



How to do a water shrew survey

The water shrew (*Neomys fodiens*)

There are three species of shrew native to the British mainland: Water shrew (*Neomys fodiens*), Common shrew (*Sorex araneus*) and Pygmy shrew (*Sorex minutus*). *Neomys fodiens* (the European water shrew) is the largest of the British shrews.

Water shrew identification

- Water shrews are semi-aquatic and use water for essential elements of their survival – in this case, feeding.
- Adult water shrews reach around 15cm in length (Head/body: 67-96mm: Tail: 45-77mm (Churchfield, 1986).
- Unlike the other two shrews, the tail is almost as long as the body.
- Water shrews can weigh between 8 - 23g with an average of 12 – 18g. Pygmy and common shrews generally weigh less than 12g (Macdonald and Barrett, 1993; Perrow & Jowitt, 2003).
- Water shrews have velvety, black dorsal (back) fur and pale, silvery white ventral (stomach) fur.
- The fur is denser than in other shrews, efficiently insulating them against cold and wet.
- They have hidden ears visible as tufts of white hairs, that they can close under water (Macdonald and Barrett, 1993).
- They have red tipped teeth and their saliva is slightly venomous and is used to stun larger prey.
- The feet have a fringe of stiff, silvery hairs which help them to swim, and the tail has a hairy 'keel' on the ventral surface (Carter & Churchfield, 2006).
- They possess sensitive, mobile whiskers which they use to detect prey whilst swimming. (Churchfield, 1986).

Water shrew © G Kinns



Water shrew – UK distribution

Water shrews are widespread and have been recorded throughout Britain, except for some parts of Northern Scotland. Water shrew distribution however, tends to be localised and sporadic (Harris *et al.* 1995). In 2003, the Mammal Society commenced a nationwide water shrew survey. (See Mammal Society website for details).

Why survey for water shrews?

Despite the UK water shrew survey, relatively little is known about water shrew habitat and food preferences. In Sussex, prior to 2003, only 71 sightings of water shrew had been recorded at the Sussex Biodiversity Record Centre (www.sxbrc.org.uk). Recent surveys have significantly increased the amount of data but there are still huge data gaps within the county and a serious lack in the quality and continuity of data. There are concerns that habitat loss and pollution is affecting water shrews at a local level but they are assumed to be locally frequent and common. With your help we can learn more about where water shrews live in Sussex and how they are affected by changes in wetlands.

When to survey for water shrews

- In summer (June – August) population densities are highest and their presence/absence should be easiest to establish.
- In winter (Nov - Jan) density/activity is lower, and water shrews are more likely to inhabit optimum sites.
- Several authors have observed that water shrews are scarce during the Jan - March period (inc. Churchfield, 1984)
- In Sussex, Southgate *et al* (2006) and Scott *et al* (2005) observed higher success with shrew tubes during winter. This may be because Sussex tends to experience dry summers, and shrew tubes provide an easy food source in winter.

What is the recommended method of surveying for water shrews?

Water shrews are elusive, difficult to trap and often leave little evidence of their presence (Churchfield *et al*; 2000). Trapping is also not recommended as the high metabolism of shrews makes them extremely vulnerable to starvation, cold, wet and shock when in traps. Trapping for shrews also requires a licence from Natural England (www.naturalengland.org.uk) and traps need to be checked every few hours.

The bait tube method makes use of the fact that shrews will usually investigate novel objects and defecate on them to mark them territorially. They are non-invasive and do not cause stress to the animals. Their high metabolism also means that they defecate whilst eating the bait in the tubes. Water shrew scats can then be analysed under a microscope as they show distinctive signs of the aquatic invertebrates that water shrews eat. Bait tubes can't tell you how many individuals are on a site, but are a good way of establishing water shrew presence/absence.

Limitations of bait tubes

Where no scats are found in a tube, water shrews are assumed to be absent but this may not be the case. It is also rare to detect water shrew presence away from water, even though water shrews wander frequently away from water.



Reed © S McIntyre. A likely habitat to find water shrews.

Likely locations to find water shrews

- Research has shown that water shrews like sites with high reed cover and a good plant litter layer, tussocky sedges or grasses, good water quality, water less than 2m deep and a high diversity of aquatic invertebrates.
- Water shrews appear to be absent from places with extensive tree cover/leaf litter, bracken, high water temperatures, intensive grazing/bankside vegetation cutting, and highly fluctuating water levels.
- They have been found on ponds, lakes, reservoirs, rivers, streams, ditches, canals, vegetated shingle and (rarely) heathland (Southgate & Scott '06).

How to make and place bait tubes

- Cut 40 mm diameter white plastic pipe (available from plumbing centres and DIY stores) into 160 - 200 mm lengths to accommodate water shrew's body and tail.
- Bait tubes with blow fly pupae/casters (*Calliphora vomitoria*) available from fishing tackle shops. Casters can be frozen where necessary.
- Place approximately 10-20 casters per tube in the centre of the tube.
- Place a small square of muslin over one end of the tube and hold in place with an elastic band. This encourages shrews to enter the tube fully and leave scats during incidental feeding, although occasionally they eat through the muslin end of the tube to obtain casters.
- Some water shrews leave scats on the top of tubes, be aware of this when collecting tubes.
- Place ten bait tubes at approximately 10m intervals along a 100m transect at each survey site.
- Place tubes roughly within 2m of the water's edge unless the site floods regularly (look for tide/brash marks).
- Place tubes level and flush with the ground at both ends, and adjacent to small mammal runs where possible.
- Place tubes within/under vegetation, or cover them with grass or leaves if site is open and tubes are exposed.
- For ease of collection, number each tube with an individual code in permanent marker pen.
- Tubes are easily lost in vegetation so mark tube location with coloured tape/string to ensure ease of collection (make sure you remove markers when you collect tubes).
- Leave tubes in situ for 10 - 14 days.
- Separate each survey site by 300m (pref. 500m) to ensure they are not being used by the same shrew.
- Make sure you have permission from landowners and site managers, that you have carried out an appropriate risk assessment and that if working by water you adhere to good health and safety codes of practice.



Water shrew tube in situ

Collecting shrew tubes

- Place each collected tube in an individual plastic bag showing date, site code and tube number (if not on tubes)
- Leave scats to air dry in open bags

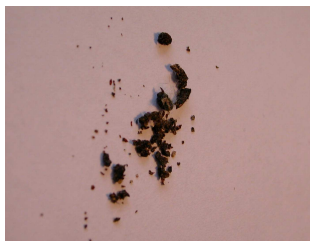
- When dry, scrape contents of each tube into a separate petri dish or similar, marked with site code, tube number and date
- Remove any obvious pieces of 'debris' (leaves, mud, snail shells) with tweezers, making sure that no scats are attached to them
- Scats are ready for analysis using a binocular microscope (G10X22 x 4 magnification)

Scat analysis

Water shrew scats are a similar size to rodent & common shrew scats. Look out for the following differences:-

- Rodent scat becomes very hard when it is dry and cannot be crushed easily
- Rodent scat is usually black/dark and smooth, and tends to be obviously pointed at one end
- Common shrew and water shrew scats will crumble when pressed and have a much rougher texture than rodent scat
- Common shrew scats are often browner than water shrew scats and contain remains of earthworm, spider and beetle
- Water shrew scats tend to be silvery due to the presence of aquatic invertebrates in their diet
- Water shrew scats are often bigger than common shrew
- You will probably find a lot of snail faeces (long, thin and wavy!)
- Discard any scats which are obviously not water shrew (but make sure you record it as a negative result)
- Scats which are not obviously water shrew can be wetted with a drop of water and broken up to expose prey fragments for further analysis under a microscope (See Carter and Churchfield, 2006 for prey remain identification)

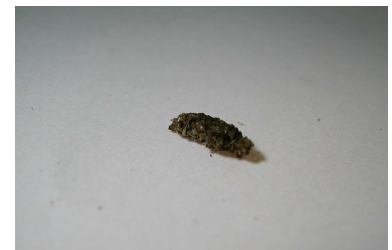
Picture of small mammal scats



a) Common shrew scat



b) Rodent scat



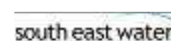
c) Water shrew scat

- To ensure consistency, all samples should be cross checked by one other person where possible.
- It is sufficient to record presence/absence of water shrews at a site. Any additional information is however useful. i.e. veg type/coverage, dimensions of watercourse, depth of water, presence of other species such as mink etc).
- Send all data to Sussex Biodiversity Record Centre to update the County records.

References

Carter and Churchfield. 2006.
 Churchfield. S. 1984 and 1986.
 Churchfield et al. 2000.
 Harris et al. 1985.

McDonald & Barrett. 1993.
 Perrow & Jowitt. 2003.
 Scott et al. 2005.
 Southgate & Scott. 2006.



SORP promotes the sustainable management of Sussex river catchments and landscapes, and the restoration of wetlands for people and wildlife. SORP is a partnership between Sussex Wildlife Trust, South East Water, Environment Agency and Southern Water Services