The use of floating rafts to detect and trap American mink *Mustela vison* for the conservation of water voles *Arvicola terrestris* along the River Wensum in Norfolk, England

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SUMMARY

Mink rafts positioned along stretches of the River Wensum proved very successful in terms of American mink *Mustela vison* detection and trapping effectiveness. Survey results indicated that there has been an expansion in the range of water voles *Arvicola terrestris* along the river from 2003 to 2005, perhaps in response to the removal of American mink.

BACKGROUND

The water vole *Arvicola terrestris* is found throughout most of England and Wales. It was once a common and widespread species but they have suffered a significant decline in numbers and distribution over the last twenty or so years. A national survey (conducted by the Vincent Wildlife Trust) in 1989-90 failed to find signs of voles in 53% of sites where they were previously recorded and eight years later, 70% of those remaining sites showed no signs. In terms of water vole numbers, this equates to an 88% decline in numbers in eight years (from 7.29 million to 0.87 million). The latest estimates based on local surveys suggest that there are now less than 250,000 water voles, which represents a 97% loss since 1990. It is the fastest declining mammal in Britain.

The distribution of water voles is now discontinuous and existing sites have become isolated and vulnerable. As a result, the water vole has received legal protection in the UK through its inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 since April 1998. Reasons for water vole declines include: loss and fragmentation of habitats; disturbance of riparian habitats; pollution of watercourses; accidental poisoning by rodenticides; and predation by introduced American mink *Mustela vison.* This case study assesses the impact of mink control (using a combination of conventional bank trapping and the Game Conservancy Trust mink raft to detect and trap mink) on water vole numbers in a river in eastern England.

ACTION

Study site: The study area encompassed the River Wensum (designated a special area of conservation) and its tributaries (52º43'04"N, 00º59'38"E), in Norfolk, eastern England.

The Game Conservancy Trust (GCT) mink raft: The GCT mink raft was developed as a means of detecting the presence of mink (as well as doubling as a trapping platform). Essentially, it is a wooden raft tethered to an anchor post amongst emergent vegetation on the banks of a river or other waterbody. It houses a removable tracking tray consisting of a small basket filled with absorbent floral foam saturated with water, covered with a layer of clay and sand mixture. Mink and other footprints, including water vole and otter *Lutra lutra,* are clearly recorded in the clay. (For details of the mink raft see: www.defra.gov.uk/wildlifecountryside/vertebrates/reports/minkraftleaflet.pdf).

Advantages of using the GCT mink raft: The use of rafts has been found to be more time and cost efficient at detecting mink than using speculative trapping or systematic searches for

field signs. It also reduces the effort required for trapping since a trap need only be set when mink are proven to be present. This is also advantageous in time terms, as by law in the UK, set traps must be inspected daily. Captures on rafts also tend to happen quickly (typically within a few days). It is thought that this is because the trap locations have already been visited by mink, without adverse experience. Traps can be alternated with the detection tray to detect and trap accordingly until there are no more signs of mink. Furthermore, because fewer traps are necessary and are set for shorter periods, the risk of non-target captures is reduced.

Disadvantages of using the GCT mink raft: The use of mink rafts is more expensive than using bank traps alone in terms of initial capital expenditure, as each raft costs about three times as much as a bank trap. A minor disadvantage is that rafts are heavier and bulkier than traps, usually necessitating the use of a vehicle to deploy them.

Deployment of the GCT mink rafts and bank traps: In mid-2004, five mink rafts were deployed, increasing to 10 in 2005 (eight remain in operation). Rafts were placed at strategic locations along the length of the River Wensum. The rafts were generally used in clusters of two to four, each 200 to 400 m apart, with clusters at 1- 5 km intervals. Rafts were checked every 2 to 3 weeks for mink presence. If detected, a humane cage trap was set on each raft in a cluster for three to seven days. If no mink were detected within the raft deployment period, usually 3 months, the rafts were moved to new locations. The use of clusters of rafts, rather than evenly spaced rafts, was based on previous experience suggesting that mink do not necessarily visit all rafts (or bank traps) in an area. On many occasions, mink footprints have been found on only one or two of a group of three rafts 100 m to 200 m apart. It is considered that raft clusters reduce the risk of leaving gaps in detection.

The mink trap: A humane cage trap for mink (developed by the Ministry for Agriculture Food and Fisheries in 1960's) is same basic design as in use today. It is a rectangular cage made from strong wire mesh with a hinged door at one end. An animal treading on a pressure plate causes the door to spring shut. It has the advantage that non-target species can be easily released unharmed. In the 3 years since the mink control project started, a total of 170 bank traps were supplied by the project to 80 trappers, with a further 30-50 supplied by the trappers themselves.

Water vole surveys: In May/June 1997, 62 sites were surveyed for the presence of water voles. After the River Wensum Mink Control Project had commenced (July 2003) water voles were monitored at the same 62 sites in October-November 2003 and from August to October 2005. (Water vole surveys were conducted by R.Yaxley). Although surveys were conducted at different times of the year, both periods were considered optimal for water vole detection as water levels were low to moderate and there were no significant flood episodes. Each survey comprised a 500 m length of waterway at each site being examined for water vole signs including latrine sites, droppings, burrows, feeding stations, footprints and water vole runs, as well as direct observations The location of the start and end of each monitoring section was established using GPS, and observations recorded on a standard survey form.

CONSEQUENCES

Mink captures: A total of over 280 mink were removed, of which 18 were caught on rafts over a 2-year period. No mink signs were identified at any of the survey sites in 2005. The approximate capture rates by trapping method (bank and raft traps) was:

262 captures / 170 or 220 bank traps = 1.6-1.3 mink per trap over 3 years

18 captures / 8 or 10 rafts = 2.2-1.8 mink per raft over 2 years

Water vole survey results: Eight of the Wensum sites showed signs of water voles in all three survey years (1997, 2003 and 2005). Of the 62 sites surveyed in 1997, 21 (35%) showed presence of water vole. Only 59 sites were surveyed in 2005 and 60 in 2003, due to access problems. In 2003, 17 (28%) showed presence of water vole, whilst in 2005, 27 of 59 (46%) showed signs of water vole. Of these 27, at eight water voles had not been previously recorded. Habitat at six of the 59 sites is now considered unsuitable for water voles.

Conclusions: The survey results indicate that there has been an expansion in the range of water voles along the River Wensum from 2003 to 2005, perhaps in response to the removal of American mink. However, in 2005, few sites had an abundance of water vole field signs, suggesting only low level water vole presence, rather than extensive colonies. Comparison between 1997 and 2005 suggests the increase in rate of occupancy from 35% in 1997 to 46% in 2005 is likely to be a genuine sign of an increase in water vole distribution.

The use of rafts enabled gaps in coverage in conventional bank trapping to be filled effectively using few resources. It allowed rapid and effective checking for mink where they were suspected in an area. Eight rafts have been left in strategic positions to detect any mink re-incursions. The mink rafts proved so successful in terms of detection, trapping effectiveness, conservation of resources and ease of use that a further 20 have been deployed in adjacent areas as the primary means of mink detection and capture.