding programme at the Otter Trust (OT) which had been producing otters for reintroduction since 1970.

3. Rehabilitated animals. By the time the programme was underway such animals were available from the Vincent Wildlife Trust's Otter Rehabilitation Centre.

C. **Techniques**

1. Preparation of otters captive bred animals spent 10 months with their mothers and then at least 6 months with the release group in secluded pens with minimal human contact. Orphan cubs were reared in small groups with minimal human contact. Average age at release was 18.3 months. Animals were released later than normal dispersal age to give naive otters more size and strength and reduce time before breeding.

2. Choice of Release Areas were determined by the National Otter Release Committee, representing the OT, the VWT and the National Conservation Agencies, using national survey results and data on habitat, pollution, fish stocks and anthropogenic factors. The choice of concentrating releases in time and space or spreading scarce resources thinly and widely was left to each organisation. The OT opted for multiple catchment releases spread over a long time span and the VWT chose to concentrate releases in time on single large catchments.

3. Habitat surveys within the chosen area detailed data was collected on habitat, pollution, fish biomass, existing otter population (if any) and likely conflicts of interest, such as fish farms. On this data catchments were chosen and release sites sought.

4. Releases soft release techniques were developed, using pens of electrified netting and a period of acclimatisation.

5. Monitoring Radio transmitter packs and harnesses were deve¬loped, tested on captive otters (Mitchell Jones et al., 1984) and used on wild otters to provide baseline behavioural data, (Green et al., 1984). Two released animals from the OT and 6 from the VWT were radio tracked, for periods of up to 115 days, and their behaviour compared with that of wild otters of similar sex and age. Each released otter has a microtransponder for identifica¬tion of corpses. Long term monitoring is by surveys of tracks and spraints. Regular, standard surveys have been carried out for 7 years in North Yorkshire for the VWT and will continue until 10 years after the last release and the first OT release has been monitored by the landowner for 14 years.

RESULTS OF THE RELEASE PROGRAMME

Initially reintroduction to large empty areas was the programme's aim, but by the time necessary techniques had been developed natural recovery was underway so only restocking took place. The first captive bred animals were released in 1983 and the first rehabilitated otters in 1985. One hundred and two captive bred animals (Wayre, pers.comm.) and 78 rehabilitated otters have been released in Britain, but only 47 of the VWT releases could be described as restocking (see Table 1 and Fig 1).

Table 1: Numbers of Otters Released by Country and County

Country	Number of Otters
Scotland	9
Northern Ireland	12
Wales	8
England	143*

* to end of 1996 plus 8 released in 1997, sites unknown

Animals Released by Sex			
Male	**Female**	**Unknown**	**Source**
48	30	0	VWT
43	51	8	OT
91	81	8	Total

VWT: Vincent Wildlife Trust
OT: Otter Trust

English County	Number of Otters
Northumberland	2
Yorkshire	29
Lincolnshire	18
Rutland	7
Northamptonshire	8
Bedfordshire	4
Cambridgeshire	4
Norfolk	34
Suffolk	14
Essex	4
Hertfordshire	6
Hampshire	4
Wiltshire	4
Dorset	5
Unknown	8

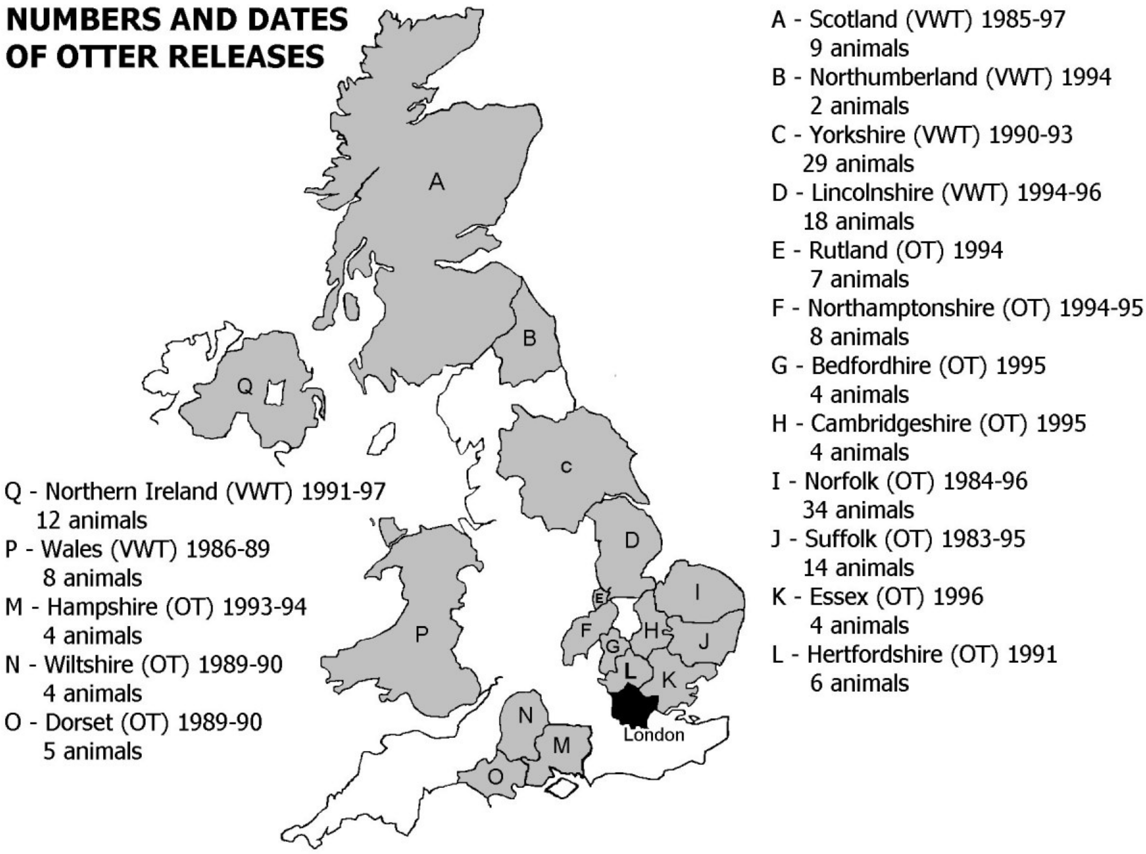

Figure 1. Numbers and Dates of Otter Releases

Breeding by Released Otters

Both organisations report that breeding by released otters occurs within 12-18 months of release. The OT has recorded 55 incidents of breeding from 36 release groups and subsequent generations to the end of 1996 (Wayre, pers.comm.). The VWT has recorded 26 families in North Yorkshire since the first release in 1990. Lincolnshire was recolonised by wild otters as the releases took place, so although 2 families born at release sites within the year were attributable to restocked animals, subsequent families were of unknown parentage. Expansion of range and influence on National Otter Survey results

1. ***East Anglia***

   In the first National Survey (1977 79) only 20 of 623 (3%) sites were positive. Norfolk was one of the few English otter strongholds left with 16 positive sites; a situation which worsened in the next few years. Suffolk and Lincolnshire had 1 positive site each and Cambridgeshire 2. Four groups, comprising 11 animals, were released before the second National Survey (1984 86). (Figure 2) In this survey only 8 of 725 (1.1%) sites were positive, of which 5 were attributed to released otters, (Strachan et al., 1990) showing that East Anglian otters were close to extinction. By the third National Survey (1991 94) (Figure 3) 37 otters had been released and 58 (8%) sites were positive, largely derived from otter releases, showing continued successful breeding and range expansion. Additional evidence for the success of the programme comes from the timing of the change from decline to resurgence of the Suffolk otter population which fits well with the beginning of the releases and also the high density of spraint found in release areas compared with the rest of south east England, (Strachan and Jefferies, 1996).

   The Lincolnshire releases were too late to figure in the third National Survey, although the start of the concurrent recolonisation by wild otters was seen. Since then VWT surveys show rapid expansion on the rivers used for releases and others, including those rejected as releases sites because the habitat or pollution levels were considered unsuitable.

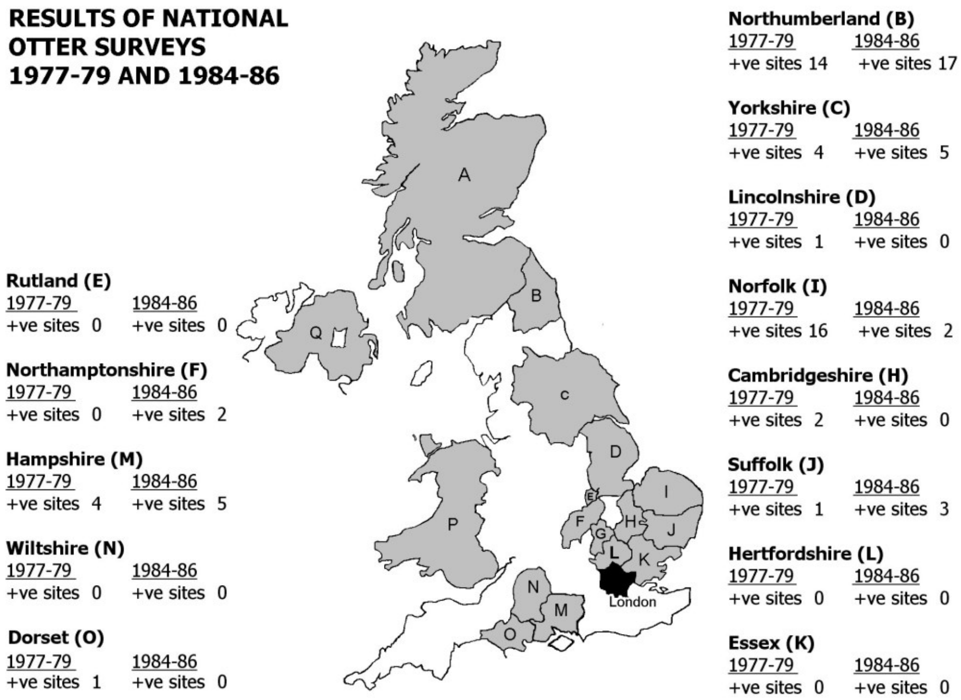

Figure 2. Results of National Otter Surveys 1977-79 and 1984-86.

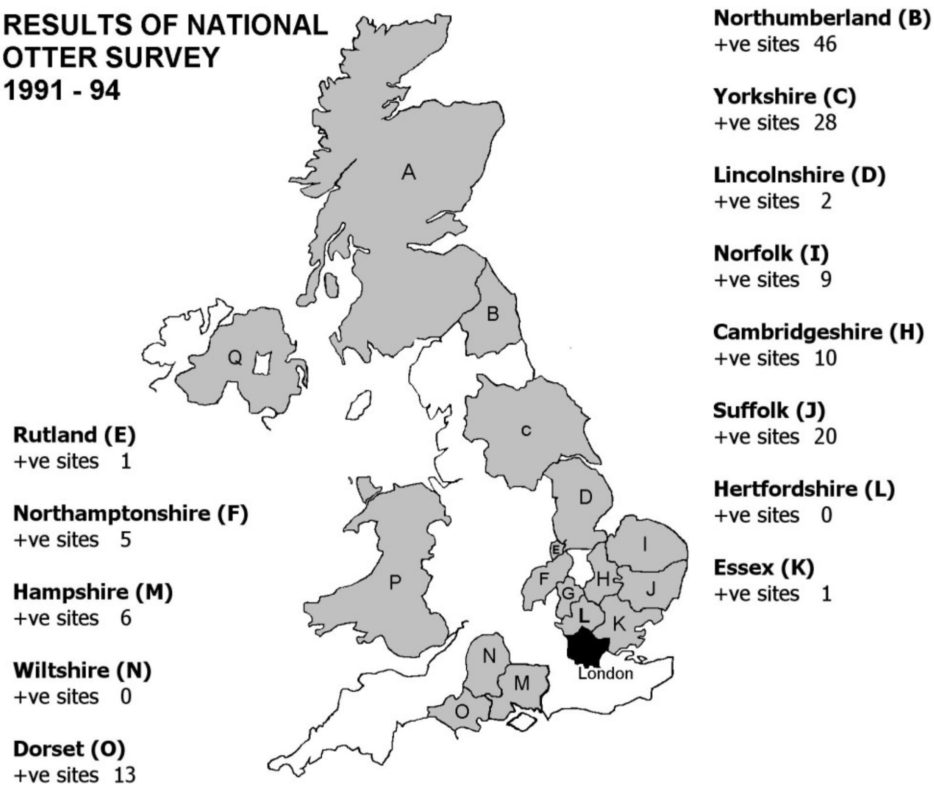

Figure 3. Results of National Otter Survey 1991-94.

2. North Yorkshire

The large Derwent catchment had no positive sites on the first National Survey (1978) and only 1 on the second in 1985, (Figure 4) but on the third National Survey (1991-94), after the VWT releases, (Figure 5) 12 (75%) of sites were positive. Only 4 otters were released on the River Esk, in late 1993, but they were enough to increase positive sites on the river from 1 in 1986 to 3 in the 3rd National Survey. Unfortunately the English survey is done on a chequer board of alternate 50km squares and the main part of the Derwent catchment south of the Esk and north of the Pocklington Canal has never been surveyed. The surveyor concluded that the improved situation on the Derwent and to a lesser extent the Esk was wholly due to the restocking programme, (Strachan and Jefferies, op. cit.). Detailed work since the National Survey shows that otters have now spread to colonise the entire 2057 km^2 catchment of the River Derwent (Woodroffe, 1996) and beyond. The whole 42km length of the River Esk is occupied by otters.

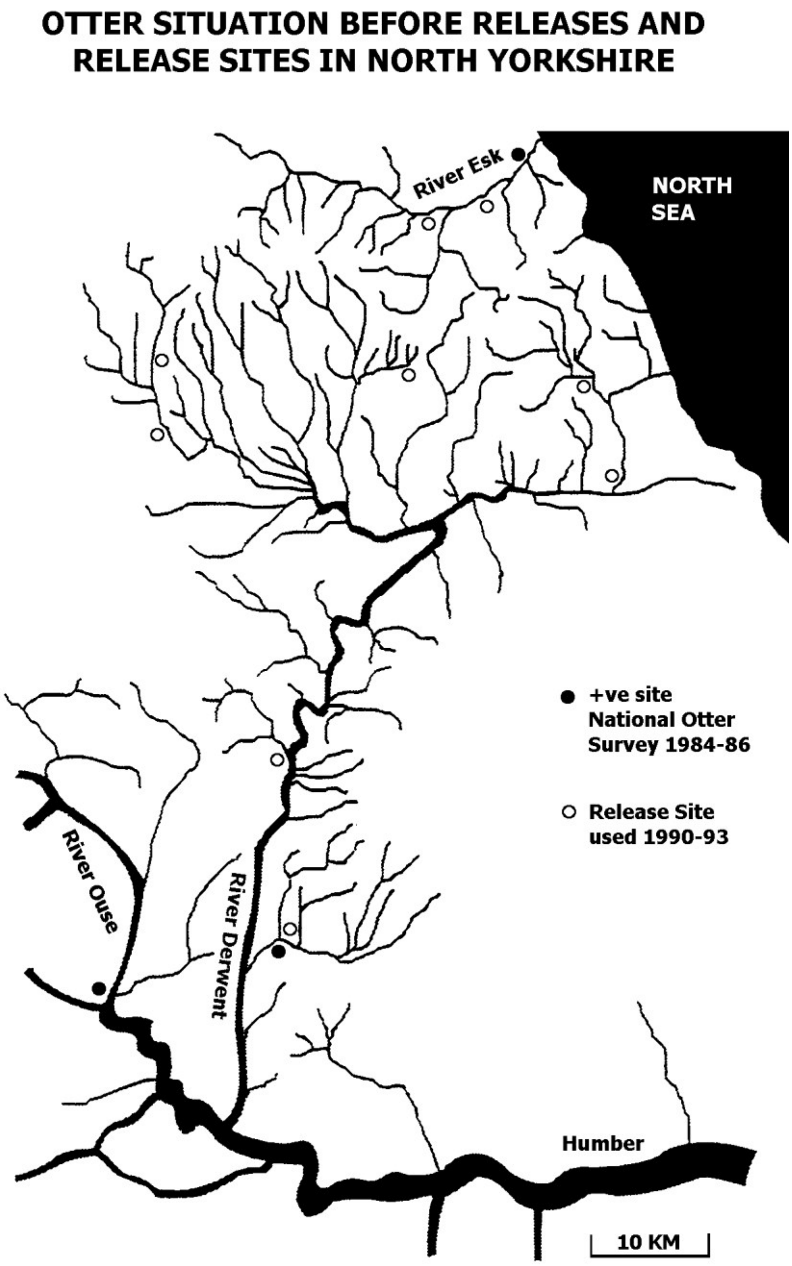

Figure 4. Positive sites for otters before release program began, and release sites in Yorkshire.

3.

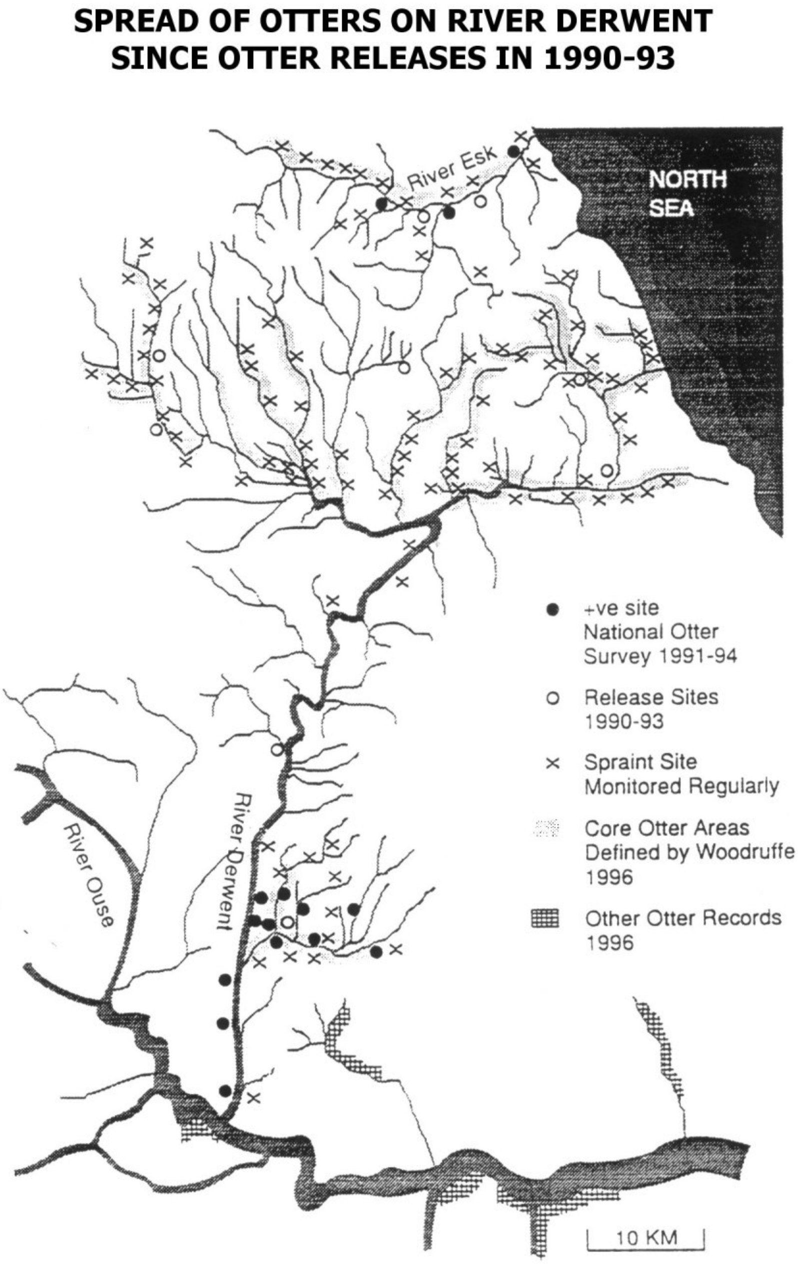

Figure 5. Spread of Otters on the River Derwent since the Otter Releases in 1990-93.

Both areas have had enough population growth and expansion of range to show up in the broad sweep of the National Survey. That the population results from restocking is demonstrated by the isolation of the two populations, there was vacant territory to the west and between them. Although other parts of England showed increased site occupancy between the second and third National Surveys the rate of increase shown in the restocked areas was greater, e.g. East Anglia showed an increase of 552% compared to 40% in Southern Region and Yorkshire showed an increase of 400% after restocking compared to 25% before.

Other areas were restocked too late to figure in the National Survey results, already had a sparse otter population or were recolonised over the same time span, so their National Survey results are not as clear cut as those for East Anglia or North Yorkshire.

Otter Mortality in Restocked Areas

Identification of dead released otters is possible by reading their transponders. It is known that 3 males and 1 female from the VWT (5.1%) and 5 males and 2 females from the OT (6.8%) releases have died. Other deaths, of subsequent generations, the relict population or where the corpse could not be read also occurred. Known deaths in release areas total 24, with circumstantial evidence of 2 more. Corpses were postmortemed and analysed for contaminants whenever possible. Most were male (19), 5 were female and 2 not sexed. The most common cause is road traffic (15), followed by drowning in fyke nets (4), snaring (?2), injury by other otters (1) and 4 deaths for which the cause was not determined.

DISCUSSION

Criteria for determining success of restocking programmes are:

1. that the released animals survive and do not show unusually high mortality.
2. that a measurable,long term breeding population is established in the release area.
3. that the population expands from the release area.

Within the, so far, short time scale these criteria all appear to have been met in Britain.

Despite publicity requesting dead animals and considerable search effort, few tagged otters were found dead. In view of concern about contamination at release sites (Mason, 1991, 1992, 1995) their pollution load was of interest. No otters died of contamination, none had above average levels and known deaths were all from common and expected causes among wild otters. British results compare well with 16 known deaths in 36 animals released in Sweden (44.4%), (Sjöasen, 1996). Male deaths were more frequent in the Swedish study (10:6) also. British animals were not implanted with radio transmitters as in Sweden, so non-traumatic deaths are under represented in the British data. However, the youth of the Swedish otters (captive bred animals <12 months, wild animals c12 months) relative to the British animals undoubtedly played a part in their higher mortality. Sjöasen demonstrated that the length of maternal care affected subsequent survival; the least successful were separated from their mothers for 50-98 days before release, whereas those with a longer period of maternal care were as successful as wild animals.

Otters bred freely after release and breeding has continued; the time scale is long enough in some areas for second and third generation breeding to have occurred. Breeding was also observed in Sweden within the study period.

Populations have expanded and are continuing to do so. The concurrent expansion of the wild population makes long term measurement of the growth of restocked populations difficult, but shows that the programme is fulfilling its aims of aiding natural recolonisation and hastening its end point. In the British context restocking achieved its ends using comparatively few animals (149). However, the situation proved not to be as urgent as predicted; although parts of England lost otters, there were still strongholds from whence recolonisation could, and did, take place. Large scale reintroductions to vacant areas have not occurred. It is no longer policy to restock otters in Britain; the last VWT restocking was in April 1996 and the last OT animals are being released in 1997.

IMPLICATIONS FOR EUROPE

In the continental context, with a larger landmass and greater distances over which recolonisation would have to take place the scale of reintroduction programme necessary to make an impact may be greater than in Britain. Without strong, genetically similar populations to provide wild stock or orphans for rehabilitation, captive breeding on a large scale would be necessary to supply the programme. Captive breeding success has now been achieved at many centres in Europe. A wild population is a prerequisite for rehabilitation, but orphan cubs can be found occasionally in the most threatened population and are especially valuable for their genetic potential. Techniques for raising and successfully returning even the youngest hand reared cub are available, so the value of the wild born orphan should not be overlooked, either for breeding or release.

The results of the British and Swedish studies show that the length of maternal care is a significant factor in survival and that older otters may be more successful. The higher male mortality recorded by all studies (72.5%:27.5%) raises questions as to the numbers of males required in a release programme. This is a drawback of rehabilitated stock; more males (59%:41%) come in, more survive, so more are available for release (61.5%:38.5%). With concern over the effects of pollution and habitat degradation and no consensus as to minimum conditions for viable otter populations, groups of males could be used as probes to test the suitability of formerly polluted or degraded habitats for the species, (Caughley, 1994) while females are used for breeding.

Preparation for a reintroduction programme requires strict adherence to agreed criteria and protocols, but does have the advantage of producing more detailed data on the chosen habitat than would be obtained from routine otters surveys. In order to assess the programme it is essential to have co-ordination of releases and agreement of all parties on record keeping and monitoring. Given such agreement and co-operation, we are cautiously optimistic that the techniques tested in Britain could be applied as successfully in Europe.

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ARTICLE

THE PREY OF OTTERS: CALORIFIC CONTENT OF EELS (*ANGUILLA ANGUILLA*) AND OTHER FISH, FROGS (*RANA TEMPORARIA*) AND TOADS (*BUFO BUFO*)

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ABSTRACT
To evaluate energetic contents of otter diet, energy values are presented for some of the main prey species of otters in Europe, eels, frogs and toads, and compared with measurements on other prey from literature. Energetic values per gram increase with larger sizes of eels, and they are relatively high. Values for amphibians were lower, and no significant variation with size was found.

Keywords: otter, diet

INTRODUCTION

One of the most important factors influencing the behaviour and performance of predator species is the nutritional quality of their prey (BEGON et al., 1996). This may be especially important for aquatic carnivores such as otters, because of the thermoregulatory problems of foraging in water and the energy expenses incurred by swimming (KRUUK et al.,1997, KRUUK and CARSS, 1996). To estimate the energetic contents of food from diet analysis, we investigated the variation in energy content with size for eels (Anguilla anguilla), an important prey species of otters throughout northern Europe (KRUUK 1995), common frogs (*Rana temporaria*) and common toads (*Bufo bufo*), which are of seasonal importance in the diet of otters in north-east Scotland. We also summarize some existing information on the energetic contents of fishes other than eels.

MATERIALS AND METHODS

A number of eels were caught by electro-fishing and netting at Lochs Davan and Kinord, Aberdeenshire, Scotland, in the summer of 1995. All the eels were killed by freezing. The wet weight and length of each fish was recorded, and adjusted to allow for reductions of length and weight caused by freezing, using regression equations from SVEDANG and WICKSTROM (1997). Eels were then skinned, the stomachs removed, and then cut into small pieces and freeze dried to constant weight (for eels > 450mm long a sample of post-anal muscle was used, and for smaller individuals the whole eel was used). Samples were then ground to a fine powder using an electric hammer mill, or chopped finely with a sharp knife, and then ground with a mortar and pestle. This procedure was repeated until the sample had been thoroughly homogenised. Samples were stored in airtight vials.

Common frogs and common toads were collected during night-time visual searches in the marshes surrounding the lochs. Wet weight and snout-vent length was recorded. We removed the spawn from gravid females (i.e. those containing fully developed eggs) of both species, and the skin of all toads, because these are normally discarded also by otters (WEBER, 1990).

Energy content, in kilocalories, of eel and amphibian samples was determined using an adiabatic bomb calorimeter (for procedure see ALLEN, 1974). Approximately 1g of each sample was used for the analysis. Several samples from across the size spectrum of eels and amphibians were duplicated to assess accuracy, which was considered sufficient as the differences in calorific values per gram for the duplicates were never more than 2.5% of the value of the smaller of the two results. Energy contents were expressed as kilojoules (kJ) per animal, kJ per gram (wet weight) and kJ per gram (dry weight).

RESULTS

A total of 45 eels was analysed. The calorific content per gram (dry weight) ranged between 19.83 kJ/g for the smallest eels to 31.64 kJ/g for the largest (mean = 23.13 kJ/g dry weight, s.e.=0.51, 5.38 kJ/g wet weight, s.e.=0.32). There was a strong and significant positive correlation between energetic content per gram of tissue, and the size of eels expressed as wet weight (Figure 1). The calorific content per gram rises rapidly with the weight of eels up to about 300g, then reaches a maximum. Hence total kJ per eel increased as a quadratic function with the weight of eels (Figure 2).

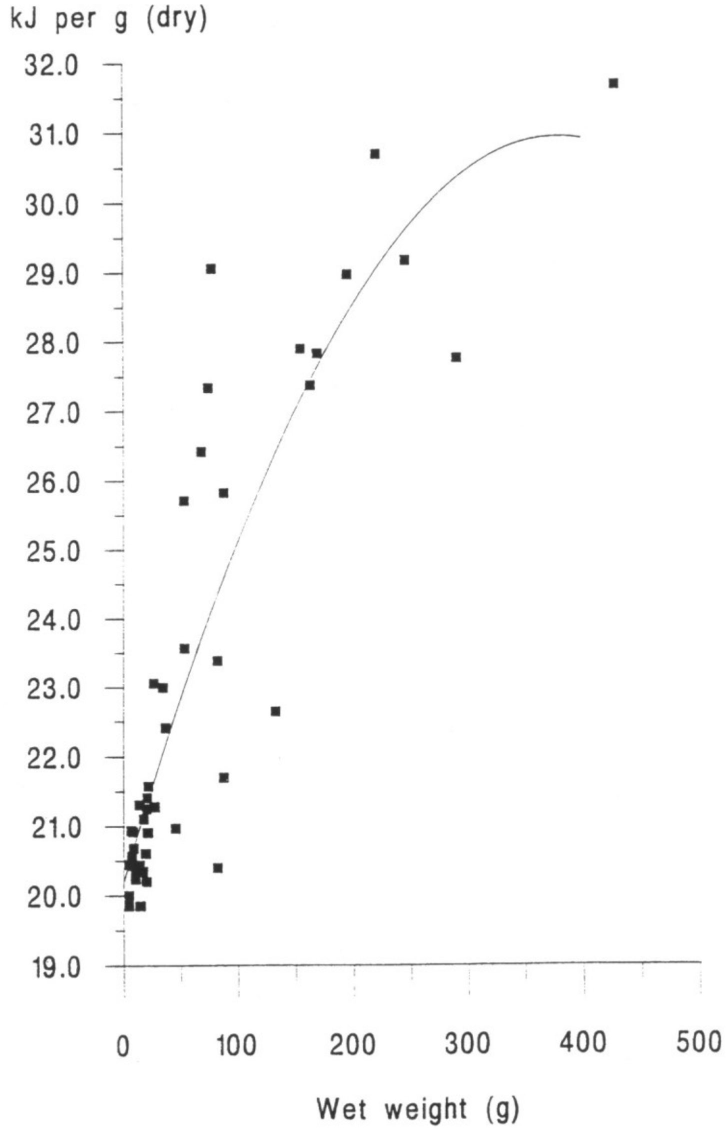

Figure 1. Energetic content of eels: kiloJoules per gram, for different sizes (wet weight). $y=20.193+0.057x-0.00008x^2$, $r=0.88$, $r^2=0.782$, $p<0.001$. (click for larger version)

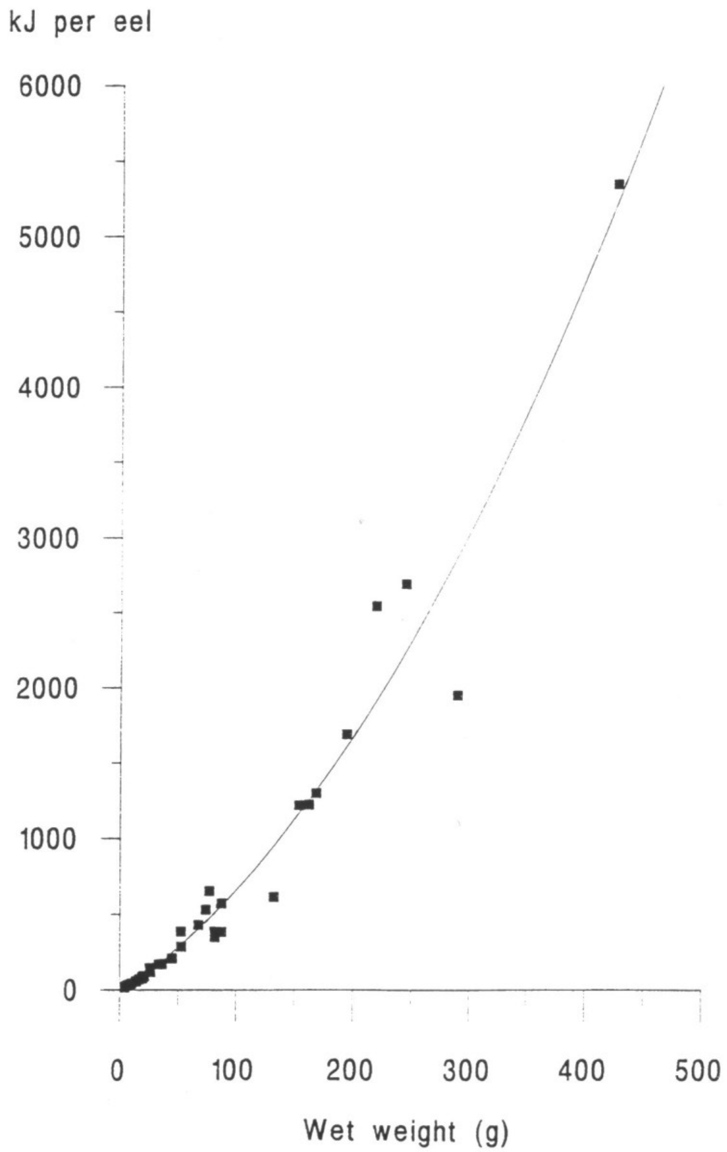

Figure 2. Energetic content of eels: kiloJoules per eel, for different sizes (wet weight). $y=0.017x^2+5.025x-16..110$; r=0.98, r2=0.960, p<0.001. (click for larger version)

A total of 15 frogs and 15 toads was analysed, with a mean wet body mass for frogs of 29.5g, for toads of 20.7g. The mean calorific values of these amphibians were lower than for eels (frog: 17.84kJ/g dry, s.e. = 0.20, 2.87kJ/g wet, s.e. = 0.13, toad: 17.39kJ/g dry, s.e. = 0.37, 3.42kJ/g wet, s.e. = 0.16). Neither frogs nor toads showed significant variation in the energetic content per g of tissue for different sized prey.

DISCUSSION

The eel results indicated that with increasing size, the energy contents per gram also increased. This is likely to be the result of the increase in the lipid share of the total energy from 20% to 80% during the development from elver to silver eel (BOETIUS and BOETIUS, 1985). DEGANI et al., (1986) also found that total fat content was lower in small eels (39% of dry weight) than in large eels (55% dw), with a rapid increase in percentage body fat for eels up to 200g wet weight, followed by a slower increase for eels of between 200 and 400g, and our results on energetic contents parallel those observations. Our results were similar also to those for the American eel (GALLAGHER et al., 1984). However, in the present study the energetic contents (and presumably, therefore, fat contents) of eels of >400 mm length were considerably less variable than those reported by SVEDANG and WICKSTROM (1997).

These data will be useful especially in conjunction with the method developed by CARSS and ELSTON (1996) for the assessment of the size of eels taken by otters, from measurements of vertebrae in spraints.

In comparison with eels, the calorific values of amphibians were much lower and there was no increase in calorific value of tissue with the size of animals. SMITH (1950) showed for *Rana temporaria* that fat content was lowest during the spring breeding season (when they are most common in the diet of otters; WEBER 1990) and it reached a maximum prior to hibernation.

Table 1: Calorific content of a range of otter prey species (means ± one standard error, kJ/g wet mass). References: (1) this study, (2) NOLET and KRUUK (1989), (3) NORMAN (1963), (4) ELLIOT 1976).

Species	**kJ/g wetw.**	**Reference**
Eel	5.38 ± 0.32	(1)
Eel	6.08	(3)
Frog	2.87 ± 0.13	(1)
Toad	3.42 ± 0.16	(1)
Brown Trout	5.92 ± 0.10	(4)
Butterfish	5.01 ± 0.17	(2)
Rockling sp.	4.29 ± 0.10	(2)
Eelpout	4.22 ± 0.18	(2)
Sea scorpion	3.76 ± 0.08	(2)
Bullrout	4.27 ± 0.209	(2)
Saithe	4.29 ± 0.13	(2)
Flatfish sp.	4.47	(2)

Table 1 shows the results of the present study along with results for other species of fish. The results of the present study suggest that eels represent, in terms of calorific content, a much more profitable prey item for otters than amphibians. Correspondingly, the results of studies on otter diet which have shown that, where present, eels often form a considerable proportion of the diet (CARRS et. al., 1998). During the spring months, however, fish availability is lowest (KRUUK et al. ,1993), and frogs and toads congregate in large numbers to breed. Under these circumstances the high availability and reduced time of capture may make it energetically worthwhile for otters to feed selectively on amphibians despite their lower calorific values. A recent study of otter-amphibian interactions in the north-east of Scotland showed that prey remains in spraints are commonest during the spring (L. BROWN, pers. comm.). Results from the same study have shown that, at this time of year, toads are often heavily predated by otters, despite the fact that the presence of poisonous dermal glands demands the removal of their skin by otters, and a subsequent increase in handling time (WEBER, 1990). SIDOROVICH and PIKULIK (1997) also described otter predation on toads in Belarus, when unusual weather conditions simultaneously reduced the availability of alternative prey and resulted in high densities of toads.

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REPORT

THE GIANT OTTER, *PTERONURA BRASILIENSIS*, IN CAÑO LA BREA, SUCRE STATE, VENEZUELA

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ABSTRACT
An active, breeding population of Giant Otters was found on the Caño la Brea river, a tributary of the Rio San Juan in Sucre state, Venezuela, 200 km further north than previously known for this species. This otter population seems to be isolated from other Giant Otter populations, so inbreeding may be a threat, as may be pathogens from domestic dogs, and hunting. The government has also given permission for oil exploration in this area, and mangrove logging is taking place.

Keywords: Giant Otter, distribution, Venezuela

INTRODUCTION

The Giant Otter, *Pteronura brasiliensis*, is the largest member of the family Mustelidae. It formerly inhabited most freshwater streams of South America from Venezuela to Argentina (EISENBERG, 1989). However, by the early 1970s, pelt hunters had decimated many populations leading to its classification as 'vulnerable' in the World Conservation Union (IUCN) Mammal Red Data Book (THORNBECK and JENKINS, 1982). A recent review of the Giant Otter's status (CARTER and ROSAS, 1997) suggests that it be elevated to that of 'endangered'.

The present distribution of this species has recently been described by CARTER and ROSAS (1997). This article discusses a population of Giant Otters studied during the dry season of 1994 in Caño la Brea, North-East Venezuela. This area is approximately two hundred kilometers North of the most Northern population they specify which inhabits the Rio Caroni by the Guri Dam. The relative positions of the two populations are shown in Figure 1. This finding greatly increases the species' known geographic range.

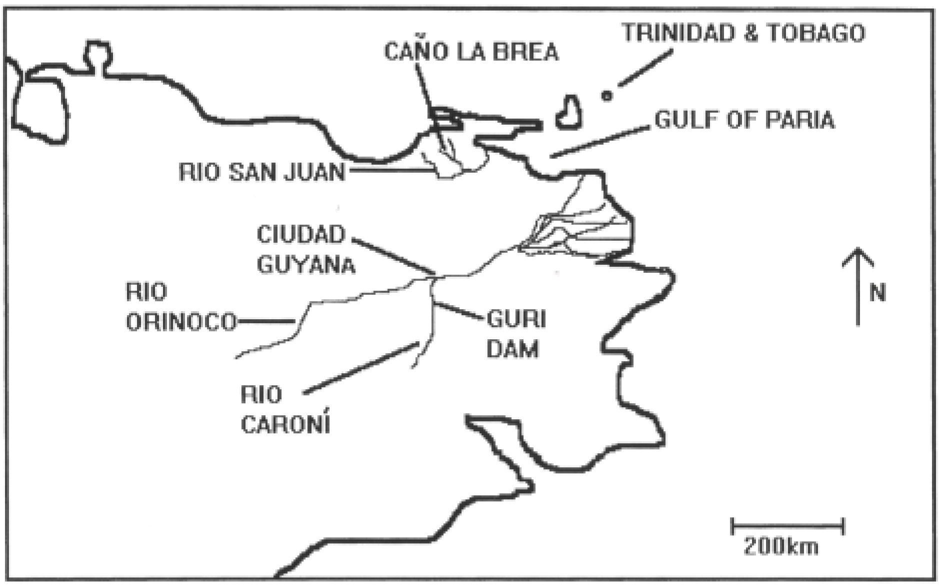

Figure 1: Map of North-East Venezuela showing the relative positions of the study population (Caño la Brea) and the nearest known other giant otter population (Guri Dam) (Carter and Rosas, 1997)

The Caño la Brea river is a tributary of the Rio San Juan in Sucre state, Venezuela. It is 34 kilometers long and varies between 3 and 6 meters in width. It is subjected to tidal movements of brackish water but its upper reaches are consistently fresh. The surrounding river networks contain only brackish water. The first twenty kilometers of the river are surrounded on either side by mangrove forests. Further upstream, it is bordered by mixed scrub, beyond which is open savannah. The presence of Giant Otters in this area is a cause for optimism: there may be other undiscovered populations in the area. However, if this group is as isolated as it appears, there is also cause for concern regarding its survival.

SURVEY METHOD

Survey work was carried out during the dry season from February until May 1994. Observations of the Giant Otter population were made from canoes. The river was divided into 34 x 1 kilometer sections. Each kilometer was surveyed by paddling slowly along the river for one hour until an otter or group of otters was sighted. At least one, one hour survey was carried out in each kilometer at the following times of day: dawn (about 5.30am) - 7.30am, 7.30am - 10.30am, 10.30am - 4.30pm and 4.30pm - dusk (about 6.30pm). The total study involved 201 hours of survey time.

Otters were observed either directly or through binoculars. The number of individuals present at each sighting was recorded as was their location on the river. In addition, drawings were done and photographs taken in order to identify individuals on the basis of their throat-markings (SCHENCK and STAIB, 1995b). An estimate of the total number of animals living in the area was made. Their behaviour was also recorded.

RESULTS: THE PRESENCE OF GIANT OTTERS IN THE STUDY AREA

The survey resulted in 44 sightings of Giant Otters and 445 minutes of observation. Individual throat markings are easily seen when the animals periscope out of the water. Figure 2. shows the throat marking of each animal that was able to be identified. In addition to these eight fully grown animals, two cubs were seen. A conservative population estimate is therefore 10.

Figure 2: The throat markings of the eight identified giant otters.

Otters 1 - 6 were commonly seen together. On one occasion, two cubs (their head size half that of the adults) were seen with this group. Otters 7 and 8 were always seen together and never seen with the rest of the group. Their behaviour was discrete and they disappeared quickly. Individuals not living in family groups are referred to as transients and commonly show this type of behaviour (CARTER and ROSAS, 1997). Giant Otters were seen only between kilometers 22 and 34 of the river. They were sighted throughout the day.

DISCUSSION

Number Of Individuals

Giant otters generally live in groups of 3 - 9 individuals consisting of a mated pair and one or two litters (CARTER and ROSAS, 1997). They are highly cohesive: group members rest, play, sleep, travel and fish together. Otters 1 - 6 in Caño la Brea make up such a group. They were often observed together and their behaviour further supports this. Constant verbal communication between the group, travelling, nuzzling, grooming and fishing together was all observed. Group defence is co-operative with the female generally taking the front line (SCHENCK and STAIB, 1994). On several occasions, otters 1 - 3 approached the canoe snorting and periscoping while the others would stay at the river bank. Otter 2 was almost always the first to approach thus suggesting it was the dominant female of the group. However, no definitive sex determination of individuals was possible during this study.

In environments such as Caño la Brea where there are distinct wet and dry seasons, females tend to give birth during the dry season (DUPLAIX, 1980; SCHWEIZER, 1992). The two cubs were seen for the first and only time in late April. They were swimming independently rather than being carried and were therefore thought to be about 3 - 4 months old. Cubs do not begin hunting and travelling with the family until they are of this age (DUPLAIX, 1980; LAIDLER, 1984). Cubs are carried between holts before this, probably to avoid parasitic infection from extended periods in one holt (SCHENCK and STAIB, 1994). Their presence shows clearly that Caño la Brea provides an excellent habitat for Giant Otters and that the group living in it are reproductively active.

Otters 7 and 8 were thought to be transients. They may have been subadults recently split from their family group or adults which have lost a mate (CARTER and ROSAS, 1997). Such animals lack an established territory and are usually shy and difficult to sight. This was characteristic of these two individuals. They were seen only in the top few kilometers of the river and were sighted much less frequently than the family group. The range of the family group and the transient otters can be seen in Figure 3.

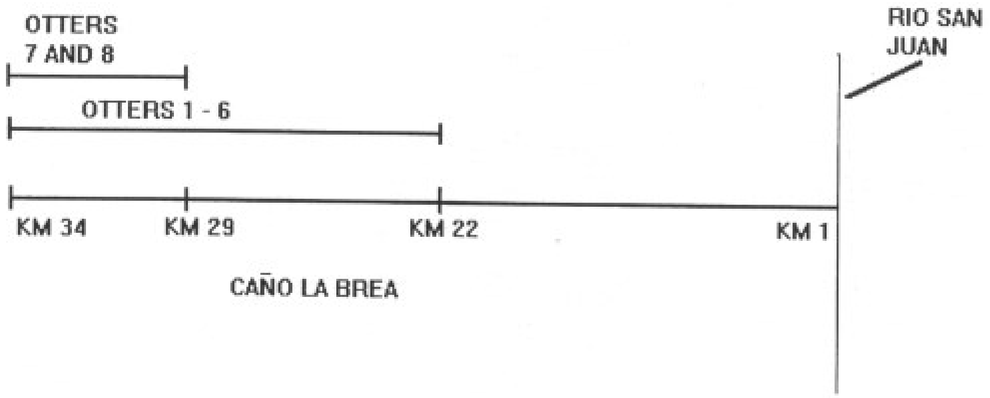

Figure 3: Diagrammatic representation of where the otters were seen during the course of the study

Distribution Within The Study Area

This study was carried out during the dry season when the savannah surrounding the river was dry. Giant Otters were seen between kilometers 22 and 34. Downstream of kilometer 22, the clear quality of the water was lost and the salinity rose sharply (pers. obsv.). A clear preference for clear or black water which is reasonably transparent (1.0 - 4.3m) and supports a large diversity of fish is shown by the Giant Otter (SIOLI, 1984; GOULDING et al., 1988). This seems to explain the observed distribution.

A previous ecological study of the area (PROJECT MERMAID, 1992) during the wet season saw Giant Otters on only two occasions using the same sampling regime. At this time, the whole river was clear and the surrounding savannah flooded. Giant Otters are known to move onto flooded forest during the wet season to exploit the influx of fish (DUPLAIX, 1980; SCHWEIZER, 1992). The dramatically smaller number of sightings during the wet season thus suggests that they increase their home range size during this time.

Several Giant Otter campsites (DUPLAIX, 1980; LAIDLER, 1984) were found during the study period. These were areas cleared of vegetation at the river edge. Fish scales and broken snail shells were often found and the areas usually had a fishy smell. Two den sites (MONDOLFI, 1970; DUPLAIX, 1980; SCHWEIZER, 1992; CARTER and ROSAS, 1997) were also found under mangrove roots.

CONCLUSIONS

This study confirms that Giant Otters occur further North in South America than was previously thought. The group appears to be healthy, numerous and is certainly reproductively active. This is cause for optimism, especially in terms of the possibilities of other undiscovered populations.

However, there are many threats that this population face. If they are as isolated as they appear, they may become or may already be inbred. This can cause a decrease in survival, growth or fertility of individuals and more importantly make them increasingly susceptible to disease (CAUGHLEY, 1994). Waro indians in the area come into the area once a year to hunt and fish. They do not hunt the otters but they bring with them many domestic dogs. These could transmit disease to the otters which would spread fast due to the tactile nature of Giant Otter groups. Transmission of disease from domestic to wild stock repeatedly had detrimental consequences (for example, 1.000 Serengeti lions died from canine distemper probably transmitted from domestic dogs (MACDONALD, 1996). SCHENCK and STAIB (1994) report of a young male Giant Otter which stayed close to a village where many cats and dogs were infected with parvovirosis. It then returned to the inner Manu National Park. If the Caño la Brea group is inbred, the consequences of disease transmission could be devastating.

During the last week of the study, a Westerner with a shot gun was seen being taken up the river in a motor boat. Giant Otters are susceptible to such hunting due to their gregarious nature and conspicuous periscoping behaviour. Increased tourism to the area could also have detrimental affects on the population in terms of the groups' reproductive success (SCHENCK and STAIB, 1995a).

The Caño la Brea area itself is under threat. Disregarding recommendations from the Venezuelan Ministry of the Environment, the government has given permission for oil exploration to be undertaken. During the study, seismic testing was heard and prospecting helicopters seen overhead.

The area is also being subjected to a mangrove wood extraction program. Areas are being clearfelled which may have serious consequences for hydrology and sediment transport. This study and others (SIOLI, 1984; GOULDING et al., 1988) suggest that Giant Otters are sensitive to such features and therefore any change in them would have serious consequences for their survival. The surrounding river network is entirely saline and therefore the otter's dry season range would become increasingly diminished.

This article presents optimistic news: Giant Otters are present 200 kilometers further North than was previously thought. The habitat is, at present, undisturbed and obviously suitable for the species. However, there are many threats that this population face and their long-term survival is by no means secure.

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SHORT COMMUNICATION

OTTERS IN THE CATCHMENT BASINS OF THE RIVER DRAU (CARINTHIA, AUSTRIA)

SIEBER Johanna
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INTRODUCTION

More and more animal species seem to be able to cope with human land use, e.g. beech marten, beaver, roe deer. There is also some significance that otters (*Lutra lutra*) are not as little flexible as we thought them to be in former years (KRANZ, pers. comm.; KRUUK, 1995). Obviously they need a certain amount of "habitat inventory" (water quality, easily reachable food, variable bank structure), but not only "natural" or completely "undisturbed" landscapes can offer these parameters. Nevertheless this should not be an excuse for lack of consideration or nonchalance and thoughtless destruction of nature.
As the plans for using the last kilometers of upstreams free running water where otters were scarce but still evident (WINKLER 1990) for building two more catchment basins became more actual, the survey was to prove whether the otters do use the already existing basins at all or disappeared completely.

METHODS

The study site was a chain of 10 catchment basins along 150 km of the river DRAU in southern Austria built some 30 years ago for generating electricity. Although the basins themselves were built in the "old fashioned way" (stones and concrete, hard banks) time passed by and helped to create sites with shallow water, sediment and vegetation. Some creeks empty (even level) into the catchments and build very well structured places.

The survey was done in late fall and winter 1993/94, the technique was as usual :
searching for spraints and/or fottprints and other otter signs by

a) walking along the banks as detailed as my limited budget allowed,
b) controlling "special" sites as there are bridges, mouths of small rivers and creeks (and upstream)
c) controlling 80 checkpoints along the river (MASON and MACDONALD, 1986)
d) visiting islands and peninsulars

Problems:

- the water level changes within short time
- waves produced by boats wash spraints and tracks away
- "wrong" season (very bad wheather! Early snowfall helped a little)

RESULTS

- 80 Checkpoints
  - 6 positive (footprints and/or spraints)
  - 10 uncertain (prints not complete or indistinct
  - 64 negative

- already known site (Spittal/Drau) reconfirmed
- new site (at Feistritz catchment basin) found
- Otters are very scarce at the river Drau (2 proofed sites - 150 km !)

- They use banks of catchment basins only close to the mouth of creeks (more and various bank structure, better food conditions, less polluted water)

REMARKS

Although this was a rather superficial investigation the results indicate the following :

- the density of the otter population at the river Drau seems to be very low.
- otters occur not only in undisturbed portions of the river but also along the catchment basins, but
- the catchments are probably only used to cross the river and/or to swim from one confluence of smaller creeks to the neighbouring.
- catchment basins seem to be rather suboptimal habitats for otters and only used when enough optimal "backcountry habitat" is available.

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SHORT COMMUNICATION

NEW COMMENTS ON OTTERS IN IRAN

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For many mammal species such as otters the present status in Iran is fairly unknown (FOSTER-TURLEY et al., 1990). In 1996 a comment on otters in Iran was published (GUTLEB et al., 1996) and in the same year first evidence of smooth coated otter (*Lutra perspicillata*) in Iran has been reported (ZIAIE, 1996). This report summarizes the data given in ZIAIE, 1996, and field observations of the coauthor.

According to HARRINGTON (1977) and TAJBAKHSH (1995) the otter is present in most permanent rivers and lakes of Iran, but is absent from the central desert region and from the southern coastline. In 1977 it was first suggested that the smooth coated otter could be found in southern rivers and some regional data of otter presence in nothern and eastern Iran were published (ISHUNIN, 1977). Furs harvested in the Hur-al-Azim Wetland, Khuzestan at the border to Iraq in 1972 (2 furs) and 1974 (1 fur) (Fig. 1, point 1) were recently determined to derive from smooth coated otters (ZIAIE, 1996). This species is known to occur in the greater part of this wetland in Iraq. The smooth coated otter is fairly common in Pakistan and the species is possibly also present in the Bahoo Kalat river basin (Fig. 1, point 2) in the southeastern edge of Iran. The otter scat found at the River Hassan Lenghi, Hormozgan in February 1997 could also be from a smooth coated otter.

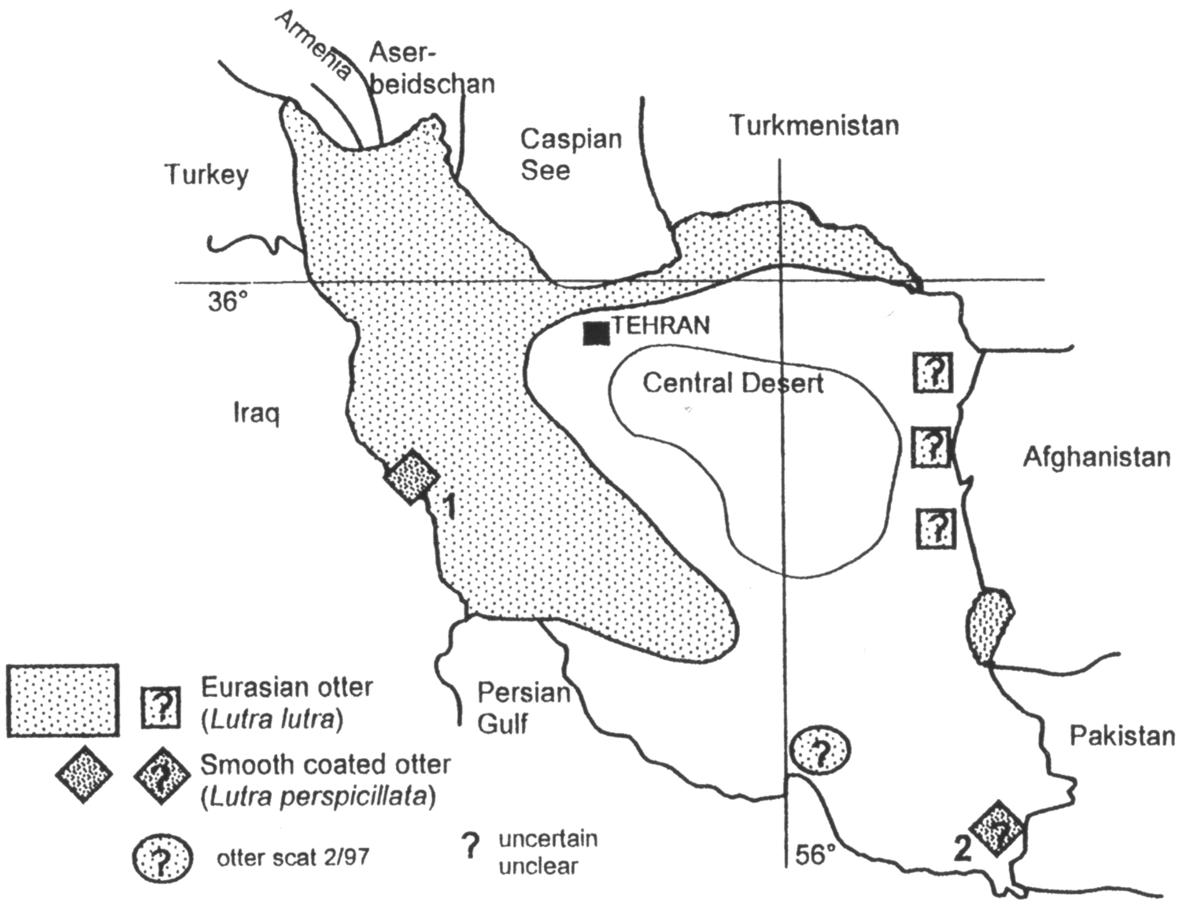

Figure 1: Distribution of otters in Iran (Gutleb et al, 1996, Ishunin, 1977; Tajnakhsh, 1995, Ziaie, 1996)

The Eurasian otter (*Lutra lutra*) can be found in rivers and freshwater lakes in the Zagros, Elburz and Koppe-Dagh mountain range and in Iranian Azarbaiejan (Fig. 1). Possibly the species is also present on the south Caspian shore and is present in the Hamoon Wetland in the south of the border area to Afghanistan and its effluent rivers.

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CALL FOR INFORMATION

AFRICAN CLAWLESS OTTERS (Genus *Aonyx*)

LARIVIÈRE Serge

I am currently reviewing the literature on African clawless otters (*Aonyx capensis* and *Aonyx congicus*) for the purpose of writing "Mammalian Species" accounts (sister publication of the JOURNAL OF MAMMALOGY). As you all know, information is sparse for these two species, and I am therefore requesting any report, article, or other printed material dealing with African clawless otters.

I also need 1 picture of a live specimen of each species, as well as skull photographs. Being based in Canada, it is hard for me to obtain any of this material, and would gratefully acknowledge any person willing to provide picture or skull photographs. Acknowledgements will be included in the publication.

Please do not hesitate to contact me for more information. I am on electronic mail and will gladly discuss any aspects of my request. Also, feel free to pass this letter to somebody who might have information on *Aonyx* species. I will gladly send copies of the final articles to any respondent, as well as reviews I have previously done on other otter species (*Lontra canadensis, L. felina, L. longicaudis*, and *L. provocax*). Our common benefit is to obtain an updated review of the information available on these interesting carnivores.

Sincerely,

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PROCEEDINGS 14th MUSTELID COLLOQUIUM

Kouty - Ledec nad Sazavou, Czech Republic
14.-17.9.1995
Toman, A., Hlavac, V. (eds.)

The proceedings cover various aspects of European mustelids including the European otter (*Lutra lutra*).

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CONTENT

The World Conservation Union

SPECIES SURVIVAL COMMISSION