

CONSERVING OTTERS



Institute of Terrestrial Ecology
Natural Environment Research Council

Natural Environment Research Council
Institute of Terrestrial Ecology

CONSERVING OTTERS

Dr. D. Jenkins
Institute of Terrestrial Ecology
Banchory

**INSTITUTE OF TERRESTRIAL ECOLOGY,
78 CRAIGHALL ROAD,
EDINBURGH, EH6 4RQ,
SCOTLAND.**

Printed in Great Britain by
Call Printing Group, Cambridge

©Copyright 1980

Published in 1980 by
Institute of Terrestrial Ecology
68 Hills Road, Cambridge CB2 1LA

ISBN 0 904282 44 9

Cover photograph: Otter (Lutra lutra). Photographed at the Otter Trust by Julian Calder.

The Institute of Terrestrial Ecology (ITE) was established in 1973, from the former Nature Conservancy's research stations and staff, joined later by the Institute of Tree Biology and the Culture Centre of Algae and Protozoa. ITE contributes to and draws upon the collective knowledge of the fourteen sister institutes which make up the ***Natural Environment Research Council***, spanning all the environmental sciences.

The Institute studies the factors determining the structure, composition and processes of land and freshwater systems, and of individual plant and animal species. It is developing a sounder scientific basis for predicting and modelling environmental trends arising from natural or man-made change. The results of this research are available to those responsible for the protection, management and wise use of our natural resources.

Nearly half of ITE's work is research commissioned by customers, such as the Nature Conservancy Council who require information for wildlife conservation, the Forestry Commission and the Department of the Environment. The remainder is fundamental research supported by NERC.

ITE's expertise is widely used by international organisations in overseas projects and programmes of research.

Dr. D. Jenkins
Institute of Terrestrial Ecology
Hill of Brathens
Glassel
Banchory
Kincardineshire AB3 4BY
033 02 (Banchory) 3434

CONSERVING OTTERS

The cause for concern

Recently there has been much publicity about otters. They are mentioned regularly in the daily newspapers, and members of both Houses of Parliament have been concerned with legislation about their protection. This concern was increased by the fact that otters are becoming scarce in most of their range, which formerly extended through much of north and central Europe. From 1 January, 1978, otters were added to the schedule of endangered species and protected in England and Wales. People are also concerned about otters in Scotland where they are not yet protected.



*Plate 1 Benjie and Soay – dog and bitch
European otters used in research at
Aberdeen. Photograph: B Trowbridge*

The otter (Plate 1) is one of the largest carnivores in Britain, only slightly smaller than the badger. Unlike the badger, which is found in a variety of habitats, including woods, moors and gardens, otters are found only near water and seldom tolerate the presence of people. Again, unlike badgers,

which in Britain eat mainly foods such as earthworms which do not concentrate pesticides, otter food consists very largely of fish and other vertebrates, which because they are high in food chains, sometimes contain high levels of some insecticides. The decline of the otter in England and Wales was associated with the use of dieldrin in agriculture and industry. Pesticides like dieldrin get into water systems where they are taken up by fish and may reach high levels in fish-eating carnivores and birds, such as otters, ospreys and herons. The use of dieldrin is now reduced and levels of pollution in English rivers are decreasing. However, there is still great concern as current surveys show that otters are scarce or absent in lowland Scotland as well as further south, and pesticides are thought to be only one of the factors involved in the national decline of this species. Changes in habitat are also involved, together with increased use of rivers for recreation, including canoeing and fishing. There is an increasing tendency to cut down riverside trees to provide space for casting, and, with the increased use of power saws, it is now easy to remove whole trees rather than saw off a few branches by hand.

In these circumstances, conservation measures specifically for otters are increasingly important. Practical steps include the establishment of otter 'havens'. These are stretches of river bank on which landowners agree to prohibit disturbance, and to fell no trees, in order to give otters some areas with maximum seclusion. In the absence of definite facts about otter requirements, provision of seclusion seems to be a sensible thing to do. In these areas, the hunting of mink is also prohibited. Mink hunting has increased elsewhere in order to give sportsmen something to hunt where otters are protected. Other measures which have been proposed include the liberation of otters bred in captivity, in order to re-introduce otters into places where they formerly occurred, but where they are now extremely scarce or extinct.

Otters still occur in many rivers in sparsely inhabited areas, especially Scotland and Ireland, but their chief haunts in Europe are rocky sea coasts in north and west Scotland and Ireland, and in Norway. They are scarce on coasts in the east and south-west of Scotland. The north-west coasts are now the best places to study otters to learn about their behaviour, food and use of habitat, so that havens can be developed scientifically, and re-introduction of otters can be done with a maximum chance of success. However, even in the north-west, otters are not secure, as recent experience at the oil terminal at Sullom Voe in Shetland has shown that otters are extremely vulnerable to oil on the sea. About 20 otters were killed when a relatively small quantity of oil escaped from an oil tanker. Otters are clearly at risk in their marine habitat as well as on rivers and marshes.

Research is now necessary to find the parts of the sea-coasts that are suitable for otters, where protection measures may be particularly important. For conservation, whether protection, re-introduction, or management of habitat, a basic knowledge of the otter's ecology and behaviour is required, and at present, we do not have this information.

Research by the Institute of Terrestrial Ecology

Work was begun in January 1975 from the Banchory research station on two lochs, Kinord and Davan, near the River Dee in Aberdeenshire (Plate 2). The study area was extended to include part of the Dee in 1977 and this first project came to an end in January 1979. Measurements of footprints and following tracks, particularly in snow, were useful techniques (Plates 3, 4, 6 and 7) to show the presence of young otters. In Deeside, otters were thought to have their young in woods and similar quiet places far up small tributaries, and to bring them to the lochs or the big river when they became mobile at 3-4 months old. Three different habitats were identified for inclusion within otter havens: secluded small tributaries and steep banks, with low risks from flooding, as breeding areas; wooded islands, quiet tributary mouths and reedy lochs, as rearing places; and long wooded stretches of river, as habitat for non-breeding animals. During this initial research, some preliminary observations were also made at the sea coast near Applecross in Wester Ross, and on coastal otters at Ardnish in Inverness-shire. Finance is now being sought for a second phase of the research to identify important coastal habitats which can be protected in order to conserve marine otters in this remaining stronghold of their range.

Movements of a marked animal

An identifiable otter cub stayed at the lochs near where it was born until it was about eight months old. It then extended its range to include part of the River Dee, gradually moving further and further afield, but returning daily to the lochs until it was 11 months old. At this time, it covered at least 55km of the river. It was finally recorded when 12 months old at a place about 68km from the furthest known point of its previous range.

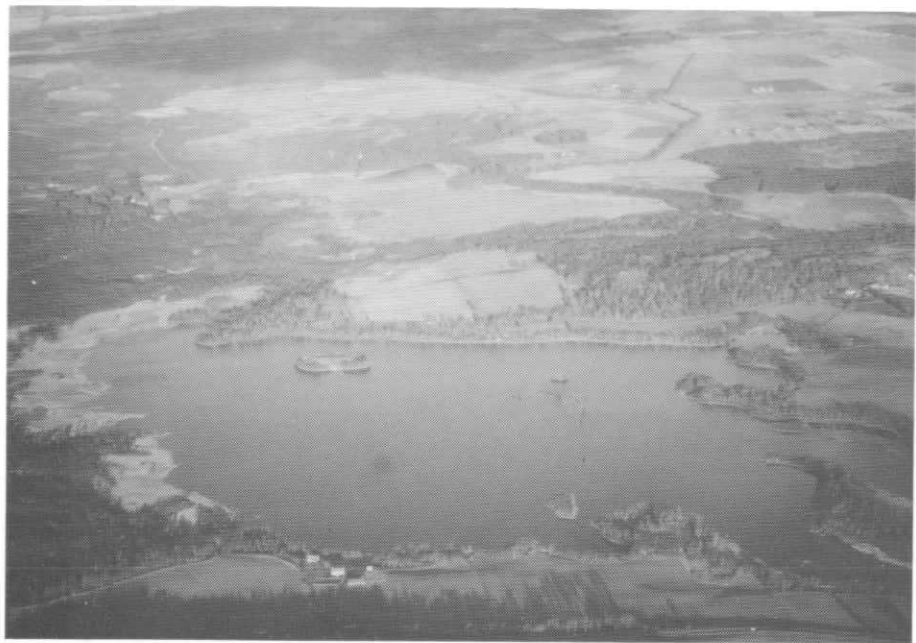
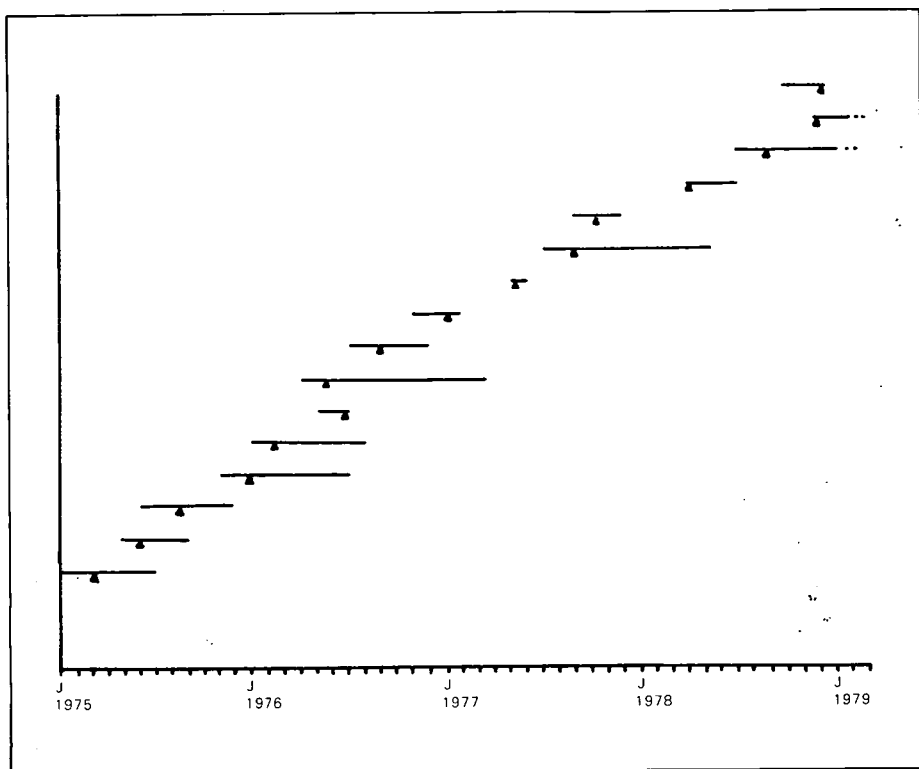


Plate 2 Lochs Kinord and Davan (the "Dinnet lochs"). Photograph: D Jenkins



Plate 3 Reedbeds at Loch Davan, Aberdeenshire. This is an important habitat for otters. Photograph: D Jenkins



*Figure 1 Bar diagram showing otter families recorded at the Dinnet lochs from January 1975 to February 1979. The length of the bar shows the supposed duration of the otters stay at the lochs, and the arrowhead when they were first seen. Reproduced by kind permission of the editor, *Journal of Animal Ecology*.*

Breeding at the Aberdeenshire study area

At the two lochs, the four years from November 1974 consisted of a good period for breeding in the first two years and a poorer period in the next two (Fig. 1). Altogether about 17 young otters were produced from 16 families, with about nine young reared in the first twenty months, and about eight more young in the next 30 months. The mean numbers reared per family in the two periods were 1.5 and 0.8. In the first period, young born in autumn survived and new babies were found in early spring. In the second period, young born in autumn disappeared and no new young were found each year until mid-summer. On the River Dee, breeding was studied only in 1977 and 1978. Approximately monthly visits to a 26km stretch of the river suggested that there were 11 otter families in five main sites in this period. Four of these families may also have been recorded at the lochs.

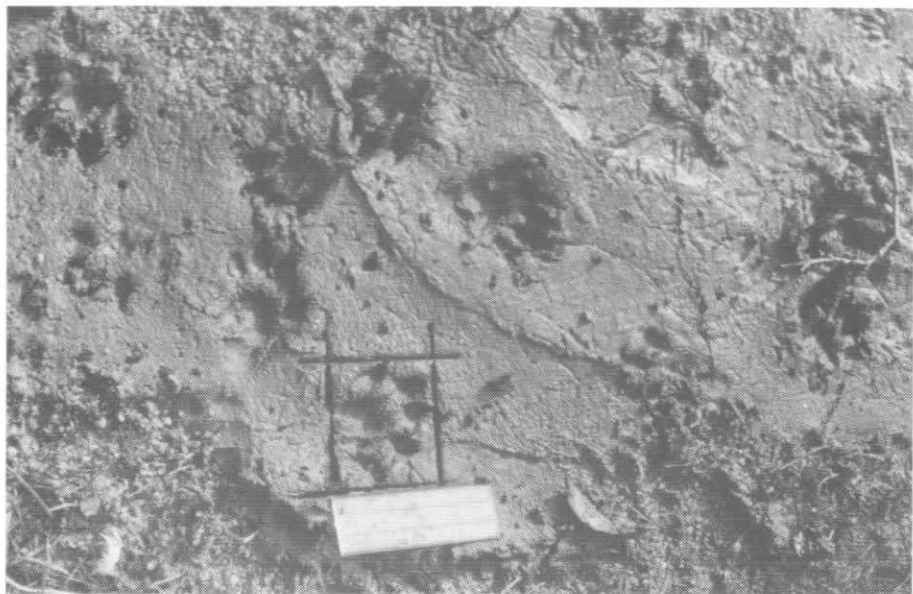


Plate 4 Measuring footprints. Photograph: D. Jenkins



Plate 5 Otter couch at River Tanar, Aberdeenshire. Photograph: R J Harper

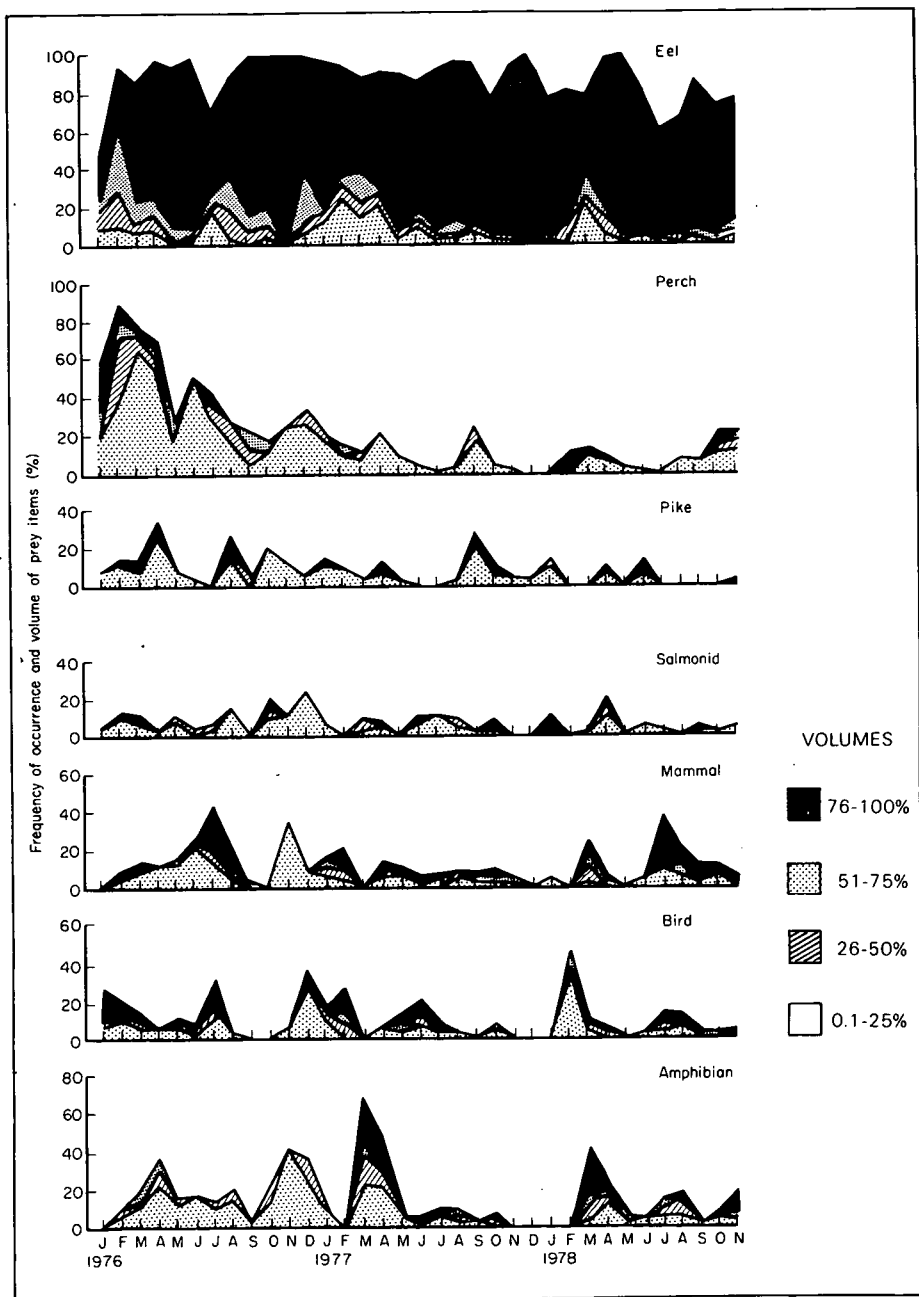


Figure 2 Frequency of occurrence of food remains in otter spraints from the Dinnet lochs. Reproduced by kind permission of the editor, *Journal of Animal Ecology*.

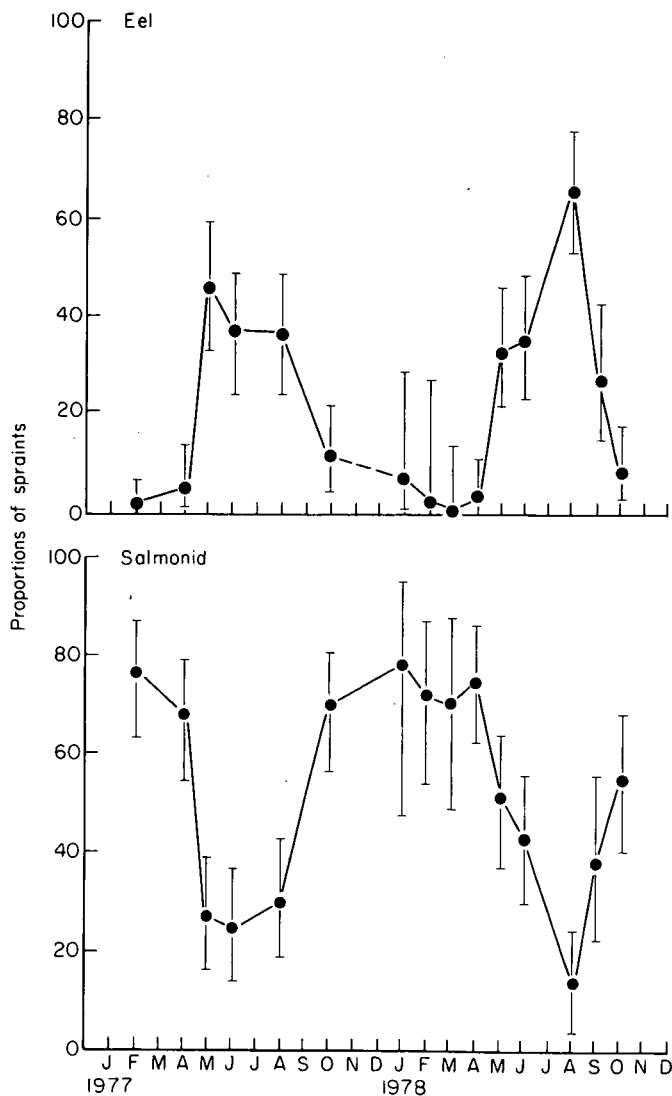


Figure 3 Proportions of spraints from the River Dee in which the volume of eel and salmonid remains were more than 75 per cent. Reproduced by kind permission of the editor, *Journal of Animal Ecology*.

Otter food at the lochs and the River Dee

At the lochs, the otters were extremely efficient hunters. They caught a prey item on 65 per cent of 114 observed hunts, taking 4.9 minutes on average to catch something. At the lochs, eels were the main food, especially in early winter and spring. Mammal (mostly rabbit) and bird remains were most frequent in their faeces during winter and mid-summer, and amphibia in early spring (Fig. 2). In faeces samples from the River Dee, there was a different seasonal pattern in the amount of eel present (Fig. 3). This amount was low in winter and high in summer, in inverse proportion to salmonid remains. Eels and salmonids were the principal foods, with other items relatively unimportant. Most eels taken were in the size range 23-32cm, and 98 per cent of salmonids were smaller than 13cm, weighing less than 125gm. Very few larger salmonids were taken, and it is clear that the otters were not having any important effect on fish of commercial size. Similar food items were eaten in different years, so that the changes in otter breeding success could not be attributed to changes in diet.

Distribution of otter faeces

Information on the ways in which otters use their habitat comes from the distribution of their droppings. A very high concentration was found in a reed-bed at Loch Davan, with more here than at most places on the sea-coast. However, on the lochs, the density of droppings varied. The density was more stable, though much lower, on the river. On the River Dee, more droppings were found at some places than at others, and there was a significant correlation between higher densities of droppings and the presence of woodland on the bank. There was a correlation not only with the presence of scattered trees on the bank, but also with the presence of thick woodland. Otters also frequented woods near the lochs. From these results, lakes with reed-beds and/or stretches of river banks with woods should be included in otter havens. Fig. 4 shows a good place for otters on the River Dee.

Otters at the coast

So far, work with coastal otters is preliminary, but coastal habitats are the only ones where regularly occupied otter holts have been found. At both places studied, occupied holts were about 1 km apart, and Fig. 5 shows the distribution of holts at one of them. At both places, these holts were regularly spaced, so that the otters may have been territorial. First ideas are that otters are commonest on rocky coasts with gently shelving shores and where *Laminaria* sea-weed is common. In the Outer Hebrides, most holts are on tiny offshore islands rarely visited by people. Much more work is required on coastal otters to find, for example, where they live in places where there are no islands, and which parts of the coast are preferred.

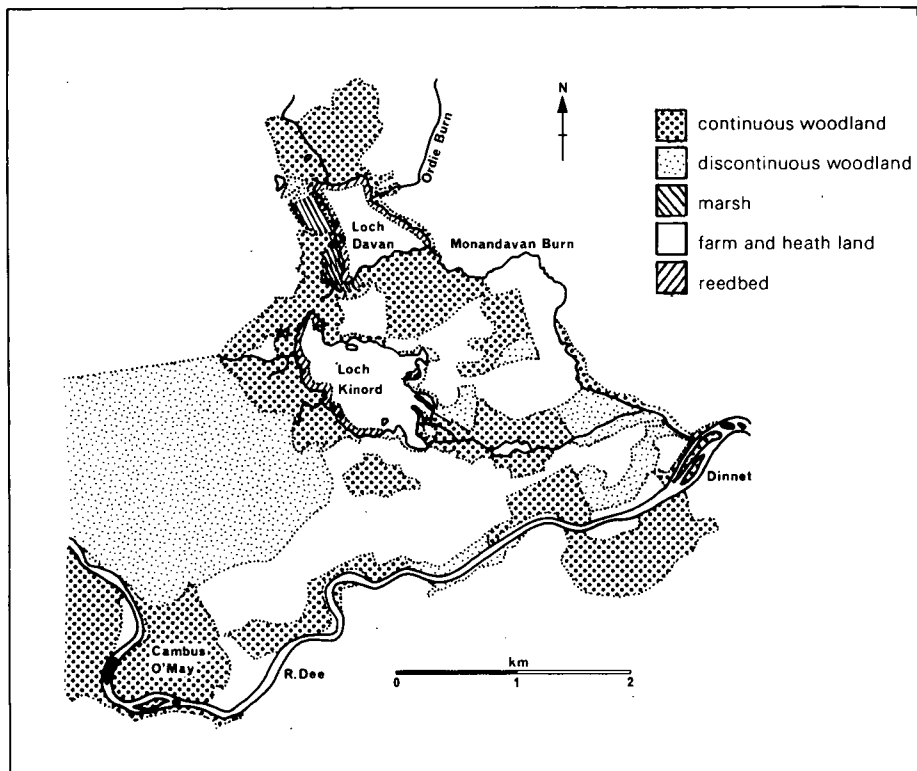


Figure 4 Part of the study area on the River Dee. The lochs are on a National Nature Reserve, but the breeding places may be up small tributaries off the Reserve. The stretch of river at Cambus is much used by otters and is suitable for an otter haven supplementing the Reserve. Reproduced by kind permission of the editor, *Journal of Animal Ecology*.

Main conclusions so far

Previous work in Sweden showed that otters there are seasonal breeders, with young born in summer and families staying together for about a year. The otters were thought to be territorial, females with young occupying exclusive ranges, but males sometimes having two females within their territory. Transient, non-breeding otters also passed through these territories. Our work in Scotland shows that, while this pattern sometimes occurs, otter behaviour and social organization are flexible. In some years, the animals' activities followed the Swedish pattern, but in other years, two or more families used the same loch at the same time. The Swedish pattern corresponded to the "poor" low density years, while another quite different pattern occurred in the "good" years, resulting in high density. This second pattern may be more typical of southern habitats.

At low density, there was only one family which stayed for about a year and which was usually nocturnal. At high density, there were long periods when up to three or even more females, and also other single animals, used both the lochs, and sometimes two or more families occurred on the same loch together. In this period, families stayed in the rearing area for about seven months. They were sometimes diurnal, sometimes nocturnal. Occasionally, families combined and played by day, but families present at the same time tended to use different areas.

What was the cause of the difference between the two sets of years? It seems most likely to be associated with differences in feeding, or in food availability. Analysis of faeces shows that much the same items were eaten each year, but there may be marked differences in their availability. Neither the abundance, nor the availability, of fish were studied, nor has any work yet been done on the hunting behaviour of otters. However, there were obvious differences between the two periods which probably affected otter food. The first two winters were mild with little ice on the lochs. Then, the otters had easy access to fishing grounds at all times. In the second two winters and in early 1979, in contrast, the lochs were mostly frozen for several weeks from November onwards. The only places providing access to water were small unfrozen openings at the mouths of the few tributary



Plate 6 Otter path at loch edge, a good place for recording footprints. Photograph: D Jenkins.

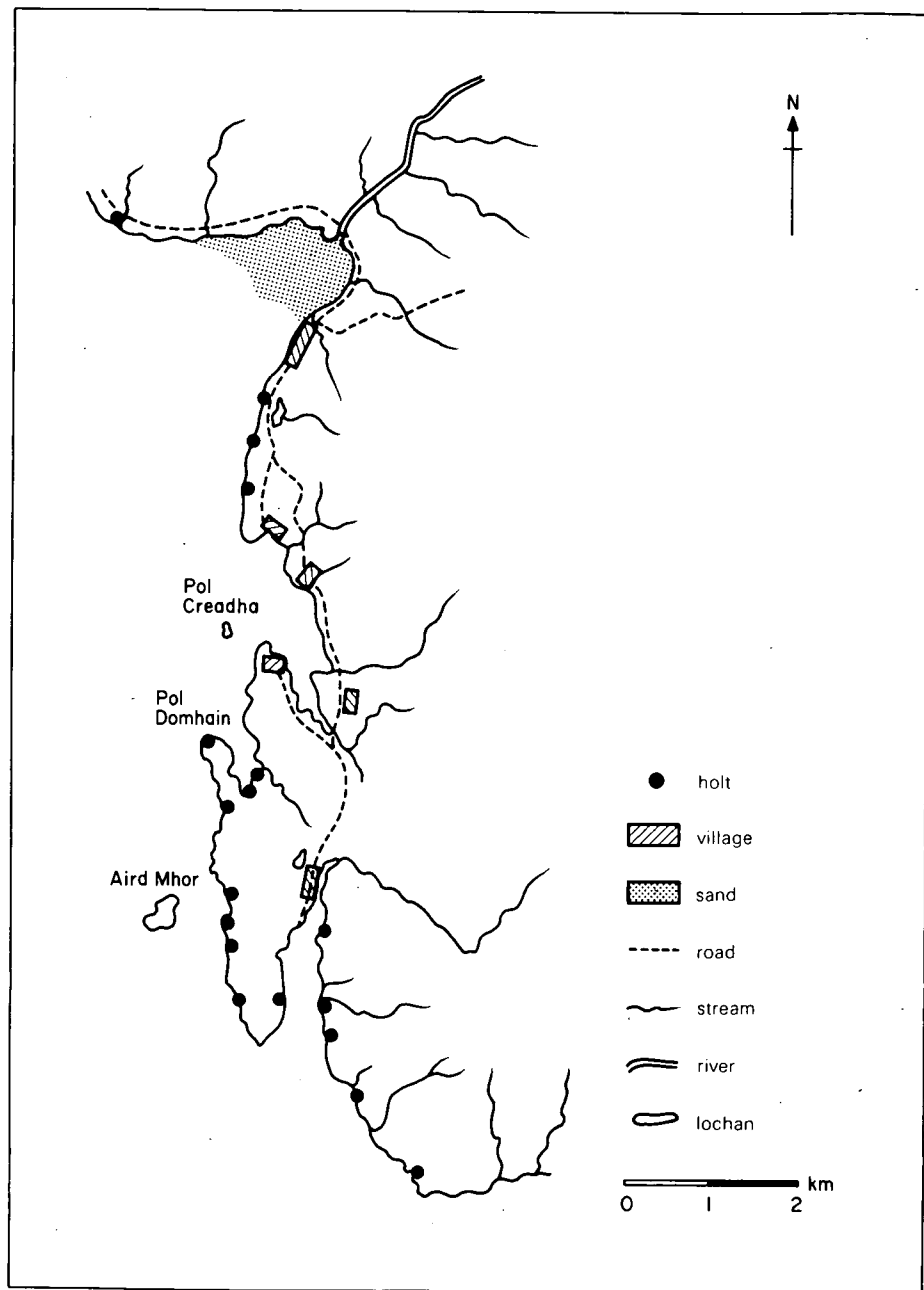


Figure 5 *Distribution of otter holts on a stretch of coast in west Scotland. Reproduced by kind permission of the editor, Journal of Animal Ecology.*



Plate 7 Otter track in snow. Photograph: R. J. Harper

streams. Footprints in the snow showed that otters visited all the patches of open water every night. Thus, whereas in the first two years there was unlikely to be any competition for places at which fishing was possible, fishing places in the second period were scarce and much used, and competition is likely to have been severe. It seems likely that such competition should lead to the exclusion, perhaps death, of sub-dominant individuals, including families with small young, and also to no pregnancies occurring over winter. The idea, therefore, is that the Swedish pattern of breeding occurs in situations where access to food is limited and competition is severe, while the "southern" pattern occurs in more open winters when access to food is easier. Work in more years is required to find if predictions based on these ideas are supported by future events.

Other studies

Staff at the Institute have been collaborating closely with colleagues in the University of Aberdeen in tackling problems involved with communication between individuals of carnivore species, including otters. Otters are believed to use their droppings as signals of their presence. Instead of, or as well as, depositing large amounts of faeces, they leave very small amounts (0.5ml or less) of anal secretion at characteristic places, such as on

boulders in streams, grass tussocks or tree roots. These small deposits have a pronounced scent and it is thought that they are used as signals between the animals. Work has begun on analysis of some of the components of these anal secretions and on the behaviour of captive otters in relation to these marking sites. This work may help in discovering the ways in which otters use their habitat.

Outstanding problems

So far, research has only scratched the surface of problems in otter ecology. This is because it is such a difficult species to study. As pollution and disturbance of rivers in mainland Britain decrease, there may be a wish to re-introduce the otter to suitable habitats. But what is a suitable habitat? How many otters should be released, and at what distances? Is their food likely to be adequate? In mainland Scotland, and the few other parts of Britain where otters remain, what positive steps can be taken to conserve them? In the north and west, where are otters at risk? What marine habitats are best for otters? What is a normal population, and what is the effect on otter numbers of constructions (e.g. oil terminals), recreation or other developments?

All these problems are concerned with conservation. Britain has a responsibility to conserve the otter, as this is one of its last remaining strongholds. ITE has begun the necessary research and has the expertise to continue. We need to obtain a basic understanding of the relation between otters and their environment. The work to be done will include surveys of distribution, studies of social behaviour (e.g. under what circumstances are they territorial?), food and feeding behaviour, supplemented by detailed fundamental work on the ways otters communicate with each other. A long-term study in several habitats is envisaged, starting in the marine environment where otters are commonest, and returning to freshwater when a better understanding of the species' social organization and dispersion mechanisms has been achieved.

ISBN 0 904282 44 9

Price £1.00 net