I.U.C.N. Otter Specialist Group

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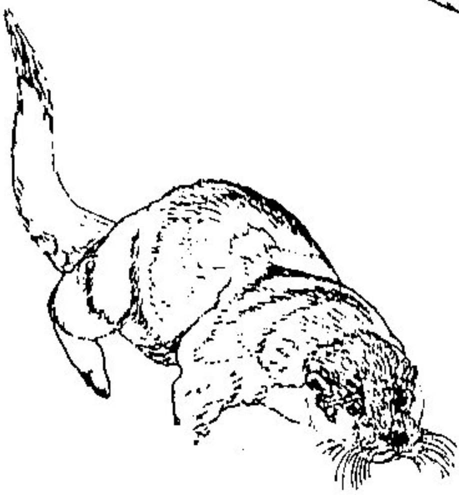

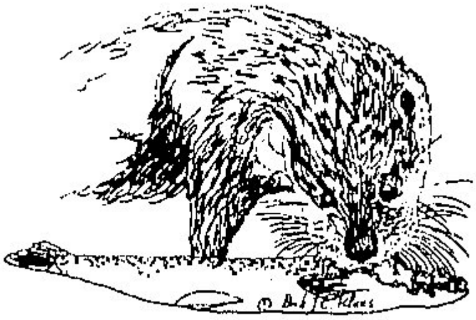

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VIEWPOINT

AN ACTION PLAN FOR THE CONSERVATION OF OTTERS

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A fundamental aspect of SSC's work is the determination or conservation priorities through the production of Action Plans. This task is included in the Commission's terms of reference. A number of high quality Action plans were prepared during the late 1970s, and the SSC Steering Committee has now requested that a new generation of such plans be produced. To assist us in these efforts, WWF have financed two salaried positions in the SSC Executive Office. This article is being written while discussions are still taking place between the Otter Specialist Group leadership and the Executive Office on how the OSG can take part in this new Action Planning process. These discussions might well have been finalised by the time this article is published, so I apologise for anything written here which is clearly out of date.

The new generation of plans are all termed "Comprehensive Action Plans". They are the result of a study carried out by a Specialist Group which includes an overview of the status of all the species within their brief, a system of setting conservation priorities, and a compilation of proposed projects which address these priorities.

Why are Action Plans needed? There are six principal reasons :

1. We need to know the priorities for species conservation, if we are to effectively channel limited funds towards the most urgent needs. A thorough knowledge of the priorities is also required if SSC, and its Specialist Groups, are to provide the high calibre advisory service which governments and conservation organisations require.

2. Not only do the priorities need to be known. They also need to be published and thoroughly documented. Specialist Groups and their members are not immortal, and information that merely resides in the collective consciousness of the Group is always liable to be lost. It is certainly not so readily available, and needs to be published in a coherent form as an Action Plan.

3. Action Plans can be used in fund raising. This is without doubt the most controversial part of the Action Planning process. We are well aware of the funding disappointments in the past, which stem chiefly from the fact SSC has traditionally aimed its fund-raising at one over-burdened, WWF. The new generation of plans is being published attractively and will be aimed at a wider variety of donors. Clearly, there will be disappointments in the future, but the Executive Office will try to assist Specialist Groups in their fund-raising to a greater degree than was possible in the past .

4. The Executive Office, if it has the species conservation priorities readily to hand for a particular group, is able to exploit opportunities on behalf of the Specialist Groups. Often this means incorporating a species element in other conservation projects, such as habitat protection, protected area management and National Conservation Strategies. We are aiming to have a much stronger species component in general conservation initiatives.

5. The larger the number of Action Plans that are produced, the more we shall be able to identify regional "hotspots" of species conservation concern. We are moving ahead rapidly in this area. There are currently 34 Action Plans in preparation by 21 Specialist Groups. And we are considering new ways to make the Action Planning process more applicable and effective for fish, invertebrates and plants. We are working towards regional species conservation strategies, in which we want all Specialist Groups to be strongly represented.

6. The preparation of an Action Plan is a good discipline for a Specialist Group as it takes a hard, detailed look at the conservation problems and assesses the priorities. The process is proving successful in bringing several Groups to life. For a Group with a long history of activity, such as the OSG, the compilation of a plan might prove considerably easier than for some of the newer Groups.

We in the Executive Office are very much looking forward to working with the OSG in this Action Planning process. We are confident that the long-term result will be an increased profile and effectiveness of otter conservation. Your close relatives, the Mustelid and Viverrid Specialist Group, are already working on such a plan, so it is now particularly appropriate that the OSG should start as well.

REPORT

THE SMOOTH-COATED OTTER IN NEPAL

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The Smooth-coated Otter (*Lutra perspicillata*) was the subject of a four month field study between November, 1904 and February, 1985 within the Royal Chitwan National Park, Nepal. This study was undertaken by myself and three other newly graduated scientists and was supported through a variety of fund raising activities and sponsorships.

This species of otter has not been previously studied in Nepal so that the resulting information forms a good basis for further studies. Two other species of otter have ranges that include the Indian subcontinent, the Oriental small-clawed otter (*Aonyx cinerea*) and the common otter *(Lutra lutra*). The Smooth-coated otter cannot be confused with the former species, which is much smaller in size, but it has similar dimensions to the common otter. The sightings we had fitted closely the description of the Smooth-coated otter and a few years previously, a young otter had been captured in Chitwan and reared at the Otter Trust. The Naryani River, the focal point of this study, forms one of the four boundaries to the National Park, with local villages established directly outside. Faecal material from the banks of the river was collected and analysed to determine the otters' diet and various other factors were recorded, such as otter tracks, sprainting sites, scrape marks, holt sites, slides and otter sightings.

A total of 75 km was surveyed and for the purposes of data analysis, it was divided Into 8 regions, ranging from deep slow moving water with cliff and boulder shores in the north east, to fast flowing water with extensive mud and pebble shores In the west. The banks on the southern side of the river, within the National Park, were dominated by riverine forest or elephant grass, whereas those on the northern non-park side were dominated by short grass due to over-grazing by domesticated animals.

A reference collection was compiled from the jaws, pharyngeal teeth and spines of each species of fish caught along the length of the Naryani during the four month period. The components of the 172 spraints analysed were compared to this reference collection, enabling 26 of the commonest fish species to be identified. Other spraint components were frog, crab, shrimp, snake and insect. A percentage of the total represented by each prey component was estimated for each spraint and these were totalled for each of the eight regions of the river. The results indicated variation along the length of the river, a predominantly fish diet in the southernmost regions, to more of a frog dominated diet, with other components becoming more frequent in the northern regions. These dietary differences could be attributed to a number of factors. The topography of the river varies, which is likely to affect both the prey availability and the most effective foraging methods. Competition with other fish predators, especially man, also influences the prey available to the otters. In the extreme south-easterly regions, both river banks are within the National Park so that human access is more limited. The broadness and depth of the river also prevents the use of fish traps and damming and drainage methods, all of which are used in the shallower and channelled regions further upstream. The north westerly regions are more accessible as the northern river bank is not within the National Park.

Regional variations were also shown for 5 of the commonest fish species found in otter spraints, again possibly due to similar theories suggested for the variation in spraint composition.

The comparison of fish remains in bird pellets with those in otter spraints demonstrated that otters take a much wider size range of fish from a wide variety of habitats.

The large number of signs, covering the whole length of the Narayani within the Park, would seem to be indicative of a healthy otter population. However, it was not possible to determine the actual numbers of otters present from our study, since there is no direct relationship between the number and density of spraints and that of otters.

Signs of otters were found both on the undisturbed and the disturbed banks, although those on the disturbed side were restricted to tracks and solitary spraints. Large sprainting and holt sites were found only on the undisturbed banks within the National Park. The sprainting behaviour and formation of scraped mounds is similar to that demonstrated by Lutra lutra.

The banks of the river suffer greatly from erosion, especially during the monsoon - so exposing tree root systems and leaving wood debris. These are exploited by the otter as holts and lying up sites. Nine holt sites were discovered in total and eight of these occurred in areas such as these. The ninth was tunnelled into a steep sandbank stabilised by elephant grass. The land immediately backing the banks where holt site entrances occurred had substantial vegetation cover. The lack of holts on the disturbed bank of the river may be attributable to direct human disturbance and a lack of suitable habitat. Almost complete deforestation and the subsequent overgrazing means that there are fewer tree root systems to be exploited and there is an absence of general cover.

It is interesting to note that otter sites were only found in the southernmost regions during the latter part of the study. At this time otter signs in the middle regions also became more plentiful. This phenomenon may be associated with the breeding season, when territorial behaviour increases. More spraints would therefore be found during the breeding season. It may also indicate an increase in otter numbers, which could fit in with a theory that the otters In Chitwan exhibit seasonal migration, as they are not seen during the monsoon period from May to September.

This movement could be in pursuit of migratory fish heading north or in search of a cooler, more suitable environment, or it could be due to the breakup of groups after breeding. They may not leave Chitwan entirely but may retreat further inland to the tals and tributaries of the Naryani.

This study has shown that the Smooth-coated otter is common along the length of the Naryani river and that it relies heavily on fish. It also suggests their feeding habits are sufficiently flexible to adapt to local variations in their food supply. A comparison of river banks suggests human activities decrease the availability of suitable habitat and over-fishing decreases food supply. Extensive deforestation in the hills causes flooding and increases the turbidity of the lowland changing both the aquatic environment and the river's topography. Pollution, resulting from chemical discharge is increasingly an important problem in Nepal. For example, the activities of a new papermill upstream of the Park, discharging untreated waste can only be having a deleterious effect. Although designated and isolated as a National Park, Chitwan is not removed from the influence of external factors, and without an effective management plan controlling these, those animal species dependent on the riverine system may rapidly decrease in number or even disappear permanently.

A copy of the final report is available - Price £3 including postage and packing.

REPORT

CONTAMINANT RESEARCH IN CANADA

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During the 1983/84 and 1984/85 trapping seasons, carcasses of river otter (*Lutra canadensis*) were collected for contaminant analysis from trappers in Ontario. The annual harvest of otters in Ontario has remained relatively stable at about 10,000 animals per year since accurate records were kept beginning in 1945. This harvest provides a lot of potential material for studies but surprisingly little has been done with it. Also, the trappers themselves are often extremely knowledgeable about the habits and numbers of otters within an area. Their knowledge is based on many years of personal observations and practical experience.

To date, the otter tissues have been analyzed only for metals, although the Canadian Wildlife Service who funded the research, has archived the tissues in Ottawa for future potential analysis for organochlorines, pesticides or other chemicals. The studies identified clear differences in tissue levels of Hg, Pb and Cd between different collection areas. In some cases the differences could be attributed to natural geological occurrences of these elements, or to direct anthropogenic activity. For example, Hg levels were high in otters caught along a river in northwestern Ontario which had been contaminated with Hg from a chlor-alkali plant during the 1960's and early 1970's. The fact that otter Hg levels remain elevated more than a decade after Hg discharge into the river stopped, attests to the persistent threat of Hg to wildlife. Some high (> 10 ppm ww) Hg levels in otter brain tissue suggests the animals were likely suffering from chronic Hg poisoning.

There is evidence to support Hg poisoning as the cause of death in at least one otter along this river system, with anecdotal evidence from trappers of more widespread furbearer mortality (Wren, 1985). The otter in question was found dead by a trapper who followed the tracks which showed the animal behaving erratically, travelling in circles and falling over. Subsequent tissue analysis revealed extremely high Hg levels of 97 ppm in liver and over 30 ppm (w/w) in brain.

Bone Pb levels in Ontario otter were highest in the areas nearest industrial activity and with the greatest reported levels or atmospheric deposition of Pb. Liver Cu levels were also elevated in otters collected near Sudbury, Ontario, which is the location of large Cu-Ni smelters. Sulphur and nitrogen emissions emissions from the smelters have caused widespread acidification of Lakes around Sudbury. Surprisingly, however, Hg levels in fish and otters near Sudbury are very low. There is no obvious explanation for this apparent anomaly, but may be related to reduced Hg uptake due to interference by Se, which is also emitted from the smelters. However, further work is required to elucidate the factors affecting Hg uptake in wildlife.

Generally, liver and kidneys are the best organs for sampling of metals, although bone is preferred for Pb. Hair has often been suggested as a good medium for element analysis, but this is not feasible when the animal is being hunted for its fur. Trapper co-operation would quickly decline if we started snipping at the valuable pelt.

Recent experiments showed that a combination of PCB plus methyl mercury was more toxic to mink (*Mustela vison*) kits than either chemical singly. Furthermore, the toxicity of methyl mercury was greater to adult mink under cold stress than in controlled laboratory conditions (Wren et al., 1987). I think it is reasonable to extrapolate these findings on mink to the otter. The studies emphasize the potential interactions of toxic chemicals with each other and with natural stresses (e.g. cold, starvation, disease). More research is required along these lines since simultaneous exposure to more than one chemical and other stresses is more typical of conditions in the wild.

There are currently no studies of contaminants in otters being conducted in Ontario, or anywhere else in Canada to my knowledge. However, otters are a very good biological indicator for many contaminants, and their use in environmental monitoring should be encouraged.

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REPORT

THE RIVER OTTER LIVE CAPTURE PROGRAM IN ONTARIO, CANADA

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The Ontario Ministry of Natural Resources (OMNR) initiated a project to live-trap river otter (*Lutra canadensis canadensis*) in 1984. This program began as a result of an exchange of wildlife between the State of Missouri and the Province of Ontario. Ontario was to provide Missouri with 14 river otter in exchange for eastern wild turkeys (*Meleaqris gallopavo silvestris*).

In the spring and summer of 1964 preparations for the live capture and transport of the otters were made. In order to implement this program successfully, it was necessary to review the literature concerning the behaviour and the ecology of river otter, as well as methods for trapping, holding and transporting of these animals.

River otters in Ontario have been observed mating in April (Hickey, pers. comm.), soon after the birth of the litter. In captivity, the pups and the female stay within the natal den for approximately three months until the young are weaned (Carnio, pers. comm.). Thus, live-trapping could begin in the early fall (at the beginning of October and continue through until freeze-up in early December) knowing that any young caught then could survive independent of the female.

Hancock live beaver traps (Hancock Live Trap Co., Hot Springs, South Dakota) modified to capture river otter had been used successfully in a number of locations including: Idaho (Melquist and Hornocker, 1979), Alaska (Woolington, pers. comm.), British Columbia (Stenson, pers. comm.), Alberta (Reid, pers. comm.), and Newfoundland (Northcott and Slade, 1976). A similar type of trap, known as a Bailey trap, had been utilized in Ontario in the 1960's with some success. OMNR had some Bailey and Hancock traps which were being used to trap nuisance beaver. Both Hancock and Bailey traps are set so that when closed, the trapped animals are partly out of the water and thereby avoid drowning. The Hancock trap has one stationary flat side and one concave strike-up side, whereas the Bailey trap has two moving sides. Since other researchers had success with the Hancock trap and the condition of animals being captured in these traps was known to be very good, the majority of traps used for this project were large suitcase-like Hancock traps. Modifications were similar to those made by other researchers (Northcott and Slade, 1976; Melquist and Hornocker, 1979; Buech, 1983) and included extending the trigger plate, and in the case of the Hancock trap, wiring the bottom edge of the trap as well as rewiring the stationary flat side so animals could not escape.

Traps were positioned in small streams in what was considered to be good otter habitat, with the trigger places situated Just under the water level. Bailey traps were set in the water with both aides open, totally concealing the whole trap under water. Hancock traps only had one side in the water with the stationary flat side staked up against the bank and camouflaged with dry grasses.

It was decided that otters would be held temporarily in captivity as an acclimation period before shipment, since shipping by commercial air over international borders may subject animals to extended periods of stress. In addition, other researchers have successfully held otter in captivity (Best, 1962;

Chanln, 1985; Jalkotzy, pers. comm.. Savin, pers. comm.). Two major holding facilities were utilized. One was modified from an existing pen (9.1m long and 6.1m wide) formerly used to hold otter or bear (Ursus americanus), and consisted of a cement floor, tin roof, and chain-link fence walls supported by angle iron posts. Access to the pen was by way of a large chain-link walk in door. This pen was equipped with a large cattle trough, hay for bedding, and several metal den boxes which later served as transport or shipping boxes. Den boxes were specially designed of sheet metal with one end equipped with a vertically sliding door and the other of wire mesh. Other sources of ventilation Included small holes punched around the upper sides of the box. A food and water dish was attached to one corner of each shipping container and two carrying handles were welded to the top. The trough was regularly filled with clean water which was circulated by a sump-pump to prevent freeze up during cold weather. The other holding facility was situated at the edge of a river with the floor, walls arid ceiling all being composed of chain-link fencing. One section of the pen was positioned on the bank of the river and covered with tarpaulin, whereas the remainder of the pen was submerged in the water. This allowed the animals to swim and drink and then dry off on the bank. Den boxes were placed on the bank, straw was used as bedding material and a sump-pump kept water open in the enclosed section of water in cold weather. This pen was similar to a soft release pen constructed and used by researchers in Alberta for otter reintroduction (Jalkotzy, pers. comm.).

In order to prevent any possible outbreak of Salmonella poisoning while in captivity, all animals in the last two years of the project were injected intramuscularly upon capture with a long-lasting antibiotic (Longicil), in a dose range of 0.5cc for a juvenile animal and up to 2.0cc for an adult. In addition, a broad spectrum antibiotic, Amoxicillin was added to the food. While in the holding pen, otters were fed white suckers (Catostomas commerconi) , white fish (Coregonus clupeaformis), ling cod (Lota lota), ciscoes (Coregonis artedii) and sometimes ground beef. Yogurt and a powdered multivitamin supplement were mixed in with the ground beef, or injected into the body cavity of previously frozen fish. Yogurt is known to prevent gastroenteritis problems In otters held in captivity (Jalkotzy, pers. comm.).

Initially, local trappers in five different locations in the province were involved in the program. These areas included the Chapleau Algonquin Park, Bancroft, Tweed, and Pembroke OMNR Districts (Figure 1).

Figure 1: Otter Trapping Locations

In 1985 and 1986 an otter biologist with live-trapping experience was hired, in addition to enlisting local help. Financial assistance was received from the Wild Turkey Trust Fund administrated by the Ontario Federation of Anglers and Hunters. In 1986 the trapping efforts were financed primarily through the same trust fund. Workshops outlining the logistics and general procedures involved were conducted for local trappers. The importance of checking live traps at least once a day was emphasized. The average number of recorded trap nights required to capture one otter in Algonquin Park was 122.

Results of the trapping efforts over the last few years are summarised in Table 1. Traps containing river otter were removed from the water as soon as possible, wired shut to prevent the escape of the animal and placed on dry ground. The trapped animals were provided with burlap material that they could use to dry themselves on. Additional burlap material was loosely covered over the outside of the trap to block out light while the animals dried off and settled down. In the event that animals continued to be restless and fight the trap, trappers were instructed how to administer an azaperone drug, Stresnil, in two intramuscular injections five minutes apart. The total dosage used was 0.3cc for juveniles and 0.5cc for adult otters. Stresnil is a tranquillizer that does not render the animal unconscious and therefore was not used as an immobilization agent. Animals were kept in a quiet, darkened area for 30 to 60 minutes before transport to a holding facility. The trap containing the otter was then placed inside the holding pen and left for several hours. This allowed for the acclimation of the animal to its surroundings, as well as enabling previously trapped otters to adjust to the newly introduced animal.

Table 1 : Otter Live-trapping Data for Algonquin Park District, Ontario 1985 - 1986

YEAR	TRAP TYPE	NUMBER OF OTTERS CAPTURED	NUMBER OF NON-TARGET ANIMALS CAPTURED[1]	NUMBER OF TRAP NIGHTS
1985	Bailey	1	5	156
	Hancock	6	12	254
1986	Bailey	0	0	164
	Hancock	3	18	645
TOTAL		10	35	1219

Average Number of trap nights to capture one animal = 122
[1]Most of the non-target animals captured were either Beaver (*Castor canadensis*) or Muskrat (*Ondrata zibethicus*)

Although contact with humans was minimized while otter were held in captivity, their behaviour, eating, and defecation
patterns were monitored. Once a significant number of otter had been trapped or weather conditions prevented further trapping, the otters were shipped. Animals were individually assessed according to the degree of agitation displayed as to whether administration of Stresnil was required for transport. In most cases animals were transported to the United States by Ontario provincial government aircraft. This allowed a biologist to feed and water the animals when necessary and to ensure their general health and welfare.

On arrival at the reintroduction area, state biologists transferred the animals to drugging or squeeze boxes (McCullough et al., 1986). Animals were immobilized with ketamine in order to be examined, weighed, measured, sexed, and ear and web tagged (Table 2). The largest adult animal live-trapped in Ontario, weighed 9.2 kg. The average weight of adult and Juvenile females was 7.1 and 4.0 kg, respectively, whereas the average weight of adult and juvenile males was 6.4 and 3.8 kg, respectively. After drugging and handling, a recovery period of several hours was allowed and then animals were transported to the release site.

Table 2 : Ontario River Otter Data obtained prior to Release in Missouri and Nebraska 1984 - 1986

STATE PROVIDED TO FOR REINTRODUCTION	KETAMIN (cc) DOSAGE	SEX	AGE	WEIGHT (kg)
Missouri	2.0	Female	Adult	9.2
	1.2	Male	Adult	6.5
	1.0	Female	Juvenile	3.9
	1.0	Male	Juvenile	3.8
	1.8	Male	Juvenile	*3.8
		Female	Adult	5.9
		Male	Adult	6.5
		Female	Adult	8.2
		Female	Juvenile	4.1
		Male	Adult	6.7
		Female	Adult	7.2
		Male	Adult	7.0
		Male	Adult	6.4
Nebraska		Female	Adult	5.4
		Female	Adult	
	1.0	Male	Adult	5.4
	0.5	Female	Juvenile	4.1

* Mortality during handling

A total of 16 of the 18 animals captured, held and transported survived to release. One mortality took place after one day in captivity, but this particular animal was subsequently found to be only 70 per cent of the weight of other otters of similar body length. The second mortality was attributed to a possible drug overdose while being processed for release in Missouri.

In Missouri, Ontario otters were reintroduced into the Chariton River and associated wooded swamp, located in the Rebel's Cove Wildlife Area in the northeast part of the state.

In 1986, Ontario river otter were also provided to the state of Nebraska as part of a three-way wildlife exchange for Iowa wild turkeys. The otters were reintroduced into the South Loop River located in the Pressey Wildlife Area in the south central part of Nebraska.

Overall, the techniques used in the Ontario otter program were successful.

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REPORT

THE CURRENT STATUS OF THE SEA OTTER POPULATION IN CALIFORNIA (DECEMBER 1986)

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Sea otters are counted directly (rather than indirectly by having their numbers inferred from scat counts or den site counts). They occur in a narrow band of coastline over relatively shallow waters and are usually in plain view. However, when intensive efforts to count the sea otter population in California started in the 1960's it soon became evident that there were some problems. For example, in 1968 and 1969 nine aerial counts of the entire California range resulted in total counts ranging from 377 to 1014, well beyond real population fluctuations. Through the 1970's a variety of techniques were tried in an effort to gain consistency and establish confidence in counts. The best of these methods involved a complete count of the range by a team of observers in an aircraft co-ordinated with simultaneous counts in numerous segments by observers on the ground ("ground truth"). A desirable feature of this method was that it allowed a total population estimate (which is different from a total count) with confidence bounds (Geibel and Miller, 1984). An undesirable feature of this technique was that it required an enormous amount of co-ordination, a lot of personnel and several consecutive days of good counting weather. As to whether the population declined during the late 1970's to early 1980's, as some people have Indicated, the California Department of Fish and Bane's (CDFG) analyses of the data suggests stability rather than decline (Wendell, Hardy and Ames, 1986). Whether the population has remained stable or declined slightly, the fact remains that a population that had been growing at a rate of approximately five percent per year has not grown for more than a decade. This lack of population growth remains a significant point of concern. However, new net fishing restrictions and the fact that the geographic range of the sea otter in California has continued to increase (Figure 1), lead us to conclude that future increases in population size in California are likely..

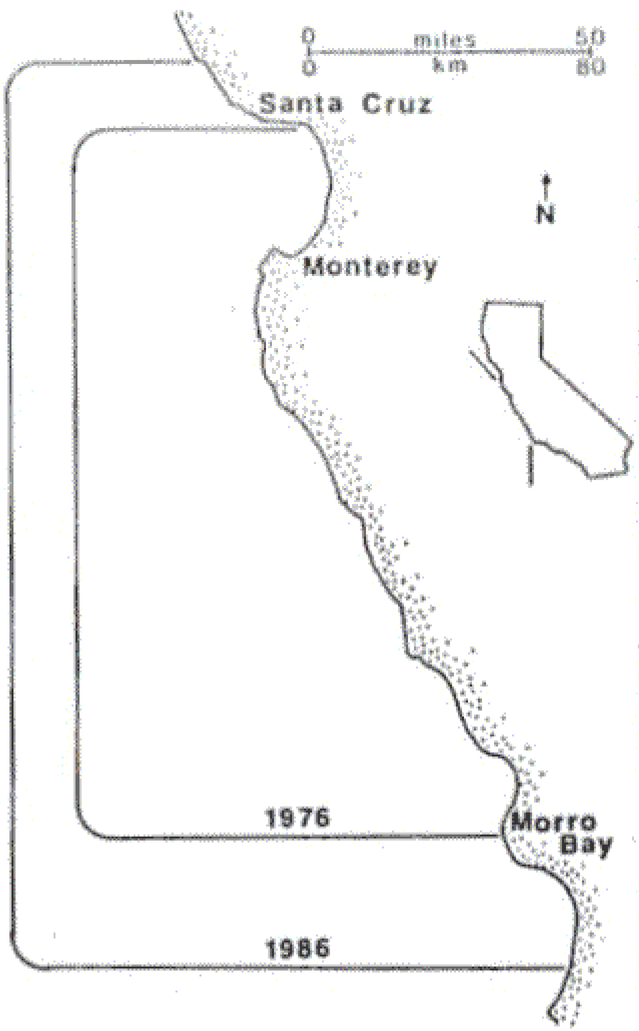

Figure 2: The Sea Otter Range in California

In 1976, sea otters occupied approximately 290 km of nearshore coatal waters, or approximately 550 km^2 of habitat (measured from shoreline to the 20 fathom isobath). In 1986, they occupied approximately 390 km of coastline or approximately 770 km^2 of habitat.

The United States Fish and Wildlife Service (USFWS), early in the 1980's, adopted a method of using several teams of expert observers to count sea otters from the ground, where possible; augmenting with aerial counts in the remainder of the range. Whi1e it has not been universally agreed that this is the ideal or best counting method, it does have the distinct advantage of requiring fewer personnel and less co-ordination. Many people have been confused by census numbers that have appecired in various reports which compare previous total population estimates with population counts. The sea otter counts since 1902 have not been expanded into total population estimates.

Since 1982, CDFG has participated with USFWS and other volunteer experts in conducting semi-annual (spring and tall) sea otter censuses. Because of concern over a relatively low count in the fall of 1985, an additional winter 1986 census was conducted followed by the regular spring count. These censuses resulted in the highest two counts since the current method of counting was instituted (1982). Since new laws had recently gone into effect restricting large mesh tangle nets (halibut nets), most people were optimistic about future population growth. (The halibut tangle net fishery is known to have accidentally drowned many sea otters in shallow water in past years (Wendell, Hardy and Ames, unpubl. ms.) and is thought by many to have been the primary reason for cessation of population growth since the raid 1970's). The fall 1936 census, however, resulted in another low count, the lowest since the current method was instituted (Table 1). Given the moderate number of dead sea otters recorded in 1986 (Table 2) and the less than ideal viewing conditions which prevailed during part of the most recent census, it appears that the precision attributed to the current census technique may have been overly optimistic, and that these counts are sensitive to environmental conditions (e.g. wave height, wind, glare, relative abundance of bull kelp, etc.) Just as all previous census techniques have been. So, despite the recent low count, we (CDFG) are still optimistic about a resurgence in population growth.

Table 1 : **Rangewide Counts of Sea Otters in California since 1982. (These censuses are continuous ground counts augmented by aerial counts)**

Date		Independents	Pups	Total
Spring	1982	1,124	222	1,346
Nov	1982	1,194	144	1,338
Jun/Jul	1983	1,153	122	1,275
Oct	1983	1,062	164	1,226
Jun	1984	1,181	123	1,304
May	1985	1,124	236	1,360
Oct/Nov	1985	1,066	155	1,221
Jan/Feb	1986	1,231	181	1,421
May/Jun	1986	1,345	225	1,570
Nov	1986	1,088	113	1,201

Table 2 : **Dead Sea Otters recorded in California from 1973 through 1986**

Year	Number of Dead Sea Otters
1973	82
1974	44
1975	52
1976	68
1977	98
1978	83
1979	69
1980	147
1981	153
1982	99
1983	118
1984	131
1985	70
1986	*76

* Preliminary

The major "threat" that has been ascribed to the California sea otter population, that of a massive oil spill, remains largely unabated. However, a proposal to establish a second population at a geographically isolated location is well underway, and actual translocation of animals could begin by late 1987. Should this translocation take place and the new population become established, then the small chance that the Californian population of sea otters could be eliminated by a massive oil spill will be reduced to near zero.

In the worst of all scenarios, were the Californian population of sea otters to be exterminated, there every reason to believe that a new population could be started from Alaskan sea otters which, although currently legally distinct, are in all likelihood biologically identical. Such transplanted populations currently thrive in British Columbia, Canada and the state of Washington.

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REPORT

NO OTTERS IN THE TASSILI MOUNTAINS (SAHARA)

Koen de SMET

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The Tassill Mountains are situated in the centre of the Sahara Desert and as they are rather high (summits over 2,000 m), they have a rainfall of more than 50 mm/year. There are many rivers in these mountains and although they only flow after the occasional rains, a great number of small lakes (locally called Guelta) remain in the deep canyons. Some river systems always have running water (Oued Imirhou, Oued Iherir) and most of them contain large quantities of fish (*Barbus* sp., *Tilapia* sp.) as well as frogs and snakes.

In these mountains (and in the Hoggar nearby) many Mediterranean species remained after the Sahara dried up and a lot of endemics closely related to Mediterranean species are found. Therefore I was convinced that *Lutra lutra* (formerly widespread in the whole of North Africa, even south of the Sahara Atlas), could have survived in this area.

However, intensive searches for otter spraints and tracks during 3 two-week trips (1984, '85 and '86) in this area proved negative and the species was not familiar to local people. The rivers searched were the Oued Djerat, Oued Tadjeradjeri, Oued Ouvet and Oued Iherir.

Next year I will survey the Hoggar river systems for otters but, after finding negative results in the Tassill, I doubt whether they will be found to occur there.

Koen reports (in litt.) that he has found abundant signs of otters in El Kala close to the border with Tunisia. Ed.

REPORT

FIRST DATA ON CONTAMINATION OF OTTERS IN THE NETHERLANDS

Sim BROEKHUIZEN

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In the last decades otters became rather rare in The Netherlands. Consequently, during the last years only a few otters that were found dead became available for scientific examination. Recently, the chemical department of the Research Institute for Nature Management analyzed liver and kidney tissue of three otters:

- an adult male, which died in the early summer of 1983 and presumably originated from the vicinity of the village of Warffum in the north-eastern part of the country (Figure 1 W). . From this animal only the skinned and cut trunk was received.
- an adult, lactating female, killed by traffic in the autumn of 1982 and originating from a peat-bog nature reserve named Rottige Meenthe (Figure 1: RM). The skin and skeleton of this animal were entered in the collection of the Dutch National Museum of Natural History in Leiden, number 35136.

- a probably first year male, found dead in February 1986 in the same peat-bog reserve Rottige Meenthe.

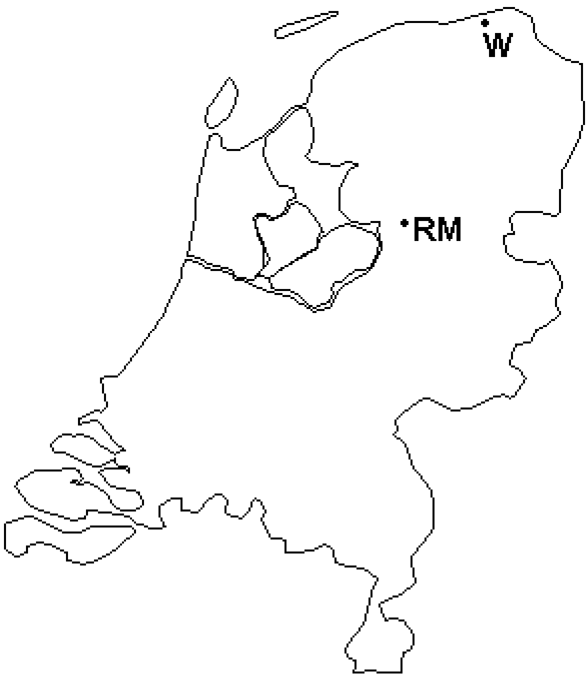

Figure 3: Locations at which Otters were found

Tissues of kidney and liver of all three otters were examined for the heavy metals lead (Pb), cadmium (Cd), mercury (hij), copper (Cu) and zinc (Zn) and for polychlorinated biphenyls (PCBs) . Kidney and liver of the otter found dead in 1986 were also examined for chlorinated hydrocarbon pesticides. The results are summarized in tables 1, 2 and 3. PCBs were detected by gas chromatography with capillary columns, but in 1986 otter PCBs were also detected by gas chromatography with packed columns. The latter method has been used in most otter analyses published up to now.

Table 1: Concentrations of heavy metals (mg/kg^{-1} dry weight) in liver and kidney tissue of three otters

		Origin Otter		
Metal	Tissue	Warffum	Rottige Meenthe	
		1983	1982	1986
Pb	Liver	0.7	0.6	0.2
	Kidney	0.9	1.3	0.3
Cd	Liver	0.5	0.7	0.4
	Kidney	0.6	1.0	0.8
Hg	Liver	3.4	12	2.9
	Kidney	4.0	0.9	5.6
Cu	Liver	16.4	13.7	30.9
	Kidney	21.8	17.8	18.5
Zn	Liver	86.6	87.8	131.0
	Kidney	81.3	87.1	95.0

Table 2: Concentrations of PCBs (mg/kg^{-1} extracted fat) in liver and kidney tissue of three otters

	Origin Otter			
Tissue	Warffum	Rottige Meenthe		
	[1]1983	[1]1982	[1]1982	[2]1986
Liver	155	4.8	243	291
Kidney	51	5.0	210	282

[1] Gas chromatography with capillary column

[2] Gas chromatography with packed column

Table 3: Concentrations of chlorinated hydrocarbon pesticides (mg/kg-1 extracted fat) in liver and kidney tissue of the otter Rottige Meenthe 1986[1]

Compound	Liver	Kidney
HCB	3.1	0.7
Hepox	0.9	
Dieldrin	2.0	
Endrin	<0.5	<0.5
α,β, γ HCH	<0.5	<0.5
DDE	8.0	3.0
DDD	<0.5	<0.5
DDT	<0.5	<0.5

Looking at the data, attention will be caught by the figures of PCBs. To compare these data with those from other European countries, the mean values of table 2 are fitted into figure 2, obtained from Mason and Macdonald (1986) and based on data from Olsson et al. (1981), to which data from Great Britain (Mason et al., 1986) were added. The wide variation in concentrations also occurs in the Dutch material. The cause of this variation is unclear, as the animals with the lowest and the highest concentration both originated from the same area and the hydrology of that area has not changed essentially during the last years.

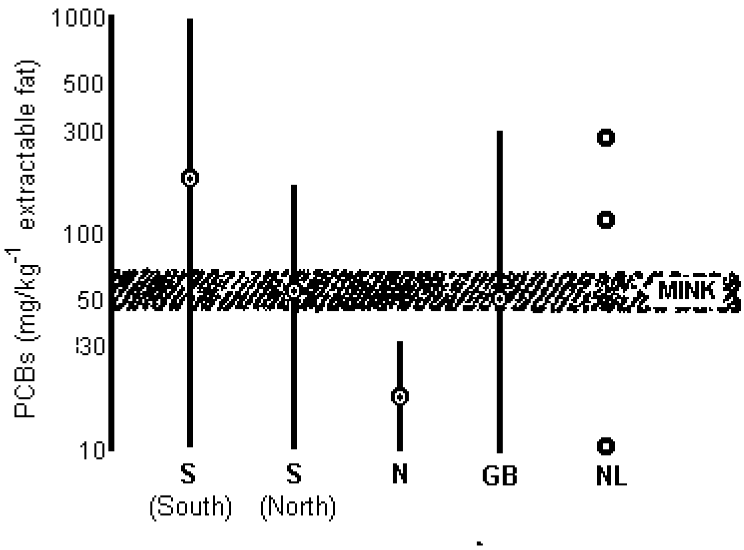

Figure 4: Ranges and mean values of PCB concentrations found in otters from southern- and northern Sweden (S), Norway (N) and Great Britain (GB), and the concentrations found in The Netherlands (NL), in comparison with the PCB level in the muscle of mink, exhibiting reproductive failure

In the first-year male from 1986, in which the highest concentrations of PCBs were found, a walnut-sized tumour was found at the back side of the liver, while in one of the kidneys a coral-shaped renal calculus was found (Broekhuizen, 1986). This animal was in a poor condition, without any fat deposit, and had actually died of pneumonia. In the other two otters no abnormalities were recorded.

Since, in two out of the three analysed otters, PCB concentrations in extractable fat exceeded significantly the minimum concentration causing reproductive impairment in experimental mink, and these two otters originated from non-industrial areas, it seems possible that PCB pollution contributed significantly to the decline of the Dutch otter population during the last decades. However, the low PCB concentration found in the lactating female shows that the situation is not that simple. As the otter with the highest PCB concentration was in a very poor condition, without any fat deposit, the very high PCB concentration in extractable fat in this animal could be mainly the result of the exhaustion of the fat reserves.

As to the chlorinated hydrocarbons and heavy metals, the detected concentrations do not seem very alarming, although we have hardly any information about synergistic effects of the different chlorinated hydrocarbons, PCBs and the biologically non-functional heavy metals, and little is known about the toxicology in European otters. The high concentrations of copper and zinc seem quite normal. These are functional elements in the metabolism of the animals and they have mechanisms to regulate these concentrations.

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REPORT

THE DUTCH OTTERSTATION FOUNDATION

A. W. J. J. de JONGH

Dutch Otterstation Foundation (Stichting Otterstation Nederland), de Laan 22-3, 9712 AV Groningen, The Netherlands.

History

The initiative for starting up a Dutch Foundation for conservation of the Dutch otter population (*Lutra lutra*) and its habitat was taken by two former students of Dr. H. Kruuk. Because of his connections with the State University Groningen (the Netherlands), these two students were able to work on otters in the wild and captivity within an otter study programme of the Institute of Terrestrial Ecology in Scotland. During these studies ideas arose to start a Dutch Otterstation. Visits to the International Otter Symposium in Strasbourg and the Otter stations of The Otter Trust (P. Wayre) in England and Aktion Flschotterschutz (C. Reuther) in Germany emphasised the necessity and the possibilities of an otterstation for conservation purposes.

With the support of Dr. J.J. Videler of the State University of Groningen a set-up plan was designed in 1985. To accomplish the main aim (protection, management and recovery of the Otter population and its habitat in the Netherlands and abroad), four approaches were chosen: education, research, breeding programme and management advising.

Present-day

Now, after one year of its existence, the same approaches are still used. In this year a lot of attention has been paid to the foundation's plans and results. There were many articles about the otter and the foundation's work in newspapers and magazines. Several times the foundation was asked for comments in radio-broadcasting, and once it had the opportunity to present itself on T.V. The otter is becoming more and more popular in Holland now and the idea that the otter is the ambassador of the freshwater ecosystem gets more and more widespread.

Today twenty co-operators are working together. Amongst them there are biologists (specialized in animal, plant and environmental biology), trained teachers and trained animal keepers. One of the animal keepers was able to broaden her knowledge by visits to several European zoos and the Otterstation of Aktion Fischotterschutz in Germany, made possible by an IUCN-grant.

Education

By means of publications in newspapers and magazines, interviews (radio and T.V.), lectures, information material, exhibitions and teaching material, the foundation tries to make the public and policy makers aware of the threatened status of the otter and its habitat.

Besides this the Dutch Otterstation Foundation has developed building plans for a visitor centre where the public will be able to see otters alive and will be informed about the otter's biology and conservation needs. This first part of the actual Otterstation will be located in the north of Holland near Groningen. The foundation is trying to establish this centre by subsidies and sponsoring (any financial aid from abroad is welcome!)

Research

Research is done in the field and in the laboratory. In the field, surveys for otters take place, often in co-operation with other Dutch organizations dealing with otter conservation. From last year's surveys it appeared that the estimated otter population size of 350 specimens was far too optimistic. Numbers of 50-150 animals reflect the present situation in a more accurate way. It seems that the Dutch otter population is diminishing. One of the main factors causing the decline is water pollution. Since the otters found dead have not yet been analyzed for contaminants an M.Sc. Biology student of the State University of Groningen started a literature study under supervision of the foundation on the influence of the Dutch water pollution on otters in the Netherlands. From this it appeared that e.g. heavy metal and PCS pollution might severely threaten the Dutch otter population. These results were confirmed by the recent analysis of an otter found dead in the province of Friesland. For example, it contained approximately 290 ppm PCB (see p27).

A second student is now studying the diet of otters in the Netherlands. In the faculty where this is done, a research station with captive otters (as a second part of the Otterstation) will be completed in early spring under the auspices of the foundation.

Breeding Programme

As a third part of the Otterstation a breeding section is planned. The aim of this section is to breed otters and, if possible, to release them in suitable areas in the Netherlands, but only if habitat conditions are right. This will become clear after intensive studies of those areas for pollution, food availability, cover, ecological infrastructure, protection measures etc. The first releases will be considered as experiments in which the animals set free will be intensively studied by radio-tracking. All three parts of the Otterstation are planned separately to avoid mutual disturbance. Especially for breeding it is of vital importance to guarantee tranquillity.

Management Advising

All kinds of management measures can already be made in the field to favour the otter. The Dutch Otterstation Foundation designs and gives advice about landscape planning in freshwater habitats, mainly local. Because of the ambassadorial function of the otter in this ecosystem, measures taken for the otter will favour many other organisms.

The foundation has been involved in the development of a design for an ecological infrastructure between two lakes in the north of Holland. This is of vital importance in countering the continuing fragmentation of otter habitats. Plans are being developed now for an extension of these "otterroads".

The Dutch Otterstation Foundation is also working on "nature-construction". For one lake in particular a management plan is being developed (in co-operation with a department of the State Forest Administration and other parties concerned) to construct an alternative, natural bank protection, with, for instance, reed marshes. These projects are put forward as examples for other areas as well.

REPORT

THE OTTER AND ITS CONSERVATION IN THE VALENCIAN REGION (E. SPAIN)

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The Region

This covers an area of 23,305 km^2 close to the Mediterranean Sea, mostly with a dry climate; mean annual temperature 15°C and annual rainfall around 500 mm. The population is 3,100,000, mainly concentrated in the littoral plains (well over 100/km^2) where much of the intensive agriculture and industry is situated. The population is sparse (normally below 20/km^2) and decreasing in inland areas which are dominated by mountains and forests.

The Rivers

The region has some 1,500 km of permanent flowing waters but with very irregular flow subject to severe summer droughts and occasional autumn floods. Total natural flow reaches approximately 100 m^3/sec.

During an intensive survey in 1984 it was estimated that 724 km (47.63%) of rivers were affected by medium and heavy pollution, principally of urban origin. Water extraction for irrigation is intensive, with less than 20 m^3/sec reaching the sea and 560 km (36.8%) of rivers are almost dry because of this. Construction of reservoirs (numbering 25 with a total capacity of 2,053 km^3) for water regulation and hydro-electric power has affected 271 km (17.8%) of rivers, either seriously reducing flow or drastically changing the natural pattern downstream. Important bankside alteration was detected in 21.8% of 151 riverine stations, while 6.65% were considered channelized. Pollution, water extraction and bankside alteration affected mainly the lower reaches, while reservoir regulation impacts the middle ones.

Most of the Valencian rivers belong to the Jucar hydrologlcal basin, with 3,966 km^3 natural resources and 2,916 km^3 demands. By the beginning of the next century demands are estimated to grow to 4,806 km^3 when imported resources from other basins will be needed and, obviously, the above mentioned impacts will get worse.

The Otter

From various sources it may be estimated that during the 1960s the otter was present In 350 km of rivers. During the field survey of 1984 otter signs were found at only 6.4% of 172 sites visited. The intensive survey of 1986 showed that *Lutra lutra* was using 140 km of Valencian rivers, i.e. 40% of the 1960's distribution.

The decline has taken place mostly in the middle reaches (the species has been absent from the lower reaches since earlier times), where pollution and population have not increased substantially but dams have been built. In several rivers, otter distribution stops consistently at the reservoir. The reasons for its absence downstream are not yet clear but low fish production and continuous and sudden changes in flow are factors to be studied.

The Research

During 1986 the Regional Wildlife Service conducted an otter project with the following aims:

- to define precisely the length of rivers used by the species and its pattern of use;
- to study the environmental features and impacts that may affect the otter;
- to propose concrete measures for habitat/species conservation.

Rivers were studied by surveying sites 2-3km apart for signs of otters. A minimum of 200 m was searched at positive sites and a site was considered negative if no signs had been found after searching 600 m. The survey was terminated once at least 3 consecutive sites had proved negative except in the case of tributaries and reaches considered suitable for recolonization. At each site, density of signs, measurements of footprints and number of potential holts were noted.
Each basin is sub-divided into stretches with similar features where natural conditions (principally cover, flow and prey) are studied and impacts precisely enumerated.
The situation of the otter In each basin and In every stretch is defined according to sign density, the discovering of holts, footprints of young animals and possibilities of communication with other populations.

Results

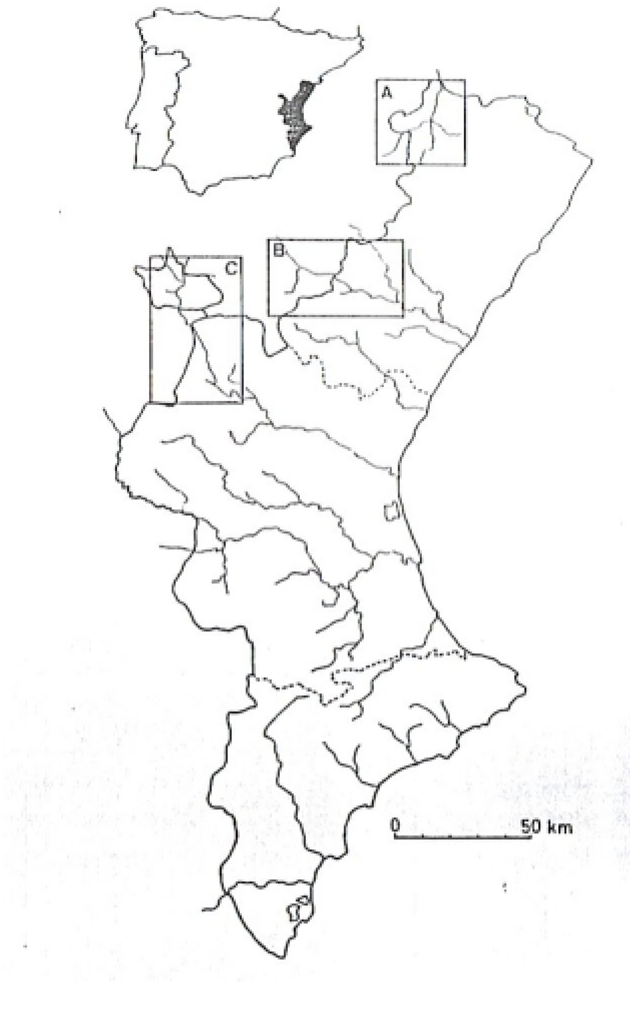

Figure 5: Study Area in Valencia

The otter population in basin A (see figure1) is defined as "good" with high spraint density (mean 21.9/200 m). Signs were found even in stretches with very poor natural conditions and 79.5 km were occupied (91% of the river length studied). Communication with downstream populations was unrestricted.

Population B is defined as "endangered", with low spraint density (4.4/200 m), a lack of signs even in habitat considered as suitable and with 44.2 km occupied, i.e. 34% of the total length studied. Distribution is limited upstream by farm pollution and downstream by water extraction and regulation.

Population C is defined as "vulnerable", also with low spraint density (4.3/200 in), a lack of signs in apparently suitable habitat and with 77.5 km occupied (53% of the river length studied). Communication with upstream population is hampered by urban pollution and is limited downstream by a reservoir.

General conservation measures given include species protection, habitat conservation/restoration, contacts with other authorities/users and education together with proposed studies and continuous monitoring.

For the stretches, 72 concrete conservation measures are given, mostly related to bankside cover (12), pollution (9), water extraction/regulation (9) and conservation of prey populations (7). Otter havens (length 5.5-17 km) are designed to protect the best stretches, totalling 26.9% of the total length used by the species. A minimum flow of 1 m^3/sec should be maintained in the river.

Conservation:

The first result of the study has been the raising of the fine for killing an otter from approximately 150$ to 3,000$, as the species is now regarded as the most endangered mammal of the Valencian fauna and in urgent need of protection.

Concerning habitat conservation/restoration, the authorities who deal with rivers are, on the one hand the Wildlife Service (bankside cover and fauna) and, on the other hand, the Water Authority (bank maintenance water, and river bed). The bankside to a depth of 5m is for public use and the Wildlife Service is urged by law to maintain cover. In the next 4 years it is planned to Improve bank cover along 54 km, mainly on otter rivers, as a pilot experiment in the application of this regulation which, until now, has not been applied.

In addition, negotiations with the Water Authority have begun to consider the length of rivers occupied by otters and especially the designed otter havens as prime conservation stretches where habitat protection should have priority, over other activities. This, together with budgets for restoration, will be included in the Hydrological Plan that is now being developed to serve as a guide to water/river users in the next decade. This plan also includes the consideration of a "minimum ecological flow" for each river that must be respected and that is of critical importance for otter survival in Mediterranean basins, where limited natural resources meet increasing water demands.

REPORT

EUROPEAN RIVER OTTER STUDBOOK

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Between 1981 and 1985 data were collected through two questionnaires. All known otter keepers and breeders were asked for co-operation.

Results:

At the end of 1985 one hundred and five otters were held in captivity at 29 different places in a sex ratio of 44 males to 60 females. The sex of one animal was unknown. Forty percent (i.e. 13 males and 24 females) were wild-born while 50% (26 males, 36 females and one animal of unknown sex) were captive bred.

For details of reproduction, see Table 1. It should be noted that otters have reproduced in captivity before the period 1981-1985 at Great Witchingham, Earsham and Innsbruck. In Table 1 it can be seen that the number of births has increased remarkably as has the number of facilities where otters have bred.

Table 1: Reproduction of Lutra lutra between 1981 and 1985 according to the studbook data

Facility	Litter/Cubs 1981	1982	1983	1984	1985	1981 - 1985	Cubs older than one month
Bayerischer Wald BRD	-	1/0.2	-	1/0.2	1/1.0	3/1.4	2/0.4
Bern CH	-	-	1/0.1	-	1/2.0	2/2.1	1/2.0
Hoyerswerda DDR	-	-	-	1/2.1	1/2.0	2/4.1	1/1.0
Innsbruck A	-	1/1.1	3/5.2.2	-	1/2	5/6.3.4	4/6.3
Koln BRD	-	-	-	1/3	-	1/3	-
Krefeld BRD	-	1/0.2	1/1.3	-	1/2.1	3/3.6	3/3.6
Novosibirsk USSR	-	1/2	2/1.1.2	2/2.2	1/1.0	6/4.3.4	3/3.3
Oderhaus BRD	-	-	-	-	2/1.1	2/1.1	-
Wilmering Vechta BRD	1/1.1	-	2/4.0	2/1.3	2/1.2	7/7.6	5/6.6
Zurich CH	-	-	-	-	1/3.1	1/3.1	1/2.1
Total Litters	1	2	9	7	11	32	20
Total Cubs	1.1	1.5.2	11.7.4	5.8.3	13.5.2	21.26.3+8	23.23

Litters of unknown number of cubs are statistically supposed to be 2

Cubs not surviving the first 30 days accounted for 32% of all cubs born. Litters in which not a single animal survived were 37.5%. Both percentages must be interpreted as rather high.

In summarizing both published and unpublished communications concerning the keeping and breeding of otters in captivity, the following points appear to lead to success:-

- a varied diet with a minimum of two feeds a day;
- unlimited access to dens which are undisturbed, warm enough, dry, dark and not draughty;
- facilities for the absolutely undisturbed rearing of cubs;
- the possibility to separate male and female.

Problems

One of the problems is the purity of the specimens living In zoos and parks. It may be that the question of which individuals are descendants of Lutra lutra barang X Lutra l. lutra crossings (probably produced in Great Britain) will never be answered.

Another problem, connected with the previous one, is the degree of co-operation with the studbook keeper. A studbook is only as informative as the information on which it is based. The co-operation with the majority of river otter keepers is quite good, but there are some keepers not co-operating at all. Amongst them is the first otter breeder in this century and until now the most successful, Philip Wayre, Chairman of the Otter Trust at Earsham and owner and director of the 200 at Great Witchingham. In particular this non-cooperation suppresses investigations into the source of captive-bred English otters which would be of great importance to people planning re-introduction projects and also for zoos and parks breeding otters of this provenence.

A third problem is that too often breeders of river otters are supplying siblings to other facilities, so inbreeding problems can arise.

The fourth problem is unbelievable! There are too many otters bred in captivity and it is very difficult to find qualified places in zoos and parks for keeping all the cubs produced.

The participants at the second conference of "Continental European Zoological Gardens" at Cologne in 1985 decided to establish breeding programmes for extremely threatened species, of which 19 different ones were selected to take part in the "European Programme for Breeding in Favour of Maintenance, EPBM". One of them is the European otter.

SHORT COMMUNICATION

OTTER NEWS FROM DENMARK

Aksel B. MADSEN

Foreningen til Dyrenes Beskyttelse i Danmark, Alhambravej 18, 1826 Frederiksberg C, Denmark

The national survey of otters, which began in November 1984 using the British survey method, was completed in May 1986. In brief, of 1154 sites visited signs of otter were found in on.ly 106 (9.2%), mostly in the north-west region of Jutland.

In continuation of the report "Otters and Fishtraps", all interested fishermen in Denmark can obtain a 'stopgrid' - a rigid square steel 85 mm bar length grid fitted to the inner end of the first fyke funnel - without charge from "PROJECT OTTER". A small publication on 14 Danish hobby fishermen's experiences from the autumn 1986 with this 'stopgrid' is now in preparation. The Ministry of Fishery now orders that all fishermen in one of the best otter areas in Denmark - River Hvidbjerg - must use a 'stopgrid' or a 'stopnet' in the fishtraps. To protect the otter the Ministry of Environment has now declared that the whole water shed of River Hvidbjerg will be preserved.

Investigations of organochlorine concentrations in muscle tissues from 8 Danish otters have been carried out in cooperation with Mats Olsson and Lars Reuthergardh, Sweden. The concentrations of PCB, DDT, dieldrin and HCB are low.

The German video "PROJECT OTTER - inquiries about the life of a threatened species" has been shown on the Danish television, and in this connection a talk about the Danish "PROJECT OTTER" was given.

The Natural History Museum, Aarhus received 11 dead otters In 1986 - 2 were drowned in fishtraps, 4 were killed by traffic and 5 were found dead.

SHORT COMMUNICATION

RESEARCH ON OTTERS, CARRIED OUT AT THE ZOOLOGY DEPARTMENT, UNIVERSITY COLLEGE CORK, IRELAND

Liam O'SULLIVAN

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During the summer of 1984, a broad programme of investigation of otter ecology and feeding biology was undertaken on part of a major river system (Munster Blackwater) in North Cork. In all, 46.8 km of watercourse (including main tributary and feeder streams) and some 90 km of riverbank were surveyed for otter signs. A considerable amount of information was compiled on a variety of study topics including: Habitat structure, resting sites, marking behaviour, minimum number of otters present, the effects of bankside clearance, disturbance and pollution. The feeding biology of otters was determined by spraint analysis and by examination of prey remains in feeding places. A comparison was made of the importance of different prey fjah recorded in the diet of otters, as gained from different dietary analysis techniques.

Full-time research of otters began in September 1985 and is currently based on the River Awbeg system in North Cork (a major tributary of the Munster Blackwater). To date, some 15 months of baseline research has been carried out. Study topics include extensive monitoring of marking behaviour, spraint collection, track size and sighting observations, identification of main habitat features, resting sites, effects of arterial drainage in the upper reaches, electrofishing and otter hunting.

A subsidiary investigation includes a marine habitat as a study area. Another subsidiary investigation involves analysis of mortality causes. It is hoped to continue current research and to extend field work on various aspects of otter ecology, should funding be made available.

OSG MEETING

SECOND WORKING MEETING OF OSG (EUROPEAN SECTION)

The European Section of the Otter Specialist Group held a working meeting at Kaposvar, Hungary in May, 1986. Members from many western European countries attended but unfortunately, despite the location, eastern Europe was represented only by Hungary and Bulgaria.

From the discussions on research and conservation measures carried out so far, it was clear that much more precise information is needed on the habitat requirements of otters. We have little idea of their minimum requirements which makes it difficult to predict the impact of various forms of habitat destruction. Typically, in much of western Europe, otter numbers are low with animals often living in what appears to be sub-optimal habitat and yet we know almost nothing about their behaviour under such conditions. Radio-tracking data are few and such studies have largely been carried out in regions with "good" otter populations. We need information from radio-tracking in a wide variety of habitat types. The delegates in Hungary recognised that this type of study on a low population could pose several problems. It could, for example, prove difficult to catch the animals and there is always the possibility of detrimental disturbance to an already threatened local population. It may be that the number of animals that could be caught and tracked would be too low to provide definitive, useful information. However, since much general conservation effort is now being expended on fragmented populations, efforts should be made to overcome such difficulties.

More information is also required on pollutant levels in otters and delegates agreed that every effort should be made to arrange for analyses of tissues from all available dead otters. We need comparative data on levels of different pollutants, on veterinary post-mortem reports and on histological examinations of tissues. Material from "normal", healthy otters is also required for purposes of comparison.

Mats Olsson from Sweden presented data on the effects of organochlorine (especially PCB) contamination on seals from the Baltic, e.g. sores on the flippers, upturned and elongated nails, erosion of jaw tissues, tumours etc. He strongly implicates PCBs in the declines in otter populations. Significant levels of PCB have been recorded in tissues of some British otters and it was of interest that a few of these animals displayed symptoms apparently similar to those described in Baltic seals. As Olsson pointed out, PCBs are derived from industrial processes but even a small workshop can cause significant contamination of the local waterway.

It was agreed that all otter tissues should, as a matter of course, be analysed for organochlorines, viz. PCBs, dieldrin, lindane and DDTs and for metals. Delegates from Britain and Sweden offered to try to assist countries lacking the facilities for analyses.

International cooperation is essential in this matter. At present, as was pointed out, in some countries (e.g. Eire, Hungary) tissues are available but no analyses are carried out while in others (e.g. Britain) certain agencies perform analyses but choose not to make their results available. We now have some idea of the approximate status of otter populations in different countries and comparative data on pollutant levels are urgently required to further European conservation efforts.

During the meeting in Hungary, one day was spent in the field visiting fish ponds. In some parts of Hungary, judging by the abundance of otter signs, the animals are relatively numerous. It is unusual to-day to find thriving otter populations in lowlands subject to intensive agriculture. In Hungary there is a conflict between conservationists and fishfarmers who claim financial losses due to otter predation. The government agencies issue some licences to kill otters at fish ponds but many more animals are destroyed illegally. This problem is not confined only to Hungary (e.g. also Bulgaria) and it would be valuable to know more about the behaviour of otters at fish ponds. Nothing is known of range sizes of animals living in areas of ponds or of their use of the ponds as opposed to other available water bodies. The true level of predation at fish ponds is unknown. It seems that otters may be more numerous in some series of ponds than in others and while the habitat varies (e.g. some ponds were surrounded by marsh and wet woodland), it may be that illegal killing is, in places, depressing numbers. The Hungarian delegates were urged to initiate radio-tracking programmes which could help to clarify the situation.

Copies of the recommendations made at the meeting are available from either of the co-ordinators of the European Section.

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Postscript:
We have just heard from Geko Spiridonov that *Lutra lutra* has now been given full protection in Bulgaria - even at fish farms where animals were previously killed.

REPORT

ORGANOCHLORINE RESIDUES IN OTTER SPRAINTS FROM HUNGARY

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During the Working Meeting of the European Section of the Otter Specialist Group in Hungary, an opportunity was taken to collect otter spraints for analysis for organochlorines. This was considered of interest because otters have disappeared from much of lowland Europe, but still appeared to thrive in Hungary, where arable agriculture appeared relatively intensive.

A large collection of spraints was made from the ledge of a bridge which was very heavily marked by otters. In the laboratory the collection was divided in four for extraction of fat and analysis by gas-liquid chromatography.

Table 1: **Analysis Results**

	DDE	PCB	Total OC
Mean	7.44	5.48	12.92
Range	1.31 - 12.90	3.42 - 7.78	7.56 - 18.27

Dieldrin and lindane were not detected.

These results can be compared with small samples of spraints analyzed from central Wales and Norfolk, U.K. Central Wales has an otter population which is generally thriving and the mean organochlorine concentration in spraints was 18.2 mg kg-1 lipid, some 1.4 times higher than the mean for Hungary. Dieldrin, DDTs and PCBs were detected. In Norfolk, the otter population is highly endangered, the species being absent from most river catchments. The mean organochlorine load in spraints was 31.8 mg kg-1 lipid, some 2.5 times higher than the mean in Hungary. Lindane, dieldrin, DDTs and PCBs were detected.

These results are based on small samples and are clearly preliminary, but the mean organochlorine load in spraints from the three populations is inversely related to our assessment of the size of these populations, based on spraint numbers. More detailed work in Britain is currently in progress; similar studies in Hungary could prove highly illuminating.

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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.

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