CHAPTER 8

WEASEL (*Mustela nivalis* L.)

History of the status and distribution of the weasel in Yorkshire

The extensive and disparate body of literature from Quaternary, archaeological, topographical, local history and folklore studies provides little information on the origins and history of the weasel (*Mustela nivalis* L.) in Yorkshire. No evidence of weasel has yet been confirmed from post-glacial cave faunas listed for any of the Yorkshire cave sites (Chamberlain 2002, Jenkinson 1984, Yalden 1999). Skeletal remains from unstratified Pleistocene deposits in Kirkdale Cave, North Yorkshire, figured as 'weasel' in Buckland (1823) were subsequently referred to stoat (*M. erminea*) (Rutter 1956). Although skeletal remains were identified in two sedimentary strata (a single bone in each) within Pin Hole Cave, Creswell on the Derbyshire/ Nottinghamshire border near the border with South Yorkshire, these occurred in a cold-phase glacial context characterised by the presence of woolly rhinoceros (*Coelodonta antiquitatis*), reindeer (*Rangifer tarandus*) and arctic lemming (*Dicrostonyx torquatus*) (Jenkinson 1984). Skeletal material, from excavations at the Mesolithic seasonal hunting camp by the River Kennet at Thatcham, Berkshire (10,050-9,600 b.p) (King 1962) and Star Carr at the eastern end of the Vale of Pickering, North Yorkshire (9,488 b.p.) (Fraser & King 1954), produced evidence of a mammal fauna of temperate forest and lakeside habitats. These, with the exception of elk (*Alces alces*), aurochs (*Bos primigenius*) and tarpan (*Equus ferus*), included a broad representation of species which occurred in Britain through to historic times. Although the carnivora were represented by brown bear (*Ursus arctos*), wolf (*Canis lupus*), red fox, wildcat, pine marten and badger, there was no evidence of the small mustelids (weasel or stoat). Despite the presence of potential prey species of woodmouse (*Apodemus sylvaticus*) and bank vole (*Clethrionomys glareolus*) in the woodlands at 9,960 b.p., as demonstrated in the fauna at Dog Hole Fissure at Cresswell Crags, North Nottinghamshire (Jenkinson 1984), there was still no evidence of either weasel or stoat.

Their absence or relative scarcity could suggest a dependence on terrestrial rodent prey, particularly field vole (*Microtis agrestis*), of open grassy habitats. The scarcity or absence of widespread open grassy habitats has been demonstrated by pollen zone VIIa evidence from sites across southern Britain, with deciduous woodland habitat blanketing both upland and lowland topographies between 7,000 and 5,000 b.p. (Yalden

1999). At this time, the fortunes of open grassland rodents and their small mustelid predators, if they occurred at all, may have been dependent on the opening up and maintenance of grassy glades by large herbivores such as aurochsen (*Bos primigenius*), red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*). Over the succeeding 3,000 years much of this woodland was felled and prevented from recolonising by pastoral and arable practices of Neolithic farmers (Yalden 1999). Although it is possible that weasel and stoat could have become widespread during this period, they still remain absent from the archaeological record. The earliest, claimed post-glacial weasel material was from a Bronze Age barrow at Gristhorpe, North Yorkshire, where 'calcined' bones found as grave goods in an oak-trunk coffin were examined by Dr William Buckland and referred to as weasel (Williamson 1872, Rutter 1956). Subsequent examination by Drs N. D. Melton and J. Bond of Bradford University has shown these bones to be of fox and pine marten (N. D. Melton *pers. comm*.).

The absence of material evidence in bone assemblages from cave or archaeological sites from the Pleistocene through to medieval strata suggests the weasel may have been scarce or absent from the Yorkshire, or even the British, fauna until relatively recent times, certainly after the land-bridge with the continent had submerged beneath the rising North Sea about 9,500 years b.p. It may even suggest that the weasel could have been introduced as late as historic times, a prospect that urges the re-evaluation of the material from Kirkdale cave (see Rutter 1956).

Etymological and literary sources

Despite the absence of material evidence through to historic times, a knowledge of weasel is shown by usage in written form in England at least from the 8th century, and in Yorkshire from the 14th century, with it having sufficient impact on the rural economy as to be regarded as 'vermin' from the 16th century. According to sources in the Oxford English Dictionary (1989), the term weasel (as *Mustela uueosule*) is included in the *Corpus Glossary*, the earliest English text written prior to 725AD (Early English Text Society 1885). Archbishop Ælfric's Vocabulary of the 10th century includes '*wesel*' and '*hearma*' (Ermine) (Wright 1884). One of its earliest written prose usages '*Ye wesill overcomys him and slas* [slays] *him*' was by Richard Rolle, the religious mystic of Hampole near Doncaster, in his *Hampole Psalter* (Psalms of David and certain canticles with a translation and expositions in English) written about 1340. Here the term wesill is used as the personification of a predatory malevolent force,

evidently with the perceived characteristics of a weasel, rather than in the sense of an actual weasel. Whether a knowledge of this animal was derived from imported cultural sources or first hand field experience is not known, though Gairdner's edition of the Paston letters (III, 365) of 1490 which includes a reference to the practice of rabbit warreners in the parish of Oxenhed, Norfolk, hanging up such '*mysdoers and forfaytours as Wesellis…*' suggests the latter (OED). By 1566, '*wesell and stote*' were regarded as being sufficiently detrimental to agriculture to be included amongst 'ravening Byrdes and Vermyn' for which the Elizabethan 'Acte for the Preservation of Grayne' allowed parish officials to pay head money for their destruction.

Churchwardens' accounts for the parish of Rawcliffe near Goole between 1721 and 1760 included at least 15 variations of the term 'weasel', and in the parish of Arksey with Bentley near Doncaster between 1722 and 1767, 25 variations have been identified. Examination of the first element of the word produces the following forms: we, wea, wee, weo, whe, wi, wo and woo. The final element is more variable being subject to doubling of the first and final letter and the substitution of s for z or v: sal, sall, sel, sell, sil, ssel, ssell, sle, ssle, zle, zal, zall, zel, zzele, zol, zoll, val, vel, vil and vill. Collectively they conform to forms in Old High German, north and west Frisian, Dutch and Old English, indicating the term at least has a considerable etymological antiquity in the Yorkshire region, arriving with migrant northern European cultures.

Churchwardens' accounts

Weasel bounties (usually 2d. per head) have been traced in 11 Yorkshire parishes (the numbers of bounty payments given in parenthesis) as follows: Adwick le Street (30), Arksey with Bentley (652), Barnburgh (1), Bawtry (17), Bolton Percy (1), Doncaster (1), Great Ayton (2), Hook (3), Rawcliffe (85), Scarborough (1), Worsborough (4) and Yeadon (1).

Their reported presence in only 11 (18.3%) of the 60 sets of parish accounts for which carnivora bounties were recorded is surprisingly low, compared with 14 (23.3%) parishes for otter, 15 (25%) for badger, 44 (73.3%) for fox, and 51 (85%) for polecat. This could suggest it was not generally regarded as a threat to the rural economy, it was difficult to catch, it was uncommon or restricted in distribution during 17th and early 18th centuries, or its status as a pest species was sporadic. Figure 8.1 illustrates the periodicity of weasel bounty payments; the earliest record, a single bounty, dates from

1619 in Doncaster, the majority are clustered between 1721 and 1767, with a small cluster between 1817 and 1822.

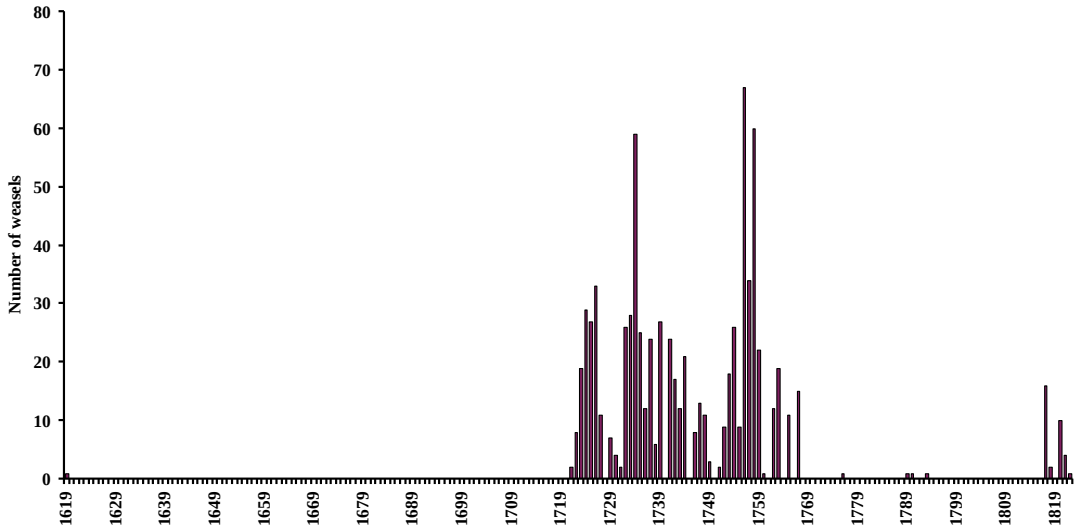

Figure 8.1. Periodicity and frequency of weasel bounty payments in 11 Yorkshire parishes from the 17th to early 19th century.

The earliest published allusions to the existence of weasel occurring in the Yorkshire region are as late the 1870s when it was reported during the YNU excursion to the Goole and Thorne Waste area on 6 August 1877 (Roebuck 1877) and when Cocks (1878) refers to ressel and rezzele as vernacular names for the weasel in the Cleveland area. Other vernacular names used in Upper Nidderdale during the 19th century include 'mouse-hunter' and 'mouse-weasel' (Clarke *et al*. 1886). This, however, is a function of the availability of published sources, rather than a reflection of its previous scarcity.

Distribution

From the late 19th century, regional reviews and county annual reports generally produced a commentary on the species' abundance rather than a mention of its mere presence (see Appendix 8.1). However, the distributional and statistical data derived from churchwardens' accounts provide an opportunity to look for earlier regional biases. Using the altitudes of those parishes (based on an estimation of the altitude near to the parish church) from which carnivora 'vermin' bounty payments have been traced, it is possible to investigate preference trends from 9ft at Swinefleet to 1000ft at Bradfield. Within this range, weasel bounty payments have been traced in parishes with

altitudes ranging from 12ft at Hook to 411ft at Yeadon. Although this suggests a wide range of geographical tolerance (Figure 8.2), plotting the % frequency of weasels for each of the parishes from which more than 25 carnivora bounty payment have been traced against altitude, indicates a pronounced low altitude bias prior to the 20th century.

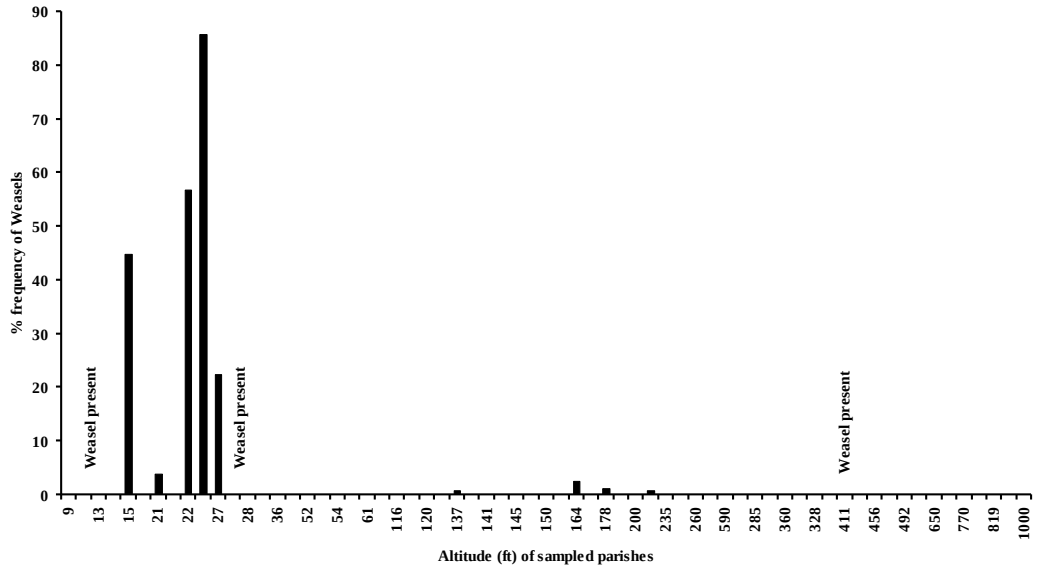

Figure 8.2. Presence and % frequency of weasel bounty payments plotted against altitude of parish.

From the late 19th century, species lists derived from naturalists' excursions to sites throughout the county routinely included mention of both weasel and stoat (see Howes 1984, Figure 10). Between 1877 and 1977, the Yorkshire Naturalists' Union undertook 505 site-recording excursions fairly evenly spread throughout the county, generally with one excursion to each of the five Watsonian vice-counties (61 to 65) per year. Table 8.1, based on data in Howes (1984, Appendix 2), gives the percentages of excursions from 1877 to 1977 to each of these vice-counties from which weasels and stoats were recorded. This source shows that weasels were marginally better recorded in sites within the two east coast vice-counties (36.3% and 31.6% for 61 and 62 respectively), where they occurred above the Yorkshire mean of 30%, but were below the county mean for those vice-counties linked to the Pennines. Stoat records in vice-counties 61, 62 and 64 were above the county mean of 34. Although this exercise

reveals a universal distribution for both species, it could possibly indicate an easterly bias.

Table 8.1. Occurrences of weasel and stoat reported at YNU excursions, 1877 to 1977.

	VC61	VC62	VC63	VC64	VC65	All areas
No. of excursions	99	98	107	114	87	505
% Weasel	36.3	31.6	25.2	28.9	28.7	30
% Stoat	43.4	34.7	25.2	35.9	31	34

Intra-guild competition

To search for evidence of potential competitive pressure exerted on weasels by a former fauna of larger carnivores, parishes have been selected where in excess of 25 carnivora bounty payments have been traced and where both polecat and weasel bounties were paid. Figure 8.3 shows the respective % frequencies of polecat and weasel bounty payments plotted in order of increasing polecat frequency. This shows that where

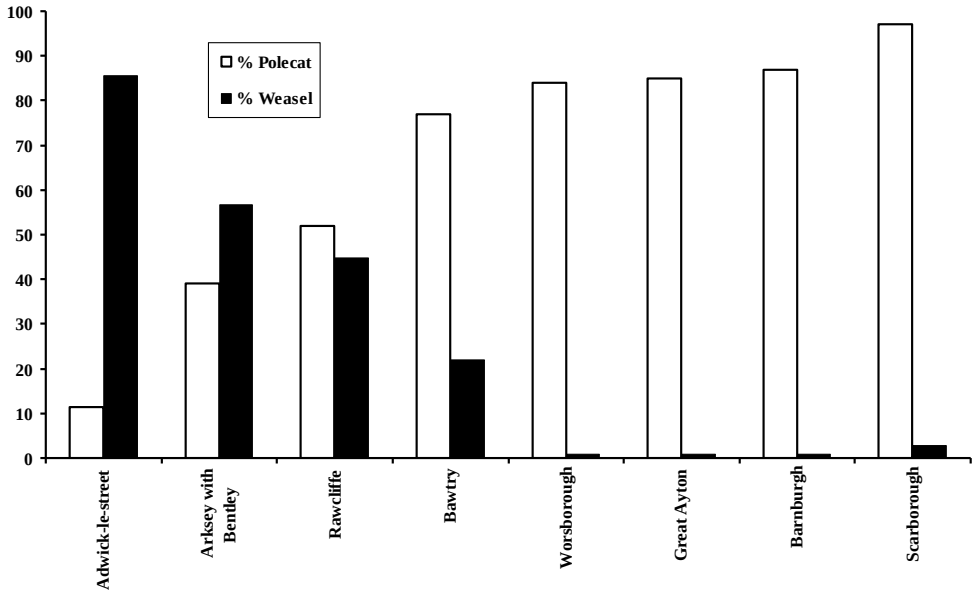

Figure 8.3. Comparisons of % frequencies of polecat and weasel in parish vermin bounty accounts, shown in order of increasing polecat frequency.

polecats constituted in excess of 80% of carnivore bounties, weasel bounties represented less than 5%, but when polecat bounties fell below 70% the relative frequencies of

weasels rose rapidly. This suggests that polecats may exert a competitive pressure on weasels to the extent that their populations may be suppressed. To further investigate this potentially competitive relationship, Figure 8.4 compares % frequencies of weasels with polecat, the regression line showing an R^2 value of 0.9688 indicating that low weasel occurrence was strongly associated with high occurrence in polecats.

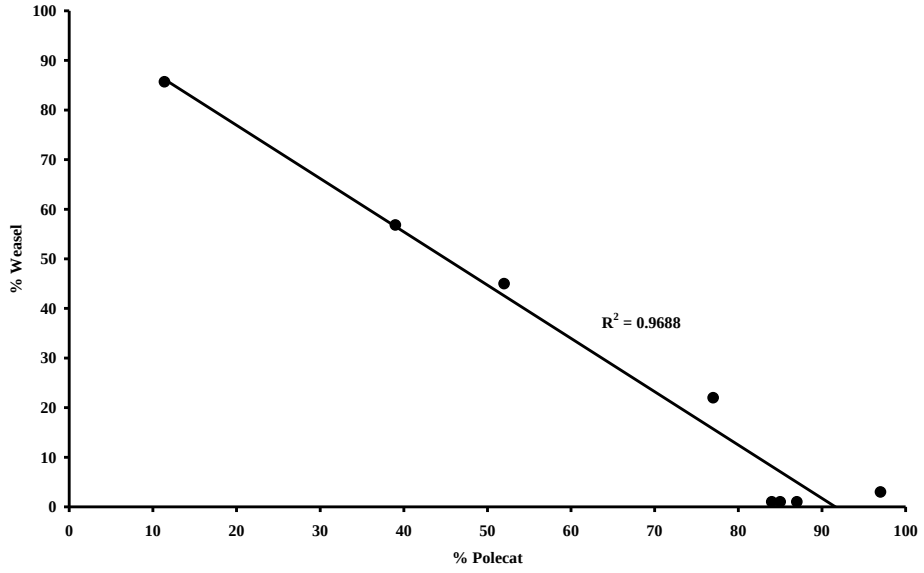

Figure 8.4. Relationship between % frequencies of Polecat and Weasel bounty payments in the same parishes

To investigate the prospect that foxes also exerted a predatory or competitive pressure, % frequencies of bounty payments for fox and weasel have been plotted in Figure 8.5, entries being arranged in order of increasing fox frequency. Again this shows a marked segregation with weasel only occurring in parishes where fox occurrence, as demonstrated by bounty payments, constituted less than 14% of bounties. Weasel abundance was able to rise above 20% only when fox bounties were consistently below 4%.

To quantify this pattern of mutual exclusivity, Figure 8.6 compares the % frequencies of weasels with fox, the regression line showing an R^2 value of 0.5469 indicating the decline in weasels was closely associated with the rise in foxes, although the association was not as close as with the polecat. That foxes may have exerted a controlling influence on this small mustelid is suggested by Mulder (1990) who reported on foxes killing and possibly being responsible for exterminations of stoats in dune regions of the Netherlands.

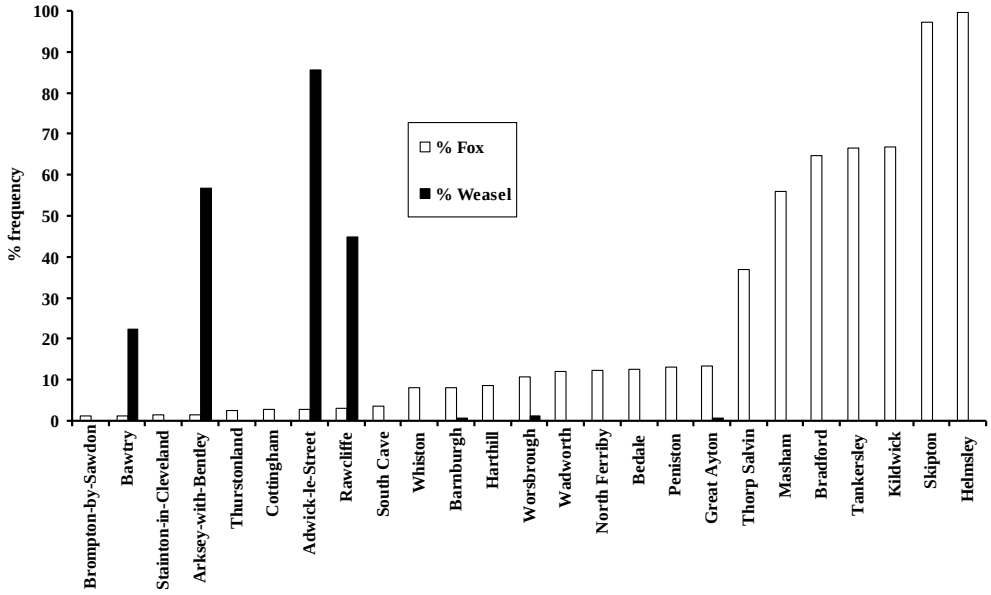

Figure 8.5. Comparisons of % frequencies of fox and weasel in parish vermin bounty accounts, shown in order of increasing fox frequency.

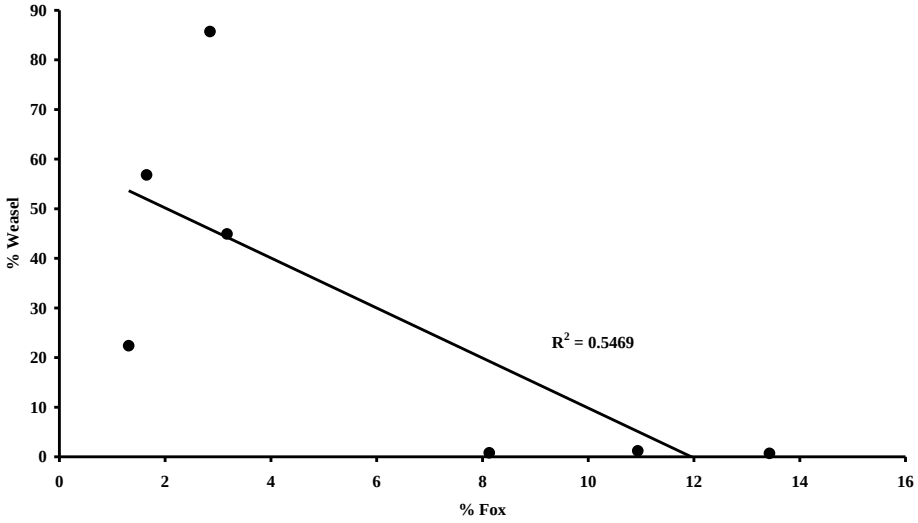

Figure 8.6. Relationship between % frequencies of fox and weasel bounty payments in the same parishes.

Perceptions of changes in status

In the absence of sequences of statistical data from the end of the 19th century to the 1960s, reports of status abstracted from local faunal reviews and annual Yorkshire mammal reports (see Table 8.1) from the 1880s to the 1970s, have been used to

generate an index of perceived abundance for both stoat and weasel. By examining the descriptive terminology, status points were awarded as follows: statements referring to population increase = 3 points; statements of high abundance = 2 points; static status = 1 point; and decline = -1 point. Figure 8.7, based on 71 reports of status, shows the respective points scored by weasel and stoat per decade from the 1880s to the 1960s.

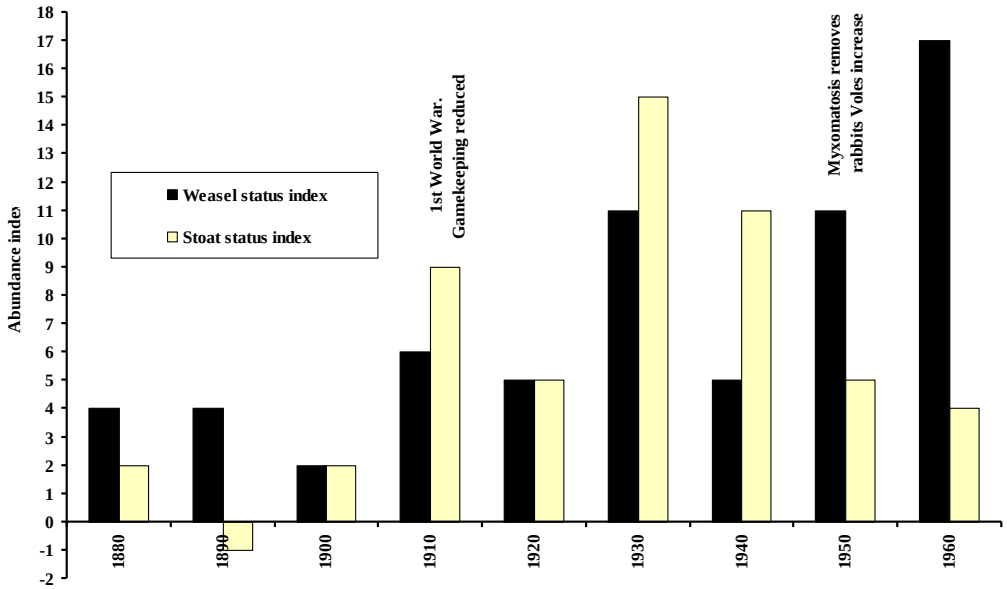

Figure 7. Perceived changes in status of stoat and weasel per decade from the 1880s to the 1960s as indicated by abundance index scores.

This indicates a perception among naturalists that weasels were generally more abundant than stoats up to the decade 1910-1919; if this is an accurate reflection, it could suggest a larger rodent population, which would tend to support higher weasel numbers. The relaxation of gamekeeping pressure during the First World War (1914-1918) may be partly responsible for an increase in statements of abundance at this time for both stoat and weasel. This decade also witnessed, as demonstrated by national game bag data, a marked increase in brown hare (*Lepus europaeus*), from c.15 killed per km^2 in 1910 to c.40 killed per km^2 in 1914 (Tapper 1992, Yalden 1999). This could have enabled stoat populations to benefit from the increased prey availability of this large lagomorph, or at least its young.

Post-myxomatosis population oscillation

In 1954 the mosquito and flea-carried viral disease myxomatosis spread through most of Yorkshire reaching its most remote northern Dales by 1955 and causing a severe

depletion in, and widespread extermination of, rabbit stocks. Tapper (1992), using the national game bag statistics, showed a collapse in the numbers of rabbits killed on shooting estates from almost 600 per km^2 in 1948 to almost zero in 1954 due to the pandemic. The game bag data also monitored stoat kills declining from c.15 per km^2 in 1946 to a post-myxomatosis nadir of less than 1 per km^2 in 1961. The removal of rabbit grazing pressure enabled a notable increase in vole, particularly *Microtus agrestis* populations in grassland habitats, providing weasels with a greatly enhanced food resource. Here, Tapper (1992) showed that c.4.8 weasels were killed per km^2 in 1953 immediately prior to the pandemic, rising to c.20 killed per km^2 in 1957.

The decline in the Yorkshire stoat abundance index from the 1930s peak of 15 to the 1960s low point of 4 would seem to mirror the national trend. Furthermore, the response of the Yorkshire weasel abundance index from 5 in the 1940s to 17 in the 1960s appears to mirror the pre- and post-myxomatosis trend. The dependence of the stoat on rabbit as a major food source and its inability to compete with the smaller weasel for the evidently increased rodent prey became evident in the aftermath of this event with reports of steep declines in stoat numbers coming from areas where rabbits had become scarce. A keeper in Littondale reported trapping about 60 stoats per year prior to 1955, when myxomatosis reached the Dale, dropping to about 10 per year during the subsequent period of rabbit depopulation (Howes 1977). On the Sandbeck estate on the south Yorkshire border with Nottinghamshire in 1965, the keeper remembered a drop in the number of stoats trapped during the period of myxomatosis and the 95 small mustelids exhibited on the keepers gibbet there in 1965 (Clegg 1967) gave a ratio of 2.96 weasels to 1 stoat. By 1962, weasels on Spurn were thought to be 'well outnumbering stoats', and by 1963 weasels were being seen more than stoats in the Knaresborough area. Stead (1966) noted that stoats on the Tees Marshes had declined and that weasels were abundant, being seen there more frequently than any other mammal. The same was reported for the Royston, Carlton and Wintersett areas where only one stoat had been seen in four years (Howes 1977).

Hewson (1972), using gamekeepers' records of tunnel traps from an unnamed 800 ha shooting estate [Swinton Park] in North Yorkshire, showed that c.44 stoats were trapped during the period 1943-1946, dropping to 9 per year in 1969 during the period of heavily reduced rabbit stocks. Concurrent with this decline, Hewson (1972) showed that numbers of weasels trapped had risen from 17 per year during the period 1943-

1946 to 31 in 1969. The ratio of weasels to stoats trapped on the estate pre-myxomatosis was 0.38 : 1, changing to 3.4 : 1 in the period of low rabbit numbers.

Using the few comparative statistics available, Figure 8.8 presents the ratios of weasels to stoats from the late 19th century to the 1960s; these are derived from the numbers of weasels and stoats on gamekeeper's gibbets at Irton in 1890 and 1905 (Gyngell 1905), Kirk Smeaton in 1901 (Sheppard 1901), Suffield in 1904 (Sheppard 1904) and Sandbeck Park in 1965 (Clegg 1967).

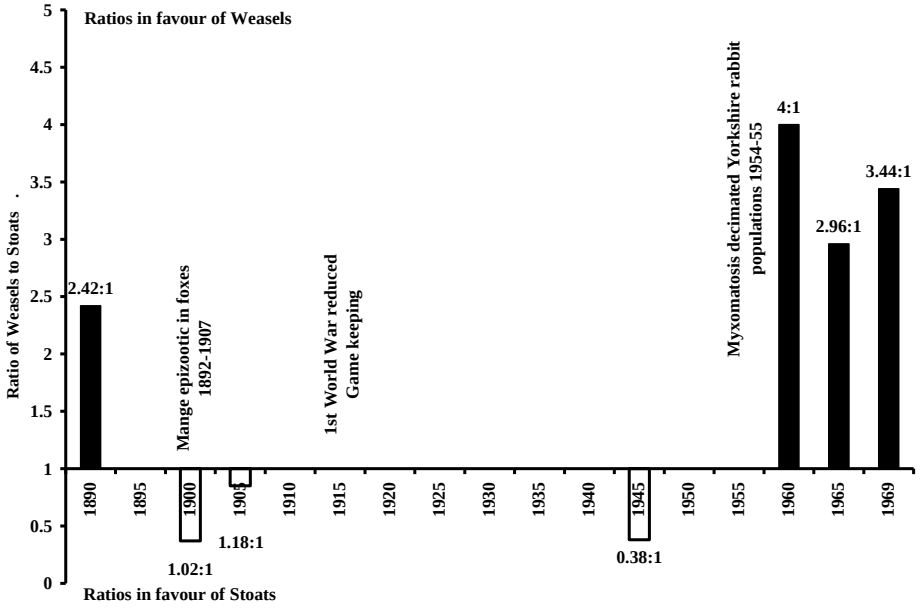

Figure 8.8. Variations in ratios of weasels to stoats from the 1890s to the 1960s based on statistics from gamekeeper's gibbets.

The numbers of weasels and stoats trapped on an 800ha estate in North Yorkshire provide ratios for 1943-1946 and 1969 (Hewson 1972) and relative numbers of field observations of weasels and stoats at Spurn Bird Observatory provide the ratio for 1962 (Govett 1963). Figure 8.8 confirms the general trends in the perceived status changes in weasel and stoat (Figure 8.7).

Conclusions and discussion

Origins of the Yorkshire population

Absence of conclusive evidence of weasel in the post-glacial sub-fossil record for the Yorkshire region and its absence from elsewhere in Britain prior to the submergence of the land-bridge with Europe some 9,500 years b.p. suggests it may have been accidentally introduced into the British fauna. It would appear that a nomenclature and

knowledge of the weasel was imported with Germanic languages during the period of Saxon colonisation, actual evidence of its presence and that its status as a pest species does not appear until as late as the 1566 Act of Parliament enabling parish officials to pay head money for their destruction, the earliest Yorkshire example being traced to 1619.

Periodicity from the 17th to the 19th centuries

The scarcity and sporadic periodicity as shown in Figure 8.1 is difficult to interpret, although it could relate to periods when rodent populations were particularly high for reasons of prevailing habitat (agricultural) management or removal of competitive predators, resulting in a surplus of unexploited rodent prey. The major changes in rural landscape brought about by parliamentary enclosures from the 1750s to 1850s did not coincide with the main period of weasel bounties. Whereas bounty payments for competitive predators such as fox and polecat were higher than any other carnivore, up to 9.1 per parish per year during the second half of the 17th century, it dropped to a maximum of 3.7 bounties per parish per year during the first half of the 18th century. If this latter figure indicated a lower population of competitive predators, this would indeed release a greater rodent resource for use by weasels. The final batch of weasel bounties from 1817 to 1822 coincided with mean fox and polecat bounty payments of 1.1 per parish per year.

Intra-guild competition

In examining the persecution pressures specifically within the weasel bounty parishes (see Figures 8.3 and 8.5), the higher weasel populations coincided with lower polecat and fox populations. This suggests that the status of the weasel as England's most abundant native carnivore (apart from the feral cat) (Harris *et al*. 1995) may be a recent phenomenon, post-dating the 18th and 19th century decline and demise of Britain's larger carnivores.

Clarke and Roebuck's (1881) assertion that weasels were more numerous than stoats during the latter half of the 19th century is borne out by the specimens on the keeper's gibbet at Irton in 1890 giving a ratio of 2.42 : 1. Furthermore, of the wide range of vermin killed by the keeper of the 1,290 acre shoot at Hooton Pagnell during the 14 months prior to 1868, 111 weasels but no stoats are listed (Rudston & Witney 1934). The Hooton Pagnell data provide what appears to be a relatively low cull rate of

0.07 per acre per year, although in a 5,000-acre keepered parish in north Lincolnshire in 1904 evidence is provided to show a cull rate of 0.0128 weasels and 0.0084 stoats per acre and a ratio of weasels to stoats of 1.5 : 1 (Peacock 1904).

With red fox populations being managed and maximised for sporting purposes by the seven Yorkshire hunts and with fox populations rising to record levels during the early 1890s (see Chapter 3), foxes would at this time have competed heavily with stoats for rabbit prey. This may be an explanation of why stoats were outnumbered by weasels at this time. At the close of the 19th century, severe outbreaks of sarcoptic mange evidently decimated fox populations on the Middleton, Bramham and probably most Yorkshire hunt territories, temporarily releasing from 1892 to 1902 the rabbit population for exploitation by other predators. This phenomenon may be the cause of the population swing in favour of stoats at the turn of the 20th century. Stoats were evidently outnumbering weasels in the late-1940s prior to myxomatosis. The prompt switch in favour of weasels during the 1960s, as indicated in Figure 8.7, is confirmed in Figure 8.8. Interestingly, the cause for this change in status was not understood at the time, being attributed to a reduction in game keeping, although Govett (1964) noticed that weasels were particularly numerous in areas with high populations of voles.