

## CHAPTER 6

### PINE MARTEN (*Martes martes* (L.))

#### **Introduction**

Trends in the history of the pine marten (*Martes martes*) in Great Britain are outlined in Langley and Yalden (1977), who monitor in detail its marked decline in numbers and a constriction of range during the 19th century, a phenomenon they attribute to intense persecution through game keeping. In 1800 pine martens were present in all but two counties; by 1915 populations were confined to areas of upland forest and moor in the Western Highlands of Scotland, the Lake District and small areas of north Wales, with possible survivals in the Cheviots and Yorkshire.

Howes (1984, 1985d) provided a critical historical review of the change in status and distribution of the species in Yorkshire, drawing information from a wide range of sources. The apparent reappearance of pine martens since the 1950s in several recently afforested areas was monitored up to 1984 and interpreted in the light of post-1919 forestry expansion. The present study adds significantly to this database both in monitoring its current status in the Northern Dales, Pennine South and West Yorkshire and the North-east Yorkshire uplands, and in providing historical statistics to support a hitherto unproven reason for its scarcity prior to 19th century persecution. This latter feature may have a bearing on the conservation management of existing populations.

Records were sought from a large number of published sources of the late 19th and the 20th century, from museum collections, and from churchwardens' accounts of the 17th to 19th centuries.

#### **Post-glacial evidence**

The postglacial evidence reviewed by Howes (1984, 1985b) showed that the pine marten had reached Yorkshire by 9,600 b.p. However, such evidence is extremely scarce, with bone material only being identified with certainty at the Maglemosian hunters' encampment at Star Carr by the shores of the former Lake Pickering (Fraser & King 1954). According to published literature on 21 caves in the Yorkshire Pennines and along the southern Magnesian limestone ridge (Chamberlin 2002), no skeletal remains of *Martes* spp. have been identified in Yorkshire cave deposits, though evidence has been located in caves on the southern Magnesian Limestone ridge at

Creswell Crags, on the Derbyshire/Nottinghamshire border 5 km south of the Yorkshire border.

Mustelid skeletal material excavated along with other ‘grave goods’ from an oak log coffin in an early Bronze Age barrow at Gristhorpe, North Yorkshire was initially identified as ‘weasel’ by William Buckland (Williamson 1872, Rutter 1956). This has been re-identified, using comparative material in the skeletal reference collections maintained at the University of York, as including five metacarpals of pine marten, and carbon dating of material gave a date of c. 2100 BC (N. D. Melton *pers. comm.*).

### **Medieval to 16th century hunting and fur trade records**

During the 14th century, pine martens were hunted in several English and Scottish counties, Bebington (1622), for example, listing ‘mottrom’ among the ‘beastes of the chaise’ in the Pickering area. Martens provided one of the sought after ‘home-grown’ luxury furs of the early medieval period (Veales 1966); however, by the 14th century the species was apparently too scarce in England to satisfy the demands of the trade and it became necessary to import pelts from Wales and Scotland, where duty was placed on their export (Langley & Yalden 1977), and eventually from Scandinavia and northern Europe. Marten (martron) pelts were among those worked by the Skinners of York in 1500 (Raine 1943), although by this time supplies may have come from overseas.

### **Churchwardens’ accounts of the 17th to early 19th centuries**

Howes (1984) showed that laws relating to bounty payments for ‘vermin’ did not include pine marten as a prescribed species under any of its archaic vernacular names, and although in some parishes other species believed to be injurious to crops and /or stock were added on the strength of the wish of parish representatives, only occasional allusions to pine marten have been located in parish accounts from anywhere in Britain. To date, small numbers of bounty payments made for pine marten have been located in parishes in Bedfordshire (Elliott 1936), Buckinghamshire (Cocks 1892), Devonshire (Brushfield 1897), Hertfordshire (Oldham 1931b), Northumberland (Nelson 1881), Nottinghamshire (White 1904), Denbighshire (Oldham 1931a) and Merionethshire (Matheson 1940, Hope-Jones 1974). Their occasional occurrence may indicate that pine martens were regarded as a valuable fur-bearing species rather than vermin, or were generally scarce during the 15th and early 16th centuries.

Evidence from churchwardens' accounts from 92 Yorkshire parishes has proved to be extremely scarce and problematical. Potential evidence has been located in only four parishes (see Table 6.1). Examples where 'marts' were unlikely to refer to *M. martes* were from the parish of Kildwick in 1680 where 2d. was paid for a 'mart head', half the price of the much more frequently occurring polecat, when one could

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**Table 6.1: BOUNTY PAYMENTS FOR 'PINE MARTENS' IN CHURCHWARDENS' ACCOUNTS FROM YORKSHIRE PARISHES**

(\* most probably refer to *M. martes*)

<b>Date.</b>	<b>Record.</b>	<b>£. s. d.</b>
<b>Ecclesfield (Sheffield City Archives PR 54/87; 89 Parish Book 1680-1766)</b>		
*1712	Paid Thomas Cuthbart for a fox and a Bawson [badger] & two Martes	-. 4. 2.
*1736 May 16	Paid Jos. Rodger for a Mart head	-. -. 6.
1736 Dec. 3	Paid Tho. Cuthbart for a Mart head	-. -. 4.
<b>Harthill (Sheffield City Archives PR 47/55-56 1702-1828)</b>		
1712	To 3 Martens to John Grant	-. 1. -.
<b>Kildwick (PR/KID Mic. 1704)</b>		
?1860	To Robert Blaykey for a Marthead	-. -. 2.
<b>Penistone (Dransfield 1906)</b>		
*1703	For 7 Foomards' heads and a Mart's head	-. 3. 4.
<b>Terrington (Wright 1898)</b>		
1818-1819	To J. Beedale for 4 Mart Heads	-. 1. 4.
<b>Thorpe Salvin (Sheffield City Archives MD 1236/1-64: CWA 1699-1787)</b>		
*1731 April 16	Pd. To Robert Dunston for a marten head	-. -. 4.
<b>Wold Newton (EYCRO PE 94/18 Churchwardens' Accounts 1739-1878)</b>		
1770	Paid for 6 mart heads	-. 2. -.
1780	Paid for 1 marts head	-. -. 4.
<b>Worsbrough (Sheffield City Archives PR 3/12-13)</b>		
*1726/7	1 'mart' @ 1s.	-. 1. -.
1748/9	29 'marts' @ 4d.	-. 9. 6.

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have expected 1 s. as for badger, fox and otter. In the parish of Worsbrough in 1748/49, 29 bounties of 4d. each were paid for 'marts', the abrupt appearance in the records of such large numbers, coupled with a payment the same as that for polecat (foomards), suggesting these may refer to *M. putorius*. In Wold Newton, 4d. each was paid for six

‘mart’ heads in 1770 and one in 1780. Since the vernacular name for the polecat in these accounts was ‘foulmart’ and payment for them was also 4d, these were probably *M. putorius*. In the parish of Terrington in 1818/1819, 1s. 4d. was paid for 4 ‘mart’ heads and again, as the vernacular name for the polecat in these accounts was ‘foulmart’ and payment for them was 4d., these were probably *M. putorius*. Similarly in the parish of Harthill, the bounties paid in 1712 for three ‘Martens’ was the same as for ‘Fomard’ heads, so were again probably *M. putorius*.

Evidence deemed to refer to *M. martes* came from the parishes of Penistone where 1 s. was paid for one in 1703, from Ecclesfield where 1 s. each was paid for two in 1712 and 6d. for one in 1736, from Worsbrough where 1 s. was paid for one in 1726/27, and from Thorpe Salvin where 4d. was paid for one in 1731 at a time when only 2d. was being paid for polecats.

### **Hunting during the 19th century**

During the 19th century ‘hunting the mart’ was a recognised field sport, but only one reference, namely to Cleveland (Harting 1891a) is relevant to this study.

### **Anecdotal records of the 19th to mid-20th centuries**

Impressions of the changing status of the pine marten from the beginning of the 19th century were assembled by Howes (1984). Clarke and Roebuck (1881) noted its abundance and widespread distribution up to the 1800s, but referred to its rapid decline from the 1850s to 1880s, the species in 1881 being regarded as ‘extremely scarce and restricted to one or two localities’. Grabham (1907) also alluded to its former abundance, referring to good numbers obtained during the 1840s and 1850s for public and private collections, but judged it in 1907 to be ‘very scarce and almost extinct’. Forrest (1908) speculated that isolated occurrences in the northern counties were due to individuals wandering from the Lake District stronghold. This interpretation was followed by Fortune (1916), St. Quintin (1921) and Sheppard (1927) to explain sporadic records in Yorkshire up to 1920. (Fortune 1916, 1928) also suggested survival of relict populations and escapees from captivity. Taylor (1956) listed records from 11 localities from 1900 to 1946 and considered it possible that the species survived in the ‘wilder parts of the county’.

### **Geographical review of 18th to 21st century records**

Howes (1984 and 1985b) accumulated c. 70 records from 60 localities and reviewed them chronologically within 16 geographical regions. The current study has increased these records to 159 from 119 sites (see Appendix 6.1 and Figure 6.1). The locations of records broadly aggregate into five distinct geographical regions of Yorkshire.

Five regional populations have been identified; chronological analyses are provided for each region (see Figures 6.2 to 6.6) and collectively in Figure 6.7.

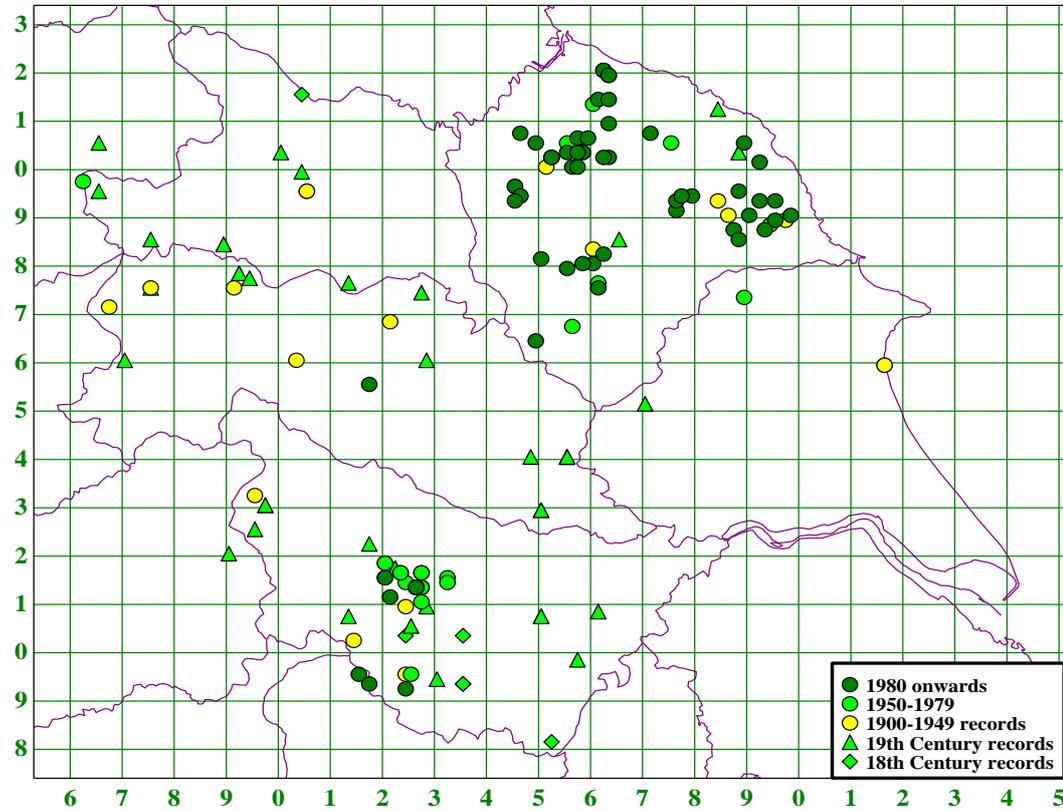
#### **1) The northern Pennine Dales including the Yorkshire Dales National Park, the eastern Dales fringes from Teesdale to Harrogate and the western dales fringes from Tebay in the north to Hardcastle Crag in the south**

The region as a whole has produced records for a minimum of 31 animals from 26 highly dispersed localities (see Appendix 1 and Figure 2). Records from the 18th century to the 1930s are collated by Howes (1984, 1985b). The Dales population seems to have represented a south-eastern extension of the larger Lancashire, Cumbrian and Lakeland population (population 'C' identified by Strachan *et al.* 1996). In addition, with populations having been present in the Tees Valley during the 18th century, as demonstrated by bounty payments made by churchwardens for parishes in the valley of the Greta (NZ/0415) (Brass 1892), the northern Pennine Dales population would also have been linked to the Northumberland and Durham population (population 'A' in Strachan *et al.* 1996). Contiguity with this population 'A' probably ceased during the 19th century, Hutchinson (1843) remarking that by 1843 the few martens met with in Durham are supposed to have come from Cumberland and Westmoreland, and Gill (1905) reported that the last record County Durham was in 1882, their final extermination having been rapid through urbanisation and the use of steel traps.

With persecution from game rearing interests and the reduction of woodland habitat, pine martens struggled to survive in the Dales throughout the 18th and 19th centuries, evidently becoming extinct or at least falling out of notice by the 1950s. The last acceptable sighting of a live marten was in 1953 in the far northwest of the Dales at Fairmile (SD628977) in the Howgill Hills (Varty 1990). The link with the Cumbrian population seems to have been severed at this time and subsequent major highway developments in the form of the M6, and increased traffic flows on the A65 along the

western flank of the Dales region would seem to have reduced any reasonable chances of wandering animals from this centre reaching the region in the foreseeable future.

### Pine marten (All Yorkshire Vice counties)



**Figure 6.1: Locations of pine marten records in time classes from the 18th century to post-1980.**

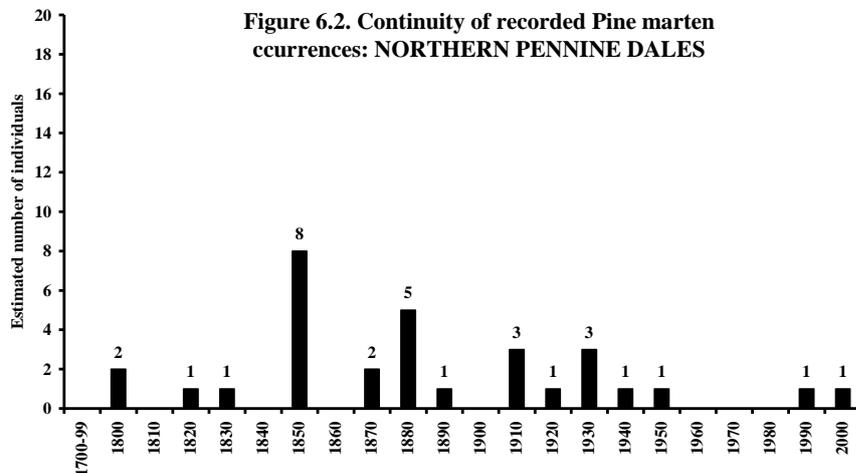
In the 1990s sporadic sightings were claimed in the eastern (Nidderdale/ Ripon) side of the Dales region (Birks *et al.* 1997, Adams 2004). Despite the presence of the A1 and the A19 forming a north/south barrier along the Vale of York, the likely origins of these animals would seem to be the adjacent Cleveland/North Yorkshire Moors population (population 'B' in Strachan *et al.* 1996), 30km to the east. Movement across this distance would have been well within the capability of pine martens which are noted for their long distance movements (Hurrell 1968).

In addition to unconfirmed sightings, the Dales region has produced 12 specimens shot or trapped between 1833 and 1934, most examined and verified by authoritative naturalists of the time and the skull of at least one specimen survives in a museum collection.

During the winter of 1833, a pine marten was killed by W. Marshall, gardener to John Foster of Clapham (SD/76) (Harting 1891a). At Hardcastle Crags (SD/9730) a

marten was caught alive in March 1853 (Johnson 1965). In 1854, a specimen measuring 30 inches in length was caught at Romfolley (SD/92) and exhibited in a cage at a local Public House (Hanson 1883); also in 1854, one was shot in Raydale (SD/8984) (Fothergill 1854, Anon. 1881c, Clarke & Roebuck 1884a, 1884b, Harting 1891a). A specimen was caught near Hebden Bridge on 2 April 1858 (Greaves 1912). In the winter of 1880, one was ‘obtained’ at Buckden (SD/9477) (Clarke & Roebuck 1881, Anon. 1882, 1891, 1900a, Harting 1891a, Woodd 1891, Forrest 1908). One, in the collection of Colonel Crompton (not located for this study), had been shot pre-1881 in the woods at Azerley (SE/2774) near Ripon (Clarke & Roebuck 1881, Forrest 1908). A specimen caught in a fox earth in Inglebrough (SD/77) c. 1884 was preserved and placed on display in Clapham village library in 1924 (Booth 1924). A specimen trapped near Tebay (NY/60) was examined by Rev. H. A. Macpherson who claimed it to be ‘the last of the Westmoreland sweetmarts’ (Macpherson 1891, Fortune 1912). One was shot hunting rooks in a rookery at Deepdale in Craven (SD/78) (Harting 1891a). On 11 May 1912 one measuring 30 inches in length was trapped at Far Greave Farm, Alconden (SD/9532; although this animal was unfit for preservation, its tail was sent to H. B. Booth who confirmed its identification as pine marten. The skull, donated by J. T. Whitaker to Cartwright Hall Museum, is now in the collection at Cliffe Castle Keighley (M. M. Hartley *pers. comm.*). In 1934, one was caught in a vermin trap on the fringes of Eavestone Moor (SE/2168) by the head keeper on the Grantley Estate (Young 1946).

Figure 6.2 indicates a reasonably continuous, though evidently declining, presence in the northern Pennine Dales through the 19th century and up to 1950.



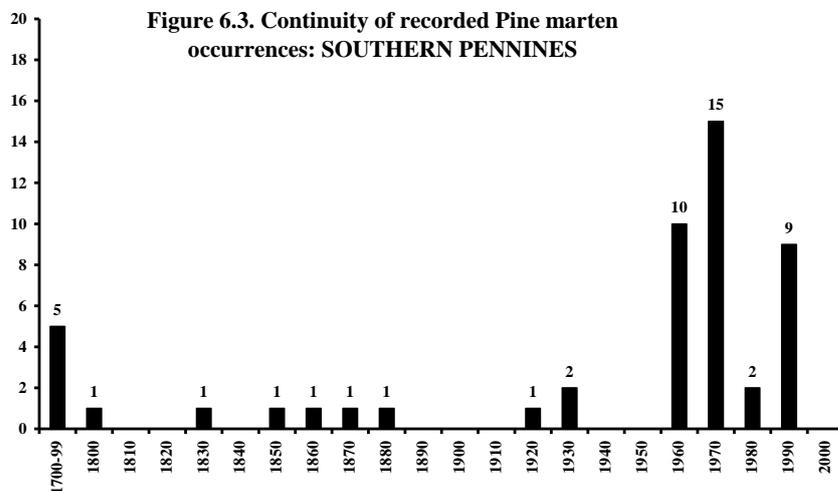
The post-1990 records concentrating in the Nidderdale/Ripon area commenced with one seen during June 1991 hunting grey squirrels in a stand of *Pinus sylvestris* near Blubberhouses (SE/1755) (Birks *et al.* 1997). On 28 October 2003, one was seen in a rushy marsh close to a conifer stands at Greycarth, Dallowgill (SE/188722) (Adams 2004). There are also unconfirmed reports of a pine marten being killed in the Dallowgill area in the 1990s, one being watched for a five minute period at an undisclosed site in the Harrogate area in 1999 and an alleged road casualty just outside this area in 2000 (Adams 2004).

## **2) Huddersfield, Wakefield, Barnsley and Sheffield areas**

This region extends from the Kirklees, Huddersfield and Wakefield areas in West Yorkshire and passes south through Barnsley and Sheffield in South Yorkshire, terminating in the Derwent Edge area of the Peak District on the Derbyshire border. It is a relatively compact area including nine 10 x 10 km squares (SE/12, 21, 31, 10, 20, 30; SK/19, 29, 39). From 1703 to 1996, the region has produced records of at least 50 animals from 30 localities (see Appendix 6.1 and Figure 6.3). Records from the 18th century to the 1970s are collated by Howes (1984, 1985b). The southern Pennine population (population 'D' in Strachan *et al.* 1996), seems to represent a relict of a former contiguous Pennine distribution which extended from Pennine West and South Yorkshire and into Derbyshire. It was also contiguous with 18th and 19th century sites in the lowland southern Vale of York. It would also be realistic to include the series of records from sites in the Hardcastle Crags region of Halifax (SD/92, 93) (arbitrarily included in the Northern Dales region) that produced records and specimens during the 1820s, 1850s and in 1912.

In addition to unconfirmed sightings, the southern Pennine region has produced five specimens shot or trapped between 1809 and 1969, most examined and verified by authoritative naturalists of the time, the skins of at least two specimens surviving in a museum collection. William Bingley (1809) records a pine marten shot on the moors above Holmfirth (SE/10). One was killed on the Whiteley estate (SE/2217) (Hobkirk 1859, 1868); the specimen dated 1855, is currently on display in the Tolson Memorial Museum Huddersfield. On 30 July 1926, a young female with an 8-inch tail and a total length of 26 inches was caught at Bolsterstone (SK/2495) on the Broomhead estate up the Ewden Valley (Mosley 1927); a photograph of the animal was exhibited at the YNU Vertebrates Section meeting in autumn 1926 (Taylor 1926); the specimen was preserved

in the R. H. Rimington Wilson collection at Broomhead Hall (Mosley 1927) and later presented to Sheffield City Museum (Clegg 1963) where it is currently housed. In August 1931, a pine marten was killed by a keeper on the grouse moor of Carlecotes Hall near Dunford Bridge (SE/1402); this specimen was preserved, although no trace of its later whereabouts has been found (Knowles 1936). A specimen mistaken for a fox was shot at Chapelthorpe (SE/3215) in April 1969; the skin, confirmed as *M. martes* by G. B. Corbet of the Natural History Museum, is now in the Yorkshire Museum, ref. 1969.249 (Simms 1970, 1971c, Hazelwood 1971, Howes 1978).



Breeding sites were confirmed between 1969 and 1978 between Wakefield and Huddersfield at Upper Hopton (SE/205188), Denby Wood (SE/238163), Bank Wood (SE/265137) and near Bretton (SE/2713) (Simms 1971a, *pers. comm.*, Howes 1991). An estimation of the number of martens present at this time was nine (C. Simms *pers. comm.*).

Post-1980s records come from Bank Wood near Emley (SE/2613) in 1984 (D. Gomersall *pers. comm.*), where there were three further sightings between 1993 and 1994 (Jason Thornton *pers. comm.*). One was seen on two occasions during February and March 1990 in woodland near Lepton (SE/203158) (Bryan Hudson *pers. comm.*).

In 1993 one was seen by a birdwatcher at Bradfield (SK/2492), where other sightings had been claimed (Birks *et al.* 1997). In April 1994, one was seen by a walker at Howden Clough (SK/1793); in 1996, one was seen 2 km from this site (Birks *et al.* 1997), and in April 1996, one was seen crossing a road at night between Emley Moor and Shelly (SE/2111) (Birks *et al.* 1997).

### 3) Cleveland and Northeast Yorkshire

This region includes the Cleveland, Hambleton and Howardian Hills, and the North York Moors. From the beginning of the 19th century, the region has produced records for at least 84 animals from 38 localities (see Appendix 6.1 and Figure 6.2). Records from the 19th century to the early 1980s are collated by Howes (1984, 1985b). The Cleveland and Northeast Yorkshire population (population 'B' in Strachan *et al.* 1996), seems to represent a southern extension or relict of the contiguous Durham/Northumberland population (population 'A' of Strachan *et al.* 1996).

The pine marten was claimed to be part of the Cleveland fauna in 1808, but no details are available as to its status and no specific records are given (Graves 1808). The old Cleveland saying '*A cat squirrel could gae fra Commondil ti Glaisdil thruff treeas an nut put foorit t't grund, yan-tahm*' (Simms 1973), also indicates a local familiarity with the species at least through the 19th century.

Figure 6.1 indicates significant aggregations of records within the region, which suggests the existence of four different sub-populations focussed on specific afforested regions within the north-east Yorkshire uplands as follows:

#### ***Sub-population 1***

The Cleveland Hills sub-population, with records from six 10 x 10 km squares (NZ/62, 61, 60, 50, 40 & SE/49), extends from Errington Wood (NZ/6220) in the north along the western and northern facing escarpment of the Cleveland Hills, with a significant aggregation of records for the plantations at the head of Billsdale (NZ/50) and south to the Silton Forest (SE/4694) and Thimbleby (SE/4596) areas in the northern end of the Hambleton Hills. Although most records date from the 1990s, one from the Skugdale Valley (NZ/5100) is dated 1900 and six others are from the 1970s. This may suggest origins from a relict 19th century population which survived on crag woodland on the Cleveland and Hambleton escarpments, finally expanding into Forestry Commission plantations which progressively reached maturity from the 1970s. A breeding record was claimed shortly before 1981 in grid square NZ/50 (R. Brown in Strachan *et al.* 1996).

In corroboration of 28 of the unsubstantiated post-1970s sightings (see Appendix 6.1), this sub-group has produced the following handled specimens. On 9 February 1900, an 'old male' pine marten measuring 32 inches total length was caught

in a weasel trap in Skugdale Valley; the preserved specimen is in the Emerson collection at the Stewart Park Museum, Marton, Middlesbrough (Elgee & Elgee 1935). In 1972, there was a road casualty near Greenhow Plantation (NZ/5803); one was shot near this site in 1983 and on c. 1 November 1993, a particularly large specimen was caught in a snare in the Ingleby Greenhow/Broughton area (NZ/5703), the skull of which formed the basis of a detailed biometric examination to establish its identity in order to exclude the possibility of it being an escaped Beech marten (*M. fiona*) or American marten (*M. americana*), both of which have historically been ranched for fur in England. Due to its very large size, comparisons were made with the cranial anatomy of the American fisher (*M. pennanti*) and European sable (*M. zibellina*), which may also have occurred as escapes from captivity (Jefferies & Critchley 1994).

### ***Sub-population 2***

The Hambleton and Howardian Hills sub-population, with records from four 10 x 10 km squares (SE/58, 68, 57 & 67), extends from Hood Hill, Sutton Bank (SE/5081) in the west to Duncombe Park (SE/6082) in the east, and south to the plantations in the Gilling Park area (SE/6175). Again the majority of records date from the 1990s, but there is a continuity known from the region since at least 1893 (Slater & Braim 1893). This sub-population was subject to a liberation of pine martens. In 1934, Adam Gordon, head keeper at Duncombe Park, Helmsley (SE/6083), imported two pairs of pine martens from Ireland and a litter was reared in captivity. An adult male and an adult female died, but in the early summer of 1935, the other adult male escaped and was not recaptured. The fate of the remaining female and the litter is not documented (Bramley 1936, Howes 1985b). Although there is no documented evidence of subsequent survivals, pine martens were known to occur in the area during the 1970s and there were six subsequent sightings up to 2003.

### ***Sub-population 3***

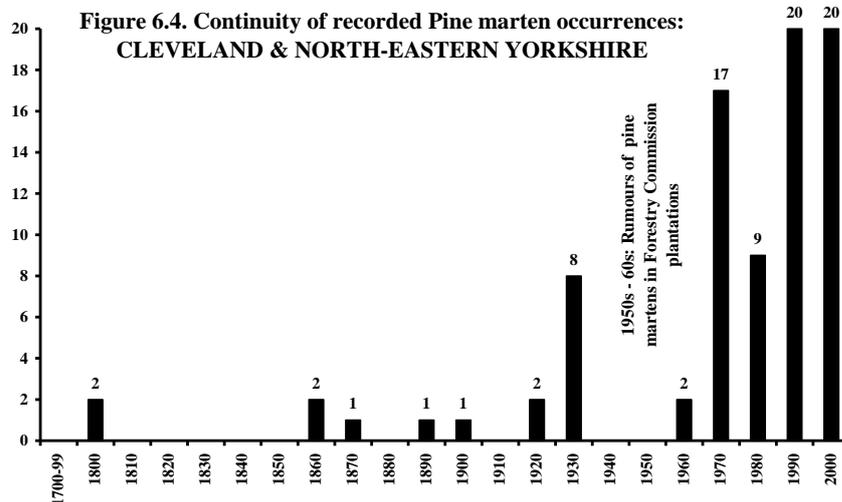
The Broxa, Cropton, Dalby, Langdale and Wykeham Forests sub-population, with records from five 10 x 10 km squares (SE/79, 89, 99, 88 & 98), extends from Southerland Lodge (SE/7691) in the west, to Suffield (SE/9890) in the east, to Allerston High Moor (NZ/8895) in the north, and to Givendale (SE/8885) in the south. Records from this sub-region date from 1921 at Levisham (SE/8690) (Fortune 1921), 1929 at Everley (SE/9789) (Clarke 1936), and 1938 in the Hole of Horcum (SE/8493) (Flintoff

*et al.* 1938). Post-war records relating to the new Forestry Commission plantations date from 1966 (Utley 1966), and there have been 14 records from 1980 to 2004.

#### ***Sub-population 4***

The Lower Esk sub-population, with records from four 10 x 10 km squares (NZ/70, 81, 80 & 90), extends from Danby (NZ/7107) in the west, to near the Flask Inn (NZ/9201) in the south-east and to Mulgrave Woods (NZ/8412) in the north.

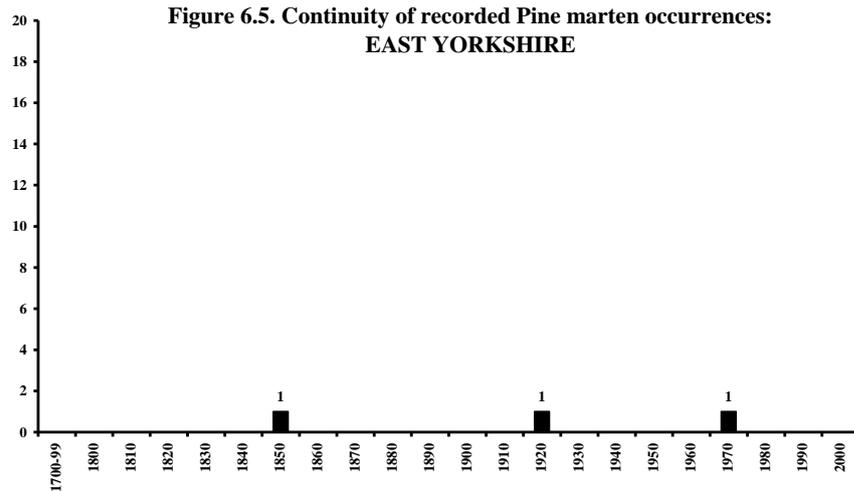
Whereas the Flask Inn occurrence, a road casualty, may more correctly be a wanderer from the Harwood Dale Forest to the south, the others form a dispersed relict population associated with wooded valleys and plantations of the lower Esk and its tributaries. Leas Head (NZ/8311) at the head of the Littlebeck valley, a southern tributary of the Esk, produced two 19th century records, one trapped in 1877 is now in the collections at Whitby Museum (Stephenson 1877, Clarke & Roebuck 1881, Harting 1891a, Forrest 1908). Mulgrave Woods was also a site where specimens were trapped during the 19th century (Theakstone 1865). This sub-population has produced three post-1970s records, including a breeding record in the mid-Esk area in 1973 (C. Simms *pers. comm.*).



#### **4) East Yorkshire**

This region consists of the whole of the East Riding of Yorkshire or Watsonian Vice-county 61. Records are available from three widely dispersed sites in 10 x 10 km squares (SE/65, 87 & TA/15). There is no evidence of a sustained population persisting

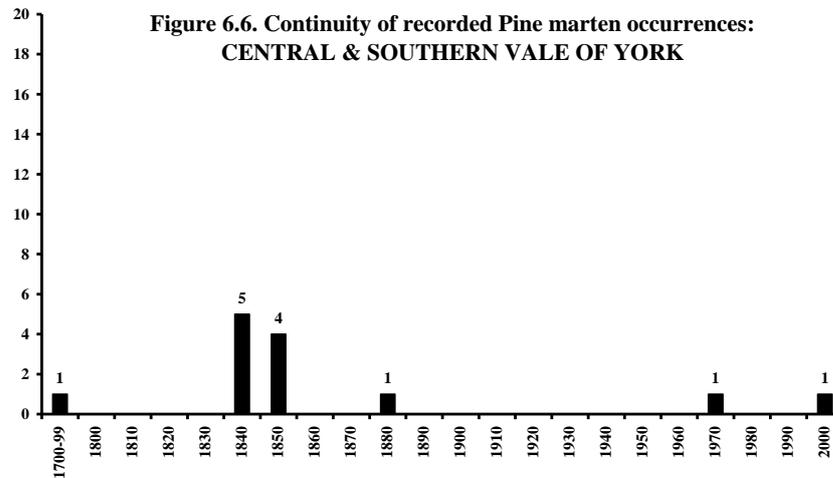
into the 19th century. The earliest record refers to a specimen shot in Kexby Wood (SE/7051) in 1854 (Fothergill 1854). The next was of a male measuring 32 inches in length trapped on 1 June 1920 at Barmston (TA/1659) (St. Quintin 1921, Smith 1921, Sheppard 1927). The nearest known contemporary population from which this specimen could have originated is in the Wykeham Forest, 40 km to the north-west.



Finally, one was seen at some date between 1972 and 1979 in the Winteringham area on the northern escarpment of the Yorkshire Wolds (Capes 2004), the animal probably wandering from Langdale Forest, 20 km to the north.

### **5) Central and southern Vale of York**

This low-lying region is mainly arable, with some survivals of ancient woodland and numerous scattered shooting and hunting coverts, extending from the Forest of Galtres region to the north of York, down to the Nottinghamshire border. The region has produced records of at least 13 animals from localities within nine 10 x 10 km squares (SK/58, 59; SE/44, 46, 50, 52, 54, 56 & 60) (see Appendix 6.1 and Figure 6.6). Records from the 18th century to the early 1970s are collated by Howes (1984, 1985b).

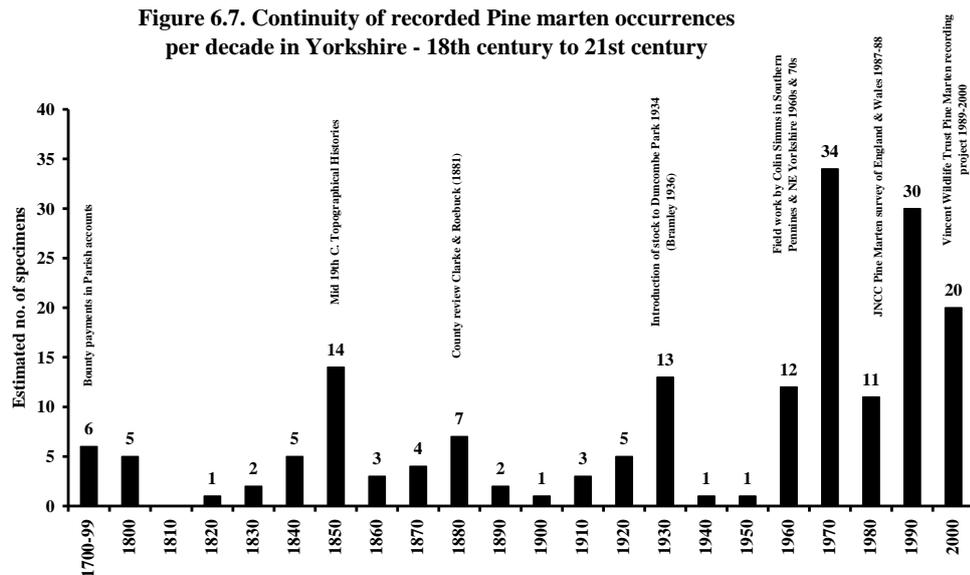


This grouping differs markedly from the pattern of information from other Yorkshire regions, the pre-1970s component referring entirely to animals that had been trapped, shot or otherwise killed. These come from tightly managed agricultural and shooting estates, the records probably reflecting the effectiveness of the species' eradication by game keeping during the 19th century, both here and elsewhere in lowland eastern England as described by Langley and Yalden (1977). One benefit of so many for the estate-killed specimens being forwarded to taxidermists is that their identity was confirmed by competent naturalists. Subsequent to the 19th century eradication, sightings from Huby (SE/56) in 1973 and Alne (SE/4964) in September 2000 were potentially wanderers from the Howardian Hills sub-population, less than 20 km to the north. Significant repopulation of former sites is unlikely due to the persistence of shooting interests and that the region is served by the A1(M) and a network of heavily used A class and Trunk roads.

Due to its predominantly nocturnal behaviour, occurrence at very low densities, propensity for wandering great distances, and preference for remote woodland habitats, the pine marten is notoriously difficult to encounter (Strachan *et al.* 1996). It is likely that the data gathered in this study may therefore underestimate its status. Throughout the period of documented parish vermin bounty payments from the 16th to the early 19th century, pine martens were the least frequently recorded of the carnivores for which payments were made. Records published in the late 19th century are also remarkably scarce, and literature references frequently relate to the same occurrence,

with claims to earlier abundance are often unsubstantiated or based on minimal or inconclusive evidence.

A significant finding of this study, however, has been the long continuity of documented occurrence in Yorkshire with only one decade (1810) without a record (see Figure 6.7). Claims as to its extinction in Yorkshire are therefore unfounded. Figure 6.7



also shows that the periodic peaks of records relate to the fluctuations in human effort in the sense of the availability of parish vermin records of the 18th century, the publication of topographical histories of the mid-19th century and the publication of the Yorkshire vertebrate fauna in 1881. These were followed by intensive surveys by individuals, such as Colin Simms of the Yorkshire Museum during the late 1960s and early 1970s, and activities for, or resulting from, the national pine marten surveys of 1987-1988 and 1989-2000. There is a plausible relationship between an increase in sightings of pine martens and the development of forestry plantations since the formation of the Forestry Commission in 1919, and the maturation of these plantations from the 1970s.

### **Competition between red fox and pine marten: a possible cause of the early decline and continued scarcity of pine martens**

Hurrell (1968) was of the opinion that foxes may kill pine martens, his surmise being supported by a Lakeland saying that ‘*when foxes are plentiful, marts are scarce*’ and *vive versa*. Strachan *et al.* (1996) considered this appeared possible with intra-guild predation and interference hostility between predators of different sizes, as observed in

red foxes (*Vulpes vulpes*) and arctic fox (*Alopex lagopus*) (Herteinsson & Macdonald 1992). Red foxes have been found to kill, and may be responsible for exterminating stoats in areas of the Netherlands (Mulder 1990).

Possible evidence of the relationship between red fox and pine marten has been deduced from bounty payment statistics abstracted from 92 parishes in the Yorkshire region. Although only four parishes revealed acceptable evidence of payment of bounties for a total of six pine martens, the comparison with frequencies of foxes are potentially instructive.

Using data from the 24 parishes which produced 50 or more carnivore bounty payments, the parishes have been presented in Figure 6.8 in ascending order of % frequency of fox occurrences (from 0% to 99.8%). By plotting the pine marten frequencies within this sequence, it has been possible to show that pine martens were not restricted to those parishes where foxes were evidently absent or relatively scarce, but occurred within the foxes mid-range of frequencies (11.% to 35.7%). Significantly, it was noticeable that pine martens did not feature in parishes where foxes constituted from 52% to 99% of parish bounties.

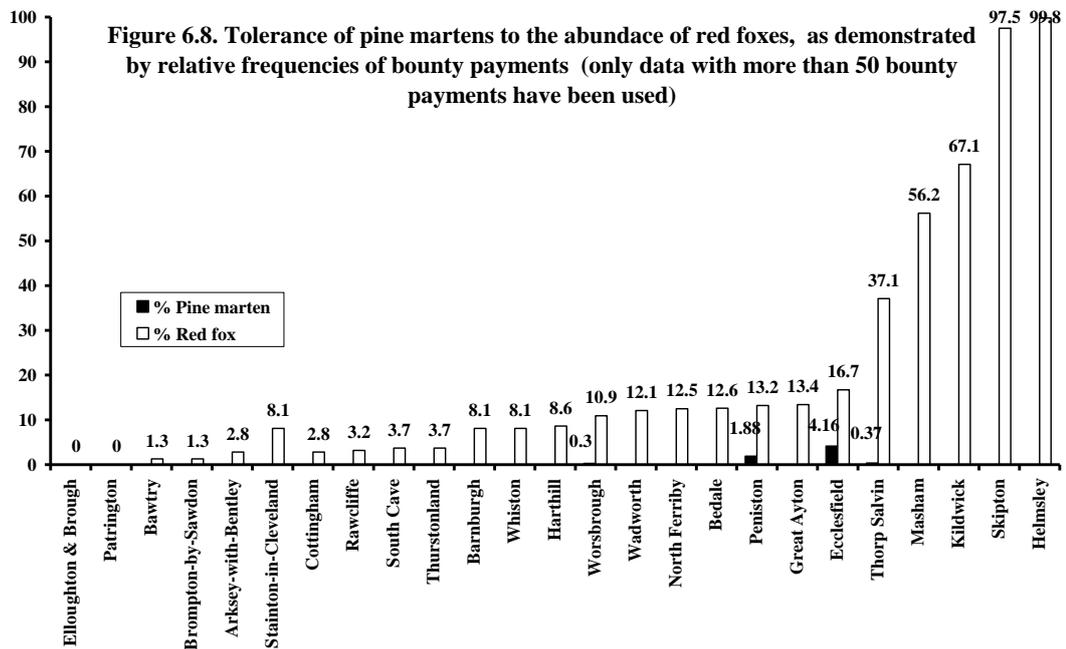
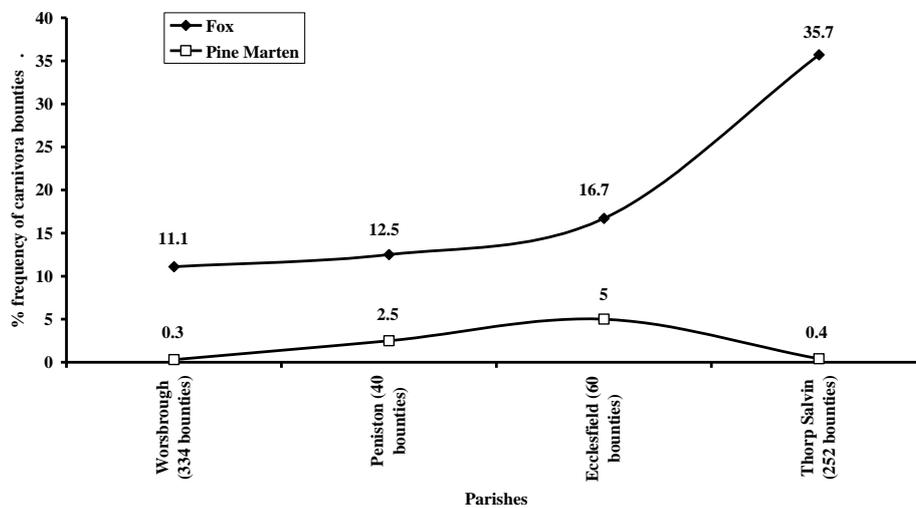


Figure 6.9 shows the % of total carnivora bounties made up by red fox and pine marten in those four parishes where pine martens were recorded. The parishes have again been arranged in ascending frequency of fox bounties. Initially, it seems that both pine martens and foxes increased proportionally, suggesting that what is suitable in the habitat for foxes is also benefiting pine martens. However, when the fox increased from

16.7% to 35.7%, the marten proportion of the bounties dropped from 5% to 0.4%, possibly indicating increased competition from foxes. If it was simply a matter of pine martens being persecuted by foxes, one would expect pine martens to be restricted to those parishes where the fox bounty indexes were absent or lowest. This was not demonstrated by the evidence as revealed in Figure 6.8. Indeed there may have been an ecological unsuitability in the parishes concerned, in terms of availability of suitable habitat, denning sites or food resources to support sufficient numbers of foxes or pine martens for them to be perceived as ‘vermin’ or for them to have been readily captured.

The preferential occurrence of pine martens in parishes where foxes were in their mid-range of frequency suggests that they shared common resource requirements. This situation would potentially lead to competition for these resources. The decline of pine marten frequency from 5 to 0.4% when fox occurrence rose from 16.7 to 35.7%, as demonstrated in Figure 6.9, and for their total absence from parishes where the fox bounty index rose above this level, as demonstrated in Figure 6.8, suggests that competition was a factor in dictating the absence of pine martens.



**Figure 6.9. Relative % frequencies of fox and pine marten bounties in Yorkshire parishes during the 18th century.**

It is arguable that the red fox has benefited from the demise or removal from mainland Britain of larger predators such as the lynx (*Lynx lynx*), which occurred during the Mesolithic with radiocarbon dates demonstrating survival through to Neolithic and Roman times, brown bear (*Ursus arctos*), which also did not survive after Roman times,

and the wolf (*Canis lupus*), which was eradicated in England during the 13th century and in Scotland possibly in the 18th century (Yalden 1999).

Released from potential competition and persecution by their absence, and eventually assisted by the introduction and massive proliferation of rabbit as a new prey species, the fox has possibly been allowed to develop as a highly successful predator, possibly to the detriment of competitors like pine marten and polecat.

### **The importance of arboreal denning sites**

Lindström *et al.* (1995) and Helldin (1998) show that pine martens have several predators and predation by the red fox may limit populations. Avoidance of foxes forces pine martens to seek safe shelter above ground (Pulliainen 1981, Webster, 2001). This may be especially important in Britain because foxes are more abundant now compared with Mesolithic times (Maroo & Yalden 2000) and pine martens are arguably more vulnerable due to the low and highly fragmented woodland cover (Bright 2000, Forestry Commission 2003).

Brainerd (1990), Lindström *et al.* (1995) and Helldin (1998) show that dens are an important resource for pine martens and sites are selected in response to predation risks and energetic constraints (Brainerd *et al.* 1995, Zalewski 1997).

Martens have an elongated body shape that is energetically inefficient (Iversen 1972); they carry limited fat reserves (Buskirk & Harlow 1989), and their fur is evidently not highly insulative (Scholander *et al.* 1950). These features increase the energetic costs of thermoregulation in cold weather (Pulliainen 1981, Brainerd *et al.* 1995, Zalewski 1997). Successful reproduction depends upon the availability of natal dens in structures offering adequate insulation to breeding females and neonates (Brainerd *et al.* 1995).

Zalewski (1997) noted that wind speed and humidity influenced den selection, with martens choosing sheltered dens such as tree cavities instead of bird nests on windy or humid days. Thus, compared with arboreal cavities, pine martens face extra energetic costs when using dens in bird nests and branches under these conditions. These costs are greatest for female martens with their energetically less efficient shape, leading them to select more sheltered structures than do males (Zalewski 1997). Therefore, female martens would be more constrained than males by the scarcity of arboreal cavities, especially in commercial conifer forests where such cavities are most scarce (Hodge & Peterken 1998). Such constraints are most severe for breeding

females; exposed structures are unsuitable as natal dens because neonates require good shelter and insulation for their survival (Brainerd *et al.* 1995).

The prominent use of roof voids as natal dens by pine martens, as found by Simms (1973), is an identical response to that shown by some bats to the scarcity of arboreal roosts (Schofield & Mitchell-Jones 2003). Roof voids offer insulation, shelter from severe weather and elevation above the reach of terrestrial predators, enabling bats and pine martens to rear young in conditions similar to those in elevated tree cavities.

Birks *et al.* (2004) predicted that, under current woodland conditions in Britain, arboreal dens offering pine martens effective insulation and protection from predators are scarce. They tested this by gathering data on dens used for resting and breeding, and hypothesized that a shortage of suitable structures would lead pine martens to occupy dens that are suboptimal in terms of the protection they offer, which may involve compromise between predator avoidance and thermoregulation

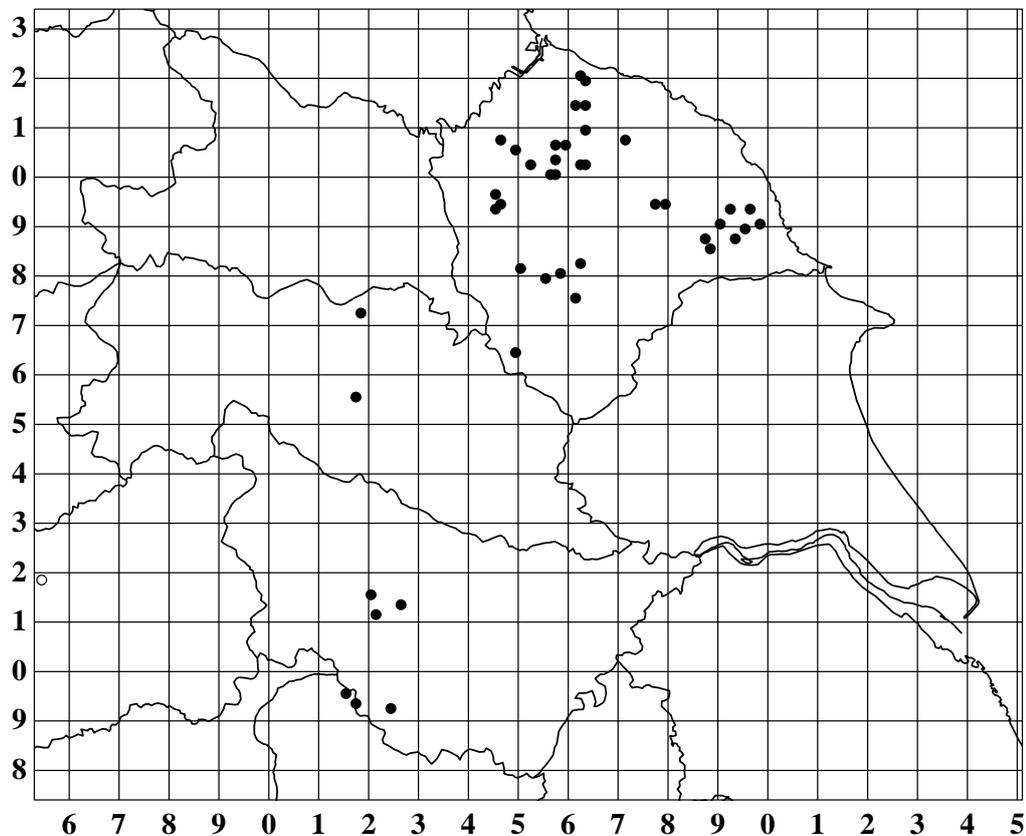
Exploring the hypothesis that a scarcity of denning sites leads to the use of suboptimal alternative structures and is a major constraint on the sustainability of pine marten populations, Birks *et al.* (in press) examined 370 pine marten dens. They found that most dens were associated with trees (44.3%), rocks (27.6%) and buildings (13.8%). The natal den sub-sample comprised buildings (44.3%), trees (22.8%), other man-made structures (17.1%) and rocks (14.3%). A total of 69.6% of dens were elevated and typically in structures offering limited shelter. Only 9.8% of all dens were in elevated tree cavities. They concluded that this diversity of dens reflected a scarcity of arboreal cavities. The alternative structures are suboptimal in terms of energetic costs and risks of predation, and this may limit breeding success in some populations.

### **Origins and current status of Pine marten populations in Yorkshire**

As part of an exercise designed to monitor the status of relict pine marten populations in the 1990s in England and Wales, an appeal for records was published widely by The Vincent Wildlife Trust and the Mammal Society (Anon 1996) and parochially by a number of authors e.g. in Yorkshire (Fletcher 2004). People reporting sightings of live or dead martens were questioned closely according to a standard protocol developed by Poulton *et al.* (2005) in order to evaluate each report and assign it a confidence score. The appeal generated a large number of reported sightings, north-east Yorkshire and Cleveland examples being reported in Capes (2004). Figure 6.10 shows the distribution

of relict populations within Watsonian Yorkshire, three in VC62, a token presence in the Dales region of VC64 and two in VC63.

### Pine marten (post 1990)



**Figure 6.10: Distribution of post-1990 pine marten records**

● = in Yorkshire and ○ = the road casualty from Euxton, Lancs. (SD51).

### Releases or escapes from captivity

Strachan *et al.* (1996) recorded a number of instances of accidental or deliberate releases of martens into the wild in Britain during the late 19th and 20th centuries. These included exotic species such as beech marten (*M. foina*), American marten (*M. americana*) or *M. martes* from European stock. Some were farmed for their fur and others were imported for private collections, such as the two pairs of Irish pine martens imported to Duncombe Park, Helmsley (SE/6083) in 1934 (see sub-population 2 above). Of possible relevance to this was a specimen found dead in June 1994 by the A581 at Euxton, Lancashire (SD/5418), which was subjected to mitochondrial DNA analysis that showed it had a closer similarity with a sample taken from a marten from Co. Laois, Ireland, than from samples taken from three Scottish martens (Birks *et al.* 1997).

Kyle *et al.* (2003) reported that wild-living American martens were known from Northumberland in the 1960s and speculated that genetic introgression may have affected subsequent *M. martes* populations, particularly in the north-east. They reported that the most likely sources of *M. americana* in the north of England are martens that escaped or were released from commercial mink farms. This raises the possibility of hybridization between species in captivity. Unfortunately, there are no official records for farms in Northumberland prior to the 1962 Mink (keeping) regulations, although fur farms were present from the 1920s. From 1962, the number of farms in Northumberland varied between two and six, although none are reportedly present now. There were also many 'backyard' farmers prior to 1962, from which martens may have escaped or been released.

Kyle *et al.* (2003) sampled mitochondrial DNA from seven martens, one from the skull of the specimen trapped in the Ingleby Greenhow/Broughton area (NZ/5703) in 1993 (Jefferies & Critchley 1994), one from Euxton, Lancashire (Birks *et al.* 1997), four from Northumberland and one from Cumbria. When compared with Scottish *M. martes* and North American *M. americana*, the North Yorkshire and the Euxton samples were closest to the Scottish *M. martes*. Two from Northumberland and one from Cumbria were identified as having intermediate probabilities of coming from either the Scottish *M. martes* or *M. americana* populations. When compared with European (German) *M. martes* or Yukon *M. americana*, the North Yorkshire and the Euxton samples were again closest *M. martes*. The same Northumbrian and Cumbrian samples were identified as having intermediate probabilities of coming from either the German *M. martes* or the *M. americana* populations. Kyle *et al.* (2003) showed that genetic introgression had occurred but was not evident in the Yorkshire or Lancashire samples.