

CAPTIVE BREEDING



THE WATER SHREW *Neomys fodiens*

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Captive Breeding of the Water Shrew *Neomys fodiens*

Introduction

The water shrew *Neomys fodiens* is a native British mammal which is rarely seen due to its elusive nature. Although very little is known about this species, the water shrew is thought to be widely distributed. The species has been selected as a priority species for conservation action by the Environment Agency. The water shrew is one of Britain's least-studied mammals.

Current Status

Water shrews are thought to be widespread throughout mainland Britain, widely distributed in England, relatively abundant in Wales and absent from Ireland and parts of northern and western Scotland. They are present on many of the larger islands including Anglesey, Arran, Skye, Mull and the Isle of Wight.



Water shrew

The population estimate for the UK is 1,900,000 individuals; 300,000 in Wales, 400,000 in Scotland and the remaining 1,200,000 in England. Populations are patchily distributed and often occur only for short periods of time. Water shrews are generally found along the banks of clear, fast-flowing freshwater rivers and streams and also ponds, reedbeds and fens. Habitat choice is probably influenced by water depth, velocity, suitable cover as well as



Water shrew by bankside vegetation

prey availability and accessibility¹. They have been found quite considerable distances away from water in woodlands and hedgerows but this is believed to be young shrews dispersing.

In favoured sites such as water-cress beds, a maximum density of 3-5 shrews per hectare have been recorded. This is a low population density compared to other small mammals such as common and pygmy shrews. Sites need to be at least one hectare in area; large enough to support a viable population in an optimal habitat. Suitable sites should be part of a more continuous habitat which provides a dispersal route for immigrants from nearby areas¹.



Water shrew diving

Legal Status

Water shrews are protected under Schedule 6 of the Wildlife and Countryside Act (1981). This offers partial protection, whereby they may not be trapped deliberately unless under licence. Their priority status places them on the IUCN Red List of Threatened Species, under the category of least concern.

Water shrews are not a UK Biodiversity Action Plan Priority Species but are included in some Local Biodiversity Action Plans. Water shrews are also protected by the Wild Mammals Protection Act, 1996, as well as the Bern Convention Appendix III.



Reasons for Decline

Predation

The main predators of water shrews are tawny owls and barn owls. However, kestrels, foxes, mustelids, cats and predatory fish such as pike will also take them. Their strong scent makes them unpalatable to most mammalian predators who kill but rarely eat them. A decrease in vegetation cover can make shrews more vulnerable to predation².

Pesticides and Pollution

Water shrews are particularly susceptible to pesticides and pollution. They have a high metabolic rate so it is believed that they may accumulate pesticides to a greater degree than other small mammals³. Freshwater habitats can be highly polluted. Pollutants can be ingested directly from the fur during grooming, which maintains the quality of the coat following swimming. Indirect effects of pollution may include reducing the diversity, abundance and quality of aquatic prey.

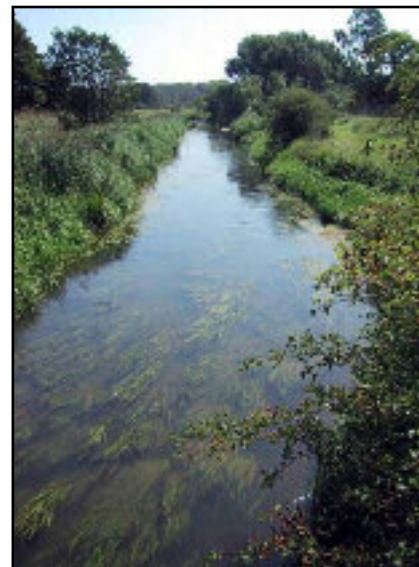
Habitat Loss

Another probable reason for decline is habitat loss. Clearance and redistribution of earth during drainage works creates uniformly inclined banks which slope steeply into water and are devoid of vegetation¹. These are not suitable for water shrews. Water shrews can tolerate a great deal of disturbance from human presence but river-bank clearance and

drainage schemes may adversely affect them by reducing their food supplies, altering the water supply and destroying their burrows and the vegetation cover⁴.

Scarce herbaceous vegetation and a bank of low incline have a significant negative effect on water shrew presence⁵. Bank management can damage burrows, which affects foraging and diving and can result in reduced prey availability². A study in Kent showed that short grass had a negative affect on the presence of water shrews, although aquatic prey and bank management played predominant roles in deciding whether shrews were present at a site².

The water shrew is more habitat specific than the common shrew, which occupies and thrives in diverse habitats¹. A study in the Weald of south-east England showed that water shrews were absent from the river catchment with the lowest quality water and where trees were not present⁵.



Suitable water shrew habitat

General Ecology

Water shrews are mostly solitary, with short alternate periods of activity and sleep at regular intervals, both day and night. Their head and body length is 63-96cm with a further 47-82cm for the tail. Weight is between 8g and 23g. Their diet consists mainly of aquatic crustaceans and insect larvae as well as terrestrial beetles, molluscs, worms and occasionally fish and amphibians. Shrews have a very energetic lifestyle and therefore high food requirements. On a daily basis they must consume at least half their body weight in food to keep up with their extremely fast metabolism. Shrews can kill animals larger than themselves due to mild toxic venom which is present in the saliva, helping to stun the prey whilst it is killed. Water shrews can dive up to 75cm or more in still water, but can only remain submerged for a few seconds as air trapped in their dense coat makes their bodies very buoyant⁶.

The mating season is between April and September, and water shrews usually produce two litters per year. Litter size is usually six, but can range from 3-15 offspring in a single litter. Young are weaned at 27-28 days but remain with their mother until they are 40 days old. Sexual maturity is reached in the second year. Their lifespan in the wild is 14-19 months but they can live up to four years in captivity.



Captive Breeding

Suitable housing

Water shrews at Wildwood are housed in glass tanks which are 64 x 33 x 40cm in size. These tanks are covered by a lid with a 1.5cm² mesh size; this is a suitable size to prevent any young shrews from escaping.



Internal design of a water shrew tank

The bottom of the tank is lined with sawdust and soil for burrowing. Straw is provided for nest building. Small tubes are also provided to allow cover, as if the shrews were burrowing into a bankside habitat. A large bowl of water is provided at the front of the tank for swimming, with pebbles to enable the shrews to climb in and out.



Water shrew tanks housed indoors

Breeding

Water shrews are solitary in the wild and due to their territorial behaviour are not kept together all year. They are paired up for breeding in the spring. A single pair comprising two different bloodlines is put together in a large breeding tank to maximise the bloodlines produced.



Young water shrews in the nest

In captivity, a maximum of two litters are produced by a single water shrew in a season. When the young have been born, the male should be removed from the breeding tank as he can show aggression towards his offspring. When the young are weaned and independent they are moved into a separate tank where groups of siblings can be kept together. The male should remain with the female no later than autumn.

Food allocation

Each water shrew should be allocated a substantial amount of food in relation to their body size, as they require a constant food supply. Approximately two tablespoons of Pedigree Chum dog food are placed in a small plastic lid. On alternate days four large crickets or half a tablespoon of mealworms are also provided. Once a week, whitebait can be substituted in place of crickets or mealworms and casters (blowfly larvae) can also be provided when available. Once a week, a small pinch of Prosecto insectivore mix is sprinkled over the food.



Water shrews feed on small freshwater crustaceans

In the wild, a large proportion of the water shrew's diet consists of insects; their teeth wear down quickly, despite the distinctive red tips on the teeth which are believed to provide thicker enamel. In captivity, as they are fed a lot of soft foods as well as insects, their teeth may not wear down as fast and this may increase their longevity.



Monitoring

At present there are no reintroduction programmes for water shrews. However, wild populations are being monitored in order to make suitable habitat management recommendations. A volunteer based survey was carried out between April 2004 and September 2005 by the Mammal Society to determine the nationwide distribution and habitat occurrence of the water shrew⁷. Evidence of water shrews was seen at 17.4% of the sites, with more individuals being recorded during the summer survey seasons. Until the population size of water shrews in Britain can be determined it is not possible to fully assess their conservation needs⁷. Water shrews were found to be widely distributed around mainland Britain. Their occurrence on a local scale may be affected by poor water quality and loss of or degradation of the riparian habitat⁷. Future research should include looking at population size, geographical occurrence and prey availability.

Live trapping of water shrews is difficult, not only due to their low population densities, but because a licence is required to trap this species. Water shrews have a high probability of dying whilst in traps, due to stress and their high food requirements. 'Bait tubes' are often used in their place. These are lengths of white plastic waste pipe with open ends baited. These are left without disturbance for about two weeks on the banks of water courses, during which time shrews will enter the tubes, feed on the bait and deposit faeces. Water shrew faeces can be differentiated from other species of shrew due to fragments of aquatic prey. Droppings contain small, shiny fragments of exoskeleton which will not be present in other small mammal faeces.

Field signs can aid in the monitoring process and they are best looked for in summer, when population numbers are at their highest. Field signs include observing burrows, prey remains, footprints and hair which can be collected using sticky traps. Water shrews can be identified by a high-pitched audible squeak, most often heard in the summer months¹.

The main aim of the Mammal Society's Survey

was to increase knowledge of water shrew distribution, with the ultimate aim of establishing a monitoring scheme for this species. Further aims included establishing habitat requirements and preferences of water shrews with the intention of producing habitat management guidelines and producing a database of records to assess the conservation needs of the species⁸. When carrying out a water shrew survey, there are many criteria which need to be recorded. The grid reference weather conditions, habitat, bank type, adjacent land, bank profile, water depth, substrate, width and speed of the water course, bank management, human use, pollution, aquatic and bankside vegetation are all required. Field signs of water shrews include burrows, prey remains, droppings, number of sightings and their activity at the time. Field signs of other mammals (mainly riparian mammals), reptiles, amphibians and wetland birds are also recorded.

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