1.2.2 Biological

1.2.2.1 Flora

Habitats

In 1983, the reserve was classified using the standard NCC habitat classification technique. This classification has been used as the basis for a description of the vegetation found at Parsonage Down NNR. See Figure 1.2.2.1a and Table 1.2.2.1a.

Table 1.2.2.1a

Habitats recorded on Parsonage Down NNR

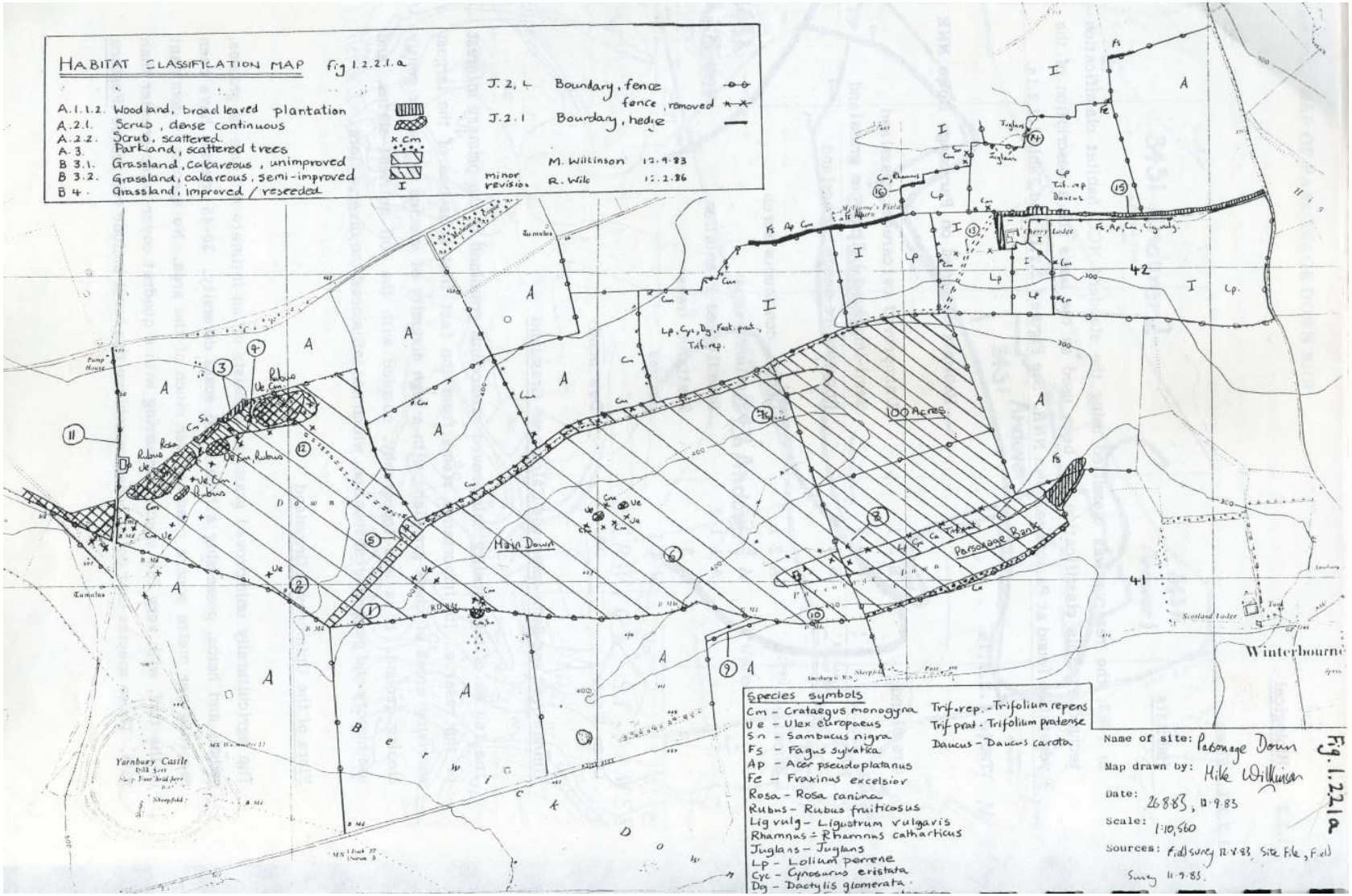
Grassland	B 3 1	Unimproved calcareous grassland
	B 3 2	Semi-improved calcareous grassland
	B 4	Improved/re-seeded grassland
Woodland	A 2 1	Dense, continuous scrub
	A 2 2	Scattered scrub
	A 1 1 2	Broadleaved Plantation
	A 3	Scattered trees
	J 2 1	Hedges
Open Water		Dew pond

Unimproved and Semi-improved Calcareous Grassland

The 160 ha of high quality unimproved calcicolous grassland is the primary interest of the reserve. Its importance stems from the fact that it is one of the largest surviving areas of chalk grassland with a high diversity of species on flat or gently sloping ground. It is this topography, coupled with the soil nutrient status, land use history and geographical location, which has influenced the diverse flora.

Flora of the Unimproved Grassland

The agriculturally unimproved grassland consists of an intimate mixture of grasses, sedges and herbs, possessing a high small scale diversity. 30-45 species have been recorded per metre square quadrat over much of the area. No species is dominant in the turf, with very few species occurring with a quadrat cover value greater than 25%. Those species that do on occasion achieve this level include red fescue (Festuca


HABITAT CLASSIFICATION MAP fig 1.2.2.1.a
A.1.1.2. Woodland, broad leaved plantation
A.2.1. Scrub, dense continuous
A.2.2. Scrub, scattered.
A.3. Parkland, scattered trees
B 3.1. Grassland, calcareous, unimproved
B 3.2. Grassland, calcareous, semi-improved
B 4. Grassland, improved / reseeded
J. 2, 4 Boundary, fence
fence, removed
J.2.1 Bourdary, hedge
M. Wiltinson 12.9.83
minor revision R. Wile 12.2.86
Main Down
Parsonage Down
100 Acres.
Winterbourne
Species symbols
Cm - Crataegus monogyna
Ue - Ulex europaeus
Sn - Sambucus nigra
Fs - Fagus sylvatica
Ap - Acer pseudoplatanus
Fe - Fraxinus excelsior
Rosa - Rosa canina
Rubus - Rubus fruticosus
Lig vulg - Ligustrum vulgaris
Rhamnus - Rhamnus catharticus
Juglans - Juglans
Lp - Lolium perrene
Cyc - Cynosurus cristata
Dg - Dactylis glomerata
Trif.rep. - Trifolium repens
Trif.prat - Trifolium pratense
Daucus - Daucus carota
Name of site: Parsonage Down
Map drawn by: Mike Wilkinson
Date: 26883, 12.9.83
Scale: 1:10,560
Sources: Field survey 12.9.83, Site File, Field Survey 11.9.85.
Fig. 1.2.2.1a

rubra), which is probably the most abundant species on the reserve, sheep's fescue (F. ovina), common bird's-foot-trefoil (Lotus corniculatus) and red clover (Trifolium pratense). Other widespread grasses include meadow and downy oat-grass (Avenula pratensis and A. pubescens), quaking grass (Briza media), crested dog's-tail (Cynosurus cristatus), creeping bent (Agrostis stolonifera), cock's-foot (Dactylis glomerata) and crested hair-grass (Koeleria macrantha). The glaucous sedge (Carex flacca) and spring sedge (C. caryophyllea) are also widespread. Herbs prominent in the turf include salad burnet (Sanguisorba minor), lady's bedstraw (Galium verum), bulbous buttercup (Ranunculus bulbosus), fairy flax (Linum catharticum), devil's-bit scabious (Succisa pratensis), small scabious (Scabiosa columbaria) and dropwort (Filipendula vulgaris). The more exacting chalk grassland species occur less frequently. These include horseshoe vetch (Hippocrepis comosa), chalk milk wort (Polygala calcarea), clustered bellflower (Campanula glomerata), kidney vetch (Anthyllis vulneraria), wild thyme (Thymus praecox), clustered bellflower (Campanula glomerata) and frog orchid (Coeloglossum viride).

Nationally restricted species occurring include dwarf sedge (Carex humilis), burnt tip orchid (Orchis ustulata), early gentian (Gentianella anglica), bastard-toadflax (Thesium humifusum) and field fleawort (Senecio integrifolius). These are described in more detail later.

Of particular interest is a group of species which denote a higher soil nutrient status, which is unusual for chalk downland. Some of these are only mildly mesotrophic such as dropwort (Filipendula vulgaris), downy oat-grass (Avenula pubescens) and sainfoin (Onobrychis viciifolia) while others are more markedly so, such as red and white clover (Trifolium pratense and T. repens), spiny rest harrow (Ononis spinosa), perennial rye-grass (Lolium perenne), selfheal (Prunella vulgaris), yellow oat-grass (Trisetum flavescens), Yorkshire fog (Holcus lanatus), sweet vernal-grass (Anthoxanthum odoratum) and field wood-rush (Luzula campestris).

Also of note is the rarity of a number of species common in light grazing regimes. Tor grass (Brachypodium pinnatum) and upright brome (Bromus erectus) are the most obvious examples, and this almost certainly reflects the 60 year recent history of relatively heavy grazing.

Although forming a less significant part of the grassland flora other species respond to facets of topography, aspect and management history. Less base rich soils occur at Castle Bushes and here plants with a more acidic preference, such as tormentil (Potentilla erecta) and cat's ear (Hypochoeris radicata), occur with species such as betony (Stachys officinalis) and saw-wort (Serratula tinctoria) which are prominent

here, but also occur elsewhere. A small patch of long ungrazed chalk grassland supports species such as wild parsnip (Pastinaca sativa), wild mignonette (Reseda lutea) and the knapweed broomrape (Orobanche elatior).

Anthills occur across much of the unimproved grassland. They support characteristic plant species which can survive the continual soil deposition, as well as the excessive heating and drying which anthills are subjected to. These species include annuals such as common whitlow grass (Erophila verna), thyme-leaved sandwort (Arenaria serpylifolia) and occasionally rue-leaved saxifrage (Saxifraga tridactylites), and creeping species, typically wild thyme (Thymus praecox), common rock-rose (Helianthemum nummularium), harebell (Campanula rotundifolia), common mouse-ear (Cerastium fontanum), squinancy wort (Asperula cynanchica) and mouse-ear hawkweed (Hieracium pilosella). Grass species occurring on anthills include red fescue (Festuca rubra) and crested hair-grass (Koeleria macrantha).

In total the reserve supports 110 of the 161 species listed on the NCC, South Region, chalk grassland recording card and 18 out of 43 of those species which are indicative of a long period of uninterrupted management without ploughing, fertilizers or herbicides. These totals are amongst the highest for Wiltshire chalk grassland sites.

Restricted Species

The nationally restricted species are those that occur in 16 to 100 10 x 10 kilometre grid squares.

Carex humilis dwarf sedge.

National occurence, 22 10 x 10 km squares. Map 1.2.2.1b.

Estimated population on the reserve > 100,000 individuals.

Carex humilis has a predominantly south-west distribution and is considered one of the characteristic species of the south-western chalk. At Parsonage Down NNR its distribution is patchy. It is usually abundant where it occurs. It is largely absent from the plateau top areas and from those areas having evidence of historical (last 200 yrs) ploughing, notably the burnbake area. It would seem that its ability to re-colonise is limited on the reserve, in contrast to Martin Down NNR, Hants, where it is successfully recolonising 30 year old swards. It is possible that this slow recolonisation is due to the heavier grazing pressure occurring on the reserve, although aspect may also be a factor.

Gentianella anglica - early gentian.

National occurrence, 36 10 x 10 km squares. Map 1.2.2.1c.
Estimated population on the reserve < 600.

This species is the only endemic to the South of England, and therefore has an international importance. Apart from a single 1987 record for Castle Barn (compt 1), it is restricted on the reserve to Parsonage Bank (compt 3). A decline in this species has been noted (table 1.2.2.1.b) which may be the result of the changes which occurred due to the sale of land following NCC purchase in 1980. This sale of land changed the grazing units and subsequently the grazing patterns. These changes are discussed in a report by R Wild (1988). The critical factors would seem to be the reduced proportion of cattle grazing, a change from cows to young stock and changes in stock use behaviour. The overall effects of this may have been to produce a closed sward, with little of the small scale bare ground patterning that occurred previously. Changes in fence lines were undertaken in 1984 in an attempt to rectify the problem but further changes in stocking patterns may need to take place.

Table 1.2.2.1b

Reproductive heads of Gentianella anglica recorded in a 10 x 18 plot

1980	1985	1986	1987
1207	1	6	5

Senecio integrifolius - field fleawort.
National occurrence, 52 10 x 10 km squares. Map 1.2.2.1d.
Estimated population size on reserve, < 500 individuals.

A small population was recorded on Castle Barn in 1980, and several individuals were recorded on Parsonage Bank in 1987. Also in 1987 a single specimen was recorded near the scrub on Castle Down (compt 2). This species is probably under recorded.

Orchis ustulata - burnt-tip orchid.
National occurrence, 63 10 x 10 km squares. Map 1.2.2.1e.
Estimated population size on reserve, > 10,000 individuals.

This species is widespread across much of the down with a DAFOR rating of 'occasional' in most areas. It is almost certainly the largest population for this species in the country.

Thesium humifusum - bastard-toadflax.

National distribution 73 10 x 10 km squares. Map 1.2.2.1f.

Estimated population size on reserve > 3,000 individuals.

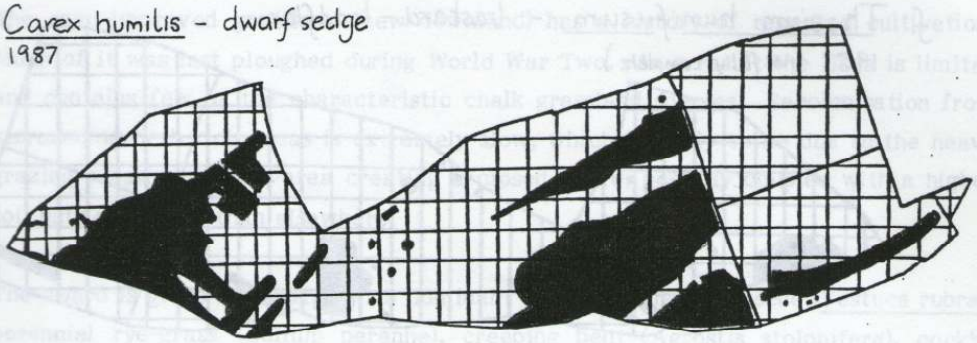
This species is reasonably abundant in the areas of higher quality turf and sparsely distributed elsewhere. The distribution map is not fully complete.

Distribution maps of restricted species. Figures 1.2.2.1.b-f.

A = approximate position

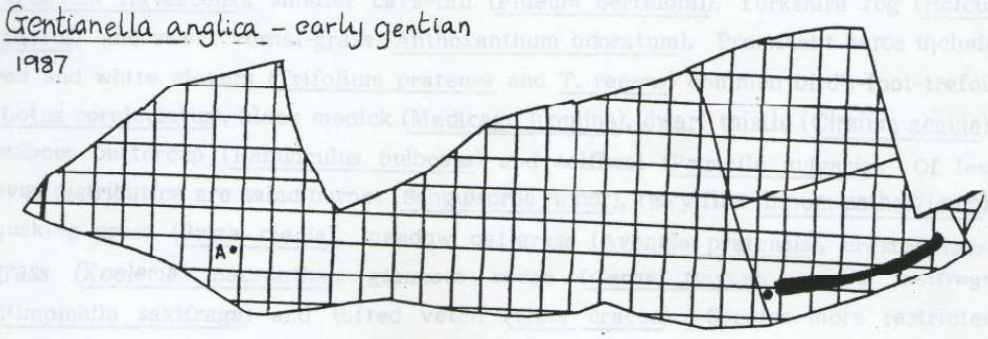
b. Carex humilis - dwarf sedge

1987



c. Gentianella anglica - early gentian

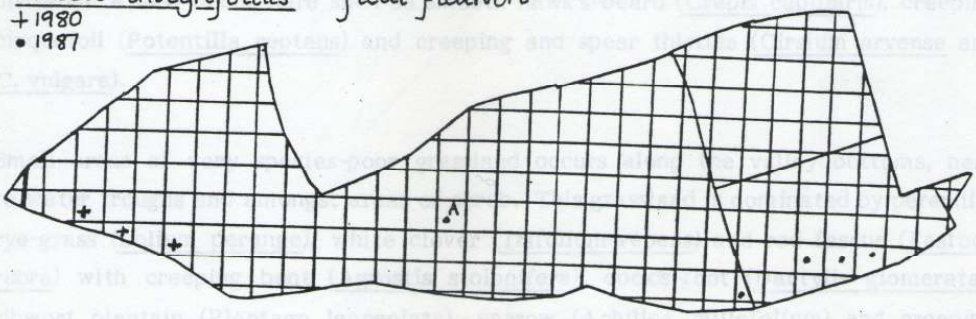
1987



d. Senecio integrifolius - field fleawort

+ 1980

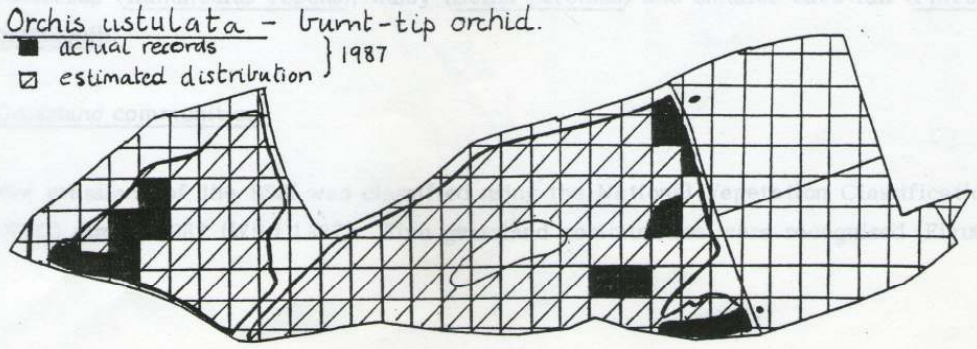
• 1987



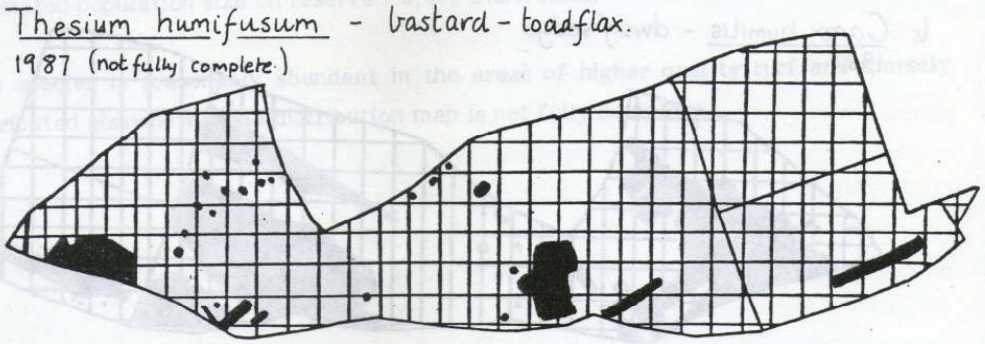
e. Orchis ustulata - burnt-tip orchid.

■ actual records

⊠ estimated distribution } 1987



f. Thesium humifusum - bastard - toadflax.
1987 (not fully complete)



Flora of the Semi-improved Grassland

The semi-improved grassland (new downland) has a history of repeated cultivation. Much of it was last ploughed during World War Two. As a result the flora is limited and contains few of the characteristic chalk grassland species. Recolonisation from surrounding herb-rich areas is extremely slow, which is likely to be due to the heavy grazing pressure in this area creating a closed sward, possibly coupled with a higher soil nutrient status than elsewhere.

The sward is grass dominated with dominant species being red fescue (Festuca rubra), perennial rye-grass (Lolium perenne), creeping bent (Agrostis stolonifera), cock's-foot (Dactylis glomerata), crested dog's-tail (Cynosurus cristatus), yellow oat-grass (Trisetum flavescens), smaller cat's-tail (Phleum bertolonii), Yorkshire fog (Holcus lanatus) and sweet vernal-grass (Anthoxanthum odoratum). Prominant herbs include red and white clovers (Trifolium pratense and T. repens) common bird's-foot-trefoil (Lotus corniculatus), black medick (Medicago lupulina), dwarf thistle (Cirsium acaule), bulbous buttercup (Ranunculus bulbosus) and selfheal (Prunella vulgaris). Of less even distribution are salad burnet (Sanguisorba minor), fairy flax (Linum catharticum), quaking grass (Briza media), meadow oat-grass (Avenula pratensis). crested hair-grass (Koeleria macrantha), glaucous sedge (Carex flacca), burnet saxifrage (Pimpinella saxifraga) and tufted vetch (Vicia cracca). Species more restricted in distribution include small scabious (Scabiosa columbaria), common knapweed (Centaurea nigra) and devil's-bit scabious (Succisa pratnesis). Species that indicate disturbance also occur here such as smooth hawk's-beard (Crepis capillaris), creeping cinquefoil (Potentilla reptans) and creeping and spear thistles (Cirsium arvense and C. vulgare).

Small areas of very species-poor grassland occurs along the valley bottoms, near to water troughs and amongst areas of scrub. This grassland is dominated by perennial rye-grass (Lolium perenne), white clover (Trifolium repens) and red fescue (Festuca rubra) with creeping bent (Agrostis stolonifera), cock's-foot (Dactylis glomerata), ribwort plantain (Plantago lanceolata), yarrow (Achillea millefolium) and creeping thistle (Cirsium arvense) being frequent. Also occurring are species such as creeping buttercup (Ranunculus repens), daisy (Bellis perennis) and smaller cat's-tail (Phleum bertolonii).

Grassland communities

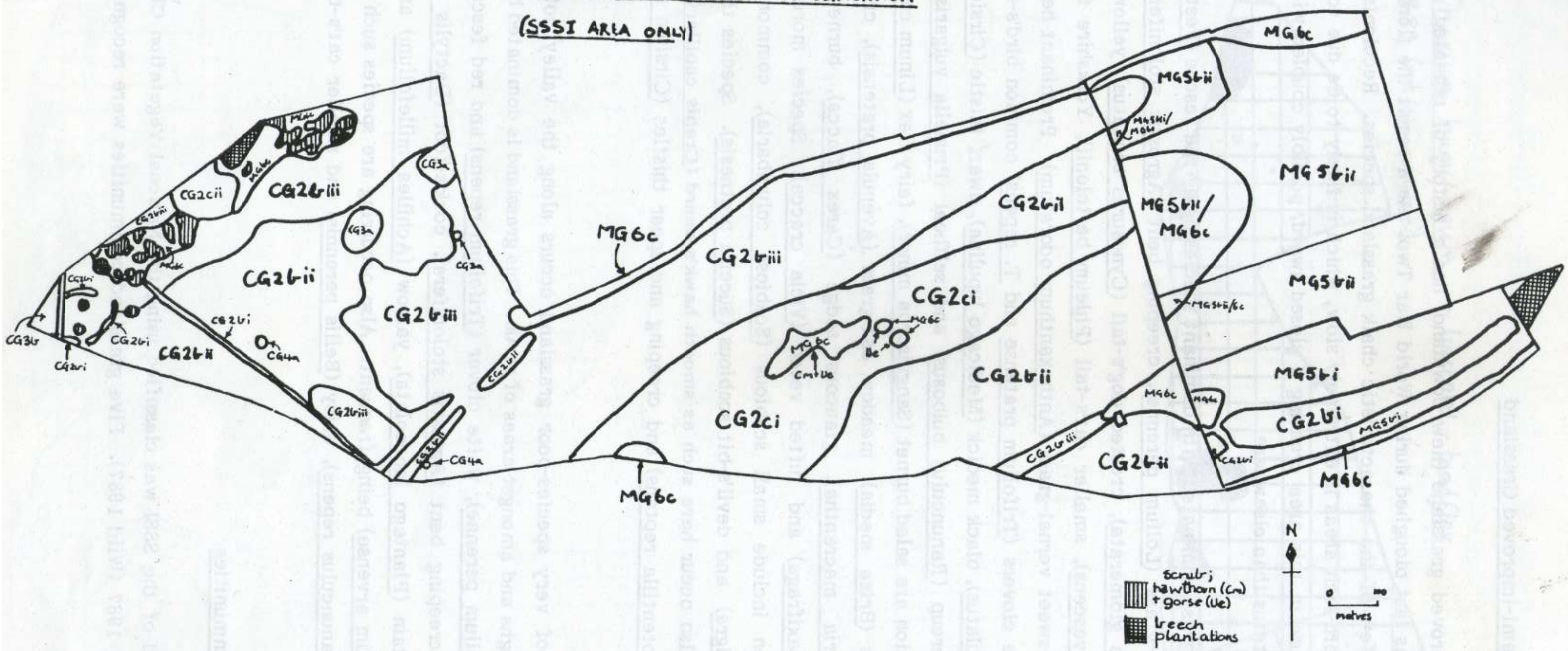
The grassland of the SSSI was classified using the National Vegetation Classification (NVC) during 1987 (Wild 1987). Five grassland communities were recognised (Figure

Fig 1.2.2.1.g

PARSONAGE DOWN NNR

NATIONAL VEGETATION CLASSIFICATION

(SSSI AREA ONLY)



1.2.2.1g) of which the most important was the Festuca ovina - Avenula pratensis calcicolous grassland. It is the most botanically rich and covers most of the reserve. Very small areas of Bromus erectus and Brachypodium pinnatum calcicolous grasslands occurred within the Festuca - Avenula grassland. A sizable area of less species-rich Cynosurus cristatus - Centaurea nigra mesotrophic grassland occurred on the semi-improved new downland. In the valley bottoms and around the scrub occurs the species poor Lolium perenne - Cynosurus cristatus grassland.

NVC Communities Recorded at Parsonage Down

Calcicolous grasslands

Festuca ovina - Avenula pratensis grassland community (CG2)
Succisa pratensis - Leucanthemum vulgare sub-community (CG2b)

CG2bi	Typical variant
CG2bii	Onobrychis viciifolia variant
CG2biii	Ononis spinosa variant

Holcus lanatus - Trifolium repens sub-community (CG2c)

CG2ci	Typical variant
CG2cii	Hypochoeris radicata - Potentilla erecta variant

Bromus erectus grassland community (CG3)

CG3a	Typical sub-community
CG3b	Centaurea nigra sub-community

Brachypodium pinnatum grassland community (CG4)

CG4a	Avenula pratensis - Thymus praecox sub-community

Mesotrophic grasslands

Cynosurus cristatus - Centaurea nigra grassland community (MG5)
Galium verum sub-community (MG5b)

MG5bi	Unploughed in WWII variant
MG5bii	Ploughed in WWII variant
MG5bii/MGbc	Transitional grassland

Lolium perenne - Cynosurus cristatus grassland (MGb)

MG6c	Trisetum flavescens sub-community

Summary

The grassland communities on the reserve appear to grade from nutrient-poor, species-rich types, that contain large numbers of typical chalk grassland species (CGc2bi) through less nutrient-poor, species rich-types (CG2bii and iii, 2c i and ii) to more nutrient-rich, species-poor types (MG5bi, ii and iii, MGbc). Topography resulting in soil differences, grazing history and past cultivation appear to be the major factors influencing these grassland types.

Of interest is the large area of unusual variants of the Festuca - Avenula/Succisa - Leucanthenum sub-community which are characterised by mildly mesotrophic calcicolous species. This mesotrophic element of the flora is most likely the result of deeper, more nutrient rich soils that occur on the gently sloping land upon which these swards are located, coupled with a long (60 years) recent history of moderately heavy grazing.

The communities did not fit easily into the NVC. This may be due to the fact that Parsonage Down NNR is one of the, if not the only, remaining well grazed site on gently sloping land. It is likely that Parsonage Down supports vegetation communities that were formerly widespread on Salisbury Plain. Similar communities probably occur on steep sites, as transition zones between sub-communities at the top and bottom of the slope.

Calcicolous Grassland

Festuca Avenula grassland (CG2)

Almost all the old unimproved chalk grassland on the reserve fits into the Festuca - Avenula grassland community, and contains the core of the biological interest. Two sub-communities were recognised, the Succisa pratensis - Leucanthemum vulgare sub-community having three variants, and the Holcus lanatus - Trifolium repens sub-community having two variants.

This community at Parsonage Down is in some respects typical of most Festuca - Avenula swards being a rich intermix of grasses and herbs, and contains many species characteristic of the community including several rarities. It has the small scale richness and variety of the community with an average of 35.4 species per metre square (range 27-46). It does, however, differ from the typical Festuca - Avenula community. It contains a number of species which are found at higher frequency than is normally allowed for within the NVC. Over much of the area Festuca rubra

is more frequent than F. ovina, the latter species being in places quite sparse. Even where F. ovina is frequent F. rubra occurs with equal frequency. Lolium perenne and Trifolium repens are more frequent than is usual. As has been mentioned other species of a more mesic tendancy such as Avenula pubescens, Cynosurus cristatus, Phleum bertolonii, Pimpinella saxifraga, Filipendula vulgaris and in some variants Onobrychis viciifolia, Ononis spinosa and Trisetum flavescens are more frequent than in the CG2b and CG2c sub-communities given in the NVC.

CG2b Succisa pratensis - Leucanthemum vulgare sub-community

This sub-community is well represented in Wiltshire but on the reserve mostly occurs as unusual variants.

CG2bi The typical variant

This variant fits closely to the sub-community described in the NVC. It occurs on Parsonage Bank and on some of the earthworks of Castle Barn. Festuca ovina, Thymus praecox, Hippocrepis comosa, Asperula cynanchica and Polygala calcarea achieve higher frequencies than elsewhere. Lolium perenne, Trifolium repens and Festuca rubra retain a higher frequency, but many of the mesotrophic species occur at a lower frequency here. All of the nationally restricted species are present, with this community being the main location for Gentianella anglica. Carex humilis and Thesium humifusum are abundant while Orchis ustulata and Senecio integrifolius occur very sparsely. Carlina vulgaris only occurs in this variant.

Parsonage Bank is a north facing slope and the steepest area on the reserve. It has a long history of harder grazing than the rest of the old downland, the turf summer maximum in 1987 being 4.5cm high. Like the earthworks it has thinner soils than other parts of the reserve. These factors are most likely to combine to produce the differences between here and the rest of the reserve.

CG2bii The Onobrychis viciifolia variant

This is the most species-rich variant of those occurring on gentle topography. Festuca rubra and F. ovina occur at similar frequency. Species such as Onobrychis viciifolia, Campanula glomerata, Coeloglossum viride, and Gentianella amarella are preferential. Increased in frequency compared with CG2bi are Avenula pubescens and Filipendula vulgare, while decreased in frequency are Thymus praecox, Hippocrepis comosa and Helianthenum nummularium. Asperula cynanchica and Leucanthemum vulgare remain frequent. Most of the nationally restricted species are present within this

variant. Carex humilis, Thesium humifusum, Orchis ustulata and Senecio integrifolius have their main location here. The distribution of Carex humilis was used to divide this variant from CG2biii and CG2ci.

This variant occurs on gently sloping land most of which is south facing. It has little recent evidence of cultivation but numerous ancient field systems. Although remaining short this community has some of the longest grazed swards on the reserve, reaching a summer maximum of 7cm in 1987. This appears to have an influence on certain plant species.

CG2bii The Ononis spinosa variant

This variant is the least species-rich of the sub-community but is quite variable. While it contains most of the community constants several species frequent in the Onobrychis variant occur here at reduced frequency; these include Onobrychis viciifolia, Campanula glomerata, Leucanthemum vulgare, Festuca ovina, Anthyllis vulneraria and Gentianella amarella. In addition to Avenula pubescens and Filipendula vulgaris a group of strongly mesotrophic species become prominent, including Ononis spinosa which is preferential here as well as Lolium perenne, Trifolium repens, Trisetum flavescens, Holcus lanatus, Anthoxanthum odoratum, Cerastium fontanum and Achillea millefolium. Orchis ustulata occurs throughout while Thesium numifusum and Carex humilis are rare.

This variant occurs on the north facing slope of Castle Down (compt 2) known as the burnbake; this is believed to have a more recent history of cultivation, some of it being in arable in 1847. Burnbaking is described in section 1.2.3.2. The variant also occurs on the lower parts of Castle Barn (compt 1) and on the flatter land near Castle Bushes. Winter feeding occurs within this variant and may have an effect on the turf.

CG2c Holcus lanatus - Trifolium repens sub-community

This sub-community is also associated with Wiltshire. Two variants were identified.

CG2ci The typical variant

The sward on the reserve fits well into the NVC description. Most of the community constants are well represented. Koeleria macrantha unusually remains frequent and Cirsium acaule is characteristically reduced. Many species are less frequent than in the Succisa - Leucanthemum sub-community and it is generally less species-

rich. Viola hirta is differential to this variant. Mesotrophic species are again prominent. Holcus lanatus, Lolium perenne, Trifolium repens, Trisetum flavesens, Avenula pubescens, Anthoxanthum odoratum and Cerastium fontanum are frequent. Dactylis glomerata has higher cover values than in the Succisa - Leucanthemum sub-community. Again Orchis ustulata occurs throughout and Carex humilis and Thesium humifusum are rare.

This variant lies on the flat central plateau of Castle Down, which may have deeper soils. It is more heavily used by the cattle herd than other parts of Castle Down. This sub-community is normally associated with cattle grazing, being influenced by the increased nutrient enrichment caused by dunging.

CG2cii The Hypochoeris radicata - Stachys officinalis variant

A small area of grassland variant was identified amongst Castle Bushes (compt 1). It is similar in many respects to the Holcus - Trifolium sub-community described in the NVC but contains a group of species indicative of lower pH values. These include Agrostis capillaris, Hypochoeris radicata, Stachys officinalis, Danthonia decumbens, Potentilla erecta and Serratula tinctoria. Certain calcicolous species widespread elsewhere are absent here such as Medicago lupulina. Helianthemum nummularium, however, is frequent in this variant.

A clay capping occurs in this area (although it is not mapped on OS geological maps), and this may account for the species differences. The cattle also use this area more than some others, the bushes providing shelter.

Bromus erectus grassland (CG3)

Bromus erectus grassland occurs at a low frequency and is not a significant component of the vegetation. Two sub-communities were recognised.

CG3a The Typical sub-community

Small patches of turf occur within the Festuca - Avenula grassland where Bromus erectus exceeds 10%. In many respects the sub-community is very similar to the surounding Festuca - Avenula swards. It may be that the occurrence of Bromus erectus is due to a subtle, slightly lower, grazing pressure here. This species has not been recorded in other areas of the grazed grassland.

CG3b The Centaurea nigra sub-community

This sub-community is found on the scrub dominated, ungrazed triangle of Castle Scrub (compt 1a). Here Bromus erects dominates the tall rank sward. Dactylis glomerata, Festuca rubra and Arrhenatherum elatius are also major components. There are a number of species associated with a lack of grazing here, for example Pastinaca sativa and Reseda lutea. In general it is species-poor but plants surviving include Lotus corniculatus, Pimpinella saxifraga, Sanguisorba minor, Filipendula vulgaris, Centaurea nigra and Serratula tinctoria.

Brachypodium pinnatum grassland (CG4)

CG4a Avenula pratensis - Thymus praecox sub-community

Two small patches occur where Brachypodium pinnatum exceeds 10% in the sward. These are possibly too small to be treated as separate from the surrounding Festuca - Avenula swards, but have been singled out due to the invasive nature of this species. The sward is similar to the Festuca - Avenula sward.

Mesotrophic grassland

Cynosurus cristatus - Centaurea nigra grassland (MG5)

MG5b Galium verum sub-community

Swards approaching the Cynosurus cristatus - Centaurea nigra grassland Galium verum sub-community were recognised. These swards were split artificially into two variants, on whether they were ploughed during WWII. These grasslands did not fit very easily into the NVC description, the MG5 most usually describing neutral meadows. The NVC does however recognise the close similarity between certain stands of this sub-community and Festuca - Avenula/Holcus - Trifolium swards. The swards are on chalk and most likely have a high soil pH but the history of ploughing has appeared to remove many species that are characteristic of calcicolous grassland, leaving only the more robust species common to both calcicolous and mesotrophic grassland. It may be that the heavy grazing pressure has prevented seed production and produced a tight sward, effectively preventing recolonisation.

MG5b1 Unploughed WWII variant

This grassland occurs at the top and bottom of Parsonage Bank, and shares many species constant to the Festuca - Avenula swards. It is grass dominated with Festuca

rubra, Cynosurus cristatus, Trisetum flavescens and Phleum bertolonii predominanting. Lolium perenne and Agrostis stolonifera are also common. Prominent herbs are Trifolium repens, T. pratense, Plantago lanceolata, P. media, Cirsium acaule, Lotus corniculatus, Ranunculus bulbosus and Medicago lupulina. Some of the commoner calcicolous species occur in reasonable quantity such as Sanguisorba minor, Pimpinella saxifraga, Carex flacca, Koeleria macrantha, Briza media and Avenula pratense.

MG5bii Ploughed WWII variant

This variant occurs on parts of the Hundred Acres (compt 4) and parts of Parsonage Down (compt 3). It is very similar to the unploughed variant but is less species-rich. It has a very similar component of grasses and herbs achieving high frequencies, but fewer of the common calcicolous species occur and then at reduced frequency. Certain species are preferential to this community including Vicia cracca, Poa trivialis, Crepis capillaris and Potentilla reptans. The frequency of the latter two species may be related to disturbance caused by wartime ploughing. Other species of disturbance such as Cirsium vulgare, C. arvense and Bellis perennis occur.

Lolium perenne - Cynosurus cristatus grassland (MGb)

MGbc Trisetum flavescens sub-community

This is a species-poor grassland dominated by Lolium perenne, Cynosurus cristatus, Dactylis glomerata and Trifolium repens. It occurs around and underneath the scrub at Castle Bushes and on the plateau of Castle Down, along the valley bottoms and near gateways and water troughs. A number of species occur less frequently including Festuca rubra, Trifolium pratense and Phleum bertolonii, while rare in this sward are Cirsium acaule, Koeleria macrantha and Plantago media. The vegetation also contains a number of ruderal and ephemeral species.

This community occurs in areas of high stock usage with greater trampling and dunging. The valley bottoms probably also have deeper soils. The combination of high nutrient levels and trampling pressure leads to the reduced number of species.

MG5bii/MGbc Transitional grassland

A small area of grassland transitional between MG5bii and MGbc occurs on the Hundred Acres associated with heavy cattle use.

(ii) Improved and reseeded grassland

This consists of 213 acres (86 ha) of the back-up land not within the SSSI. Its importance lies in the management flexibility that it allows. It is botanically poor with compartments 5, 6, 10/11, 14 and 15 being re-seeded leys and compartments 7, 8 and 9 being improved permanent pasture. Although the latter have not been ploughed in the last 60 years, concentrated stock use and fertiliser application has maintained a species poor sward. Most of the grassland is dominated by perennial rye-grass (Lolium perenne), crested dog's-tail (Cynosurus cristatus), white clover (Trifolium repens) and creeping buttercup (Ranunculus repens).

The NVC has not been applied as yet to the back-up land, but the leys would most likely fall within Lolium perenne leys MG7 while other areas are probably Lolium perenne - Cynosurus cristatus grassland.

(iii) Scrub dense and scattered

The reserve is in general scrub free over much of the area. The two significant areas of scrub occur at Castle Bushes and Castle Down Scrub. At Castle Down Scrub on the plateau, there are a small number of standard hawthorns (Crataegus monogyna) with clumps of gorse (Ulex europaeus). At Castle Bushes, hawthorn and gorse predominate while elder (Sambucus nigra), dog-rose (Rosa canina), blackthorn (Prunus spinosa) and bramble (Rubus fruiticosus) also occur. Whitebeam (Sorbus aria) has been planted within the scrub and there are multi-stemmed ash (Fraxinus excelsior).

The scrub at Castle Bushes covers a range of ages. Hawthorn trees occur from saplings growing through the protective shelter of bramble and gorse to old mature standards, beneath which stock graze. It would appear that at Castle Bushes the scrub developed in a pattern still discernible. Gorse was probably the initial coloniser, although some hawthorns were probably already there, possibly planted in association with the barn. It has been said that gorse was introduced here during WWI when the Bushes area was used as a horse picket. The disturbance may have provided conditions suitable for germination. The gorse development was probably dense in places. As it ages gorse opens up allowing the invasion of bramble and subsequently hawthorn and rose and to a lesser extent elder, blackthorn and ash. At some point cattle break into the developing clump and start to open out the centre. The thorns are large enough to survive. Later the gorse dies and remains only as decaying wood while hawthorn and rose survives as single specimens in grassland. Eventually hawthorns and occasionally ash, being long lived are the only shrub species left in a particular area. All stages of this proposed scrub development can be seen at Castle Bushes. Many of the clumps of scrub here are circular in shape with gorse

at the edges which lends weight to this proposal. There is a question mark over the current regeneration of gorse, which seems poor. If gorse regeneration is the starting point of the process, it needs to be ongoing to maintain scrub development. Regeneration will need to be monitored.

(iv) Broadleaved Plantation

There are three broadleaved plantations: Cherry Lodge and Drive Trees, Castle Barn Plantation (compt 1b) and The Beeches (compt 16). The Cherry Lodge and Drive Trees, and Castle Barn Plantation were probably planted in 1843 by Charles Wanborough, when 1,000 beech trees were planted on the Homanton Estate. They are therefore likely to be about 140 years old.

All plantations are dominated by beech with sycamore invading into Cherry Lodge and Drive Trees. The shrub layer here is dominated by privet (Ligustrum vulgare), with wayfaring tree (Viburnum lantana), guelder rose (Viburnum opulus), yew (Taxus baccata), holly (Ilex aquifolium), dogwood (Thelycrania sanguinea), hawthorn (Crataegus monogyna), and other shrubs. The ground flora is generally poor but a few plants of Cephalanthera damasonium occur, along with Ornithogalum umbellatum. There is a grassland element in both shelterbelts, including species such as Lathyrus pratensis, Knautia arvensis, Filipendula vulgaris and Galium mollugo. The Beeches and Castle Barn Plantation are much poorer in species having been grazed for many years. Stock have now been fenced out of parts of both areas.

(v) Hedges and Scattered Trees

Many of the internal boundaries possess remnant hedges and scattered trees, while a thick hedgerow/shelterbelt (The Hedgerow) occurs on the bank on the northern edge of Melsomes (compt 6) and Nomans Land (compt 5). Many of the remnant hedges survive only as aged hawthorns amongst lightly grazed sward. At the top of Parsonage Bank a belt of aged and decaying larch is similarly open to grazing. Within The Hedgerow beech, hawthorn, elder, ash and buckthorn occur. The ground flora is rank vegetation dominated by stinging nettle (Urtica dioica).

(vi) Dew Pond

There are two dew pond sites on the reserve; both were derelict for many years. The Castle Barn dew pond (compt 1c) was relined in autumn 1982, and the surrounding area fenced to exclude stock. This has provided an open water habitat and long vegetation habitat.

Within the dew pond the development of aquatic flora has been limited. Ranunculus aquatilis has occurred in a number of years, and stiff-leaved water-crowfoot (R. circinatus) and toad rush (Juncus bufonius) have occurred on the muddy margins.

Prior to fencing the sward surrounding the pond itself was lightly grazed. It has subsequently developed into longer vegetation, dominated by creeping bent (Agrostis stolonifera), red fescue (Festuca rubra) and cock's-foot (Dactylis glomerata). A number of herbs occur including spiny rest harrow (Ononis spinosa), wild carrot (Daucus carota), common knapweed (Centaurea nigra), common bird's-toot-trefoil (Lotus corniculatus), ragwort (Senecio jacobea) and musk thistle (Carduus nutans).

Being shallow and close to trees the pond is prone to fill up with silt and leaves; in 1987 the dry summer and silting led to the pond drying up. The liner had developed punctures around its edge and was relined. These factors combined with the long distance from sources of colonisation most likely mean the pond will remain in an early stage of development.

1.2.2.2 Fauna

Parsonage Down has not been particularly well recorded for invertebrates and none of the results of any of the surveys or monitoring programmes being carried out (eg L Jones-Walters/Mike Morris/Ed Rispin) are currently available. However, the information compiled to date provides enough material on which to base a reasonable assessment of the fauna (eg Morris, 1966; Williams, 1960; Price, 1960; Gillam, 1964; Sheppard, 1983) and is considerably more than is available on the majority of sites. Mammals and birds have been recorded in detail by Miss B Gillam and butterflies have also been recorded by Miss Gillam, T Williams and others.

Invertebrates

Mollusca

The molluscan fauna was recorded by Dr J G Evans, Cardiff University in 1983 and 1984. The following is taken from a discussion on this recording (Evans 1984).

"Samples were taken from grassland and woodland. The grassland faunas are of low diversity with only one main species of Vallonia and one of Helicella. As a preliminary result it may be suggested that there is a gradient of decreasing diversity from the main down (compts 1 and 2) through Parsonage Bank (compt 3) to the new down (compts 3 and 4). This may relate to decreasing maturity of the grassland and the fact that Parsonage Bank is largely a steep north facing slope (NB: 1987 sward height recording highlighted subtle grazing differences between these areas which may have an effect on mollusca faunas, RW). The faunas of the woodland, scrub and hedgerows are richer than those of the grasslands, but there is variation from site to site. Several species occur as two or more varieties, eg Trichia hispida includes sparsely hairy and abundantly hairy forms as well as colourless and brown forms".

Dr Evans (pers comm 1987) considered the molluscan fauna of the reserve to have significant archaeological research potential. The reserve presents the opportunity to study present day faunas, to aid archaeological interpretation and the study of its sub-fossil faunas, the latter being particularly important to paeleoenvironmental evaluation. The molluscan fauna at Parsonage Down does not, however, contain rare species or have a high intrinsic conservation value.

Lepidoptera

The large area of unimproved chalk grassland supports few butterfly species. The sward is generally too short for most of the characteristic chalk grassland species, and only meadow brown (Maniola jurtina), small heath (Coenonypha pamphilus) and possibly common blue (Polyommatus icarus) breed on the open down itself, and then only in relatively low numbers. The Adonis blue butterfly (Lysandra bellargus) is believed to have bred in the long ditch on Castle Barn until about 1947. Its food plant Hippocrepis comosa is not common on the reserve and there are no steep south facing slopes which it prefers. It is unlikely the population was ever large as much of the SSSI is unsuitable. The loss of patches of rabbit disturbed ground in the long ditch, following the 1954 crash in the rabbit population due to myxomatosis, is likely to have made a marginally suitable habitat even less suitable. This, and possibly the loss of the adjacent Berwick Down in the early 1950s, is the likely cause of the butterfly extinction. A population occurs in a cutting on the A303 south of Yarnbury Castle, only 2½ km from the reserve. It is likely, bearing in mind the recent expansion of this species, that it could reach the reserve, particularly as the prevailing wind would bring individuals in the direction of the reserve. However, if conditions were suitable for this species on parts of the reserve it is difficult to see why it is not still here. Marsh fritillary (Eurodryas acorinia) possibly bred in 1982/1983. This occurrence was probably due to colonisation of less suitable habitats at a time to temporary population expansion. Small blue (Cupido minimus) and chalkhill blue (Lysandra coridon) have both been recorded on the reserve, but are not known to have bred during the last five years. It is unlikely that either species had significant breeding populations for many years prior to that.

Small areas of long grass support larger butterfly populations of the commoner species. The main areas are Castle Scrub (1a) and the dew pond enclosure (1c). Over the last seven years species known to have bred in one or other of these areas include marbled white (Melanargia galathea), meadow brown (Maniola jurtina), small copper (Lycaena phlaeas), brown argus (Aricia agestis), common blue (Polyommatus icarus), small skipper (Thymelicus sylvestris), Essex skipper (Thymelicus lineola), large skipper (Oohlodes ucnata) and speckled wood (Pararge aegeria).

The stinging nettle (Urtica dioica) is found in several locations across the reserve and supports the nettle feeding species small tortoiseshell (Aglais urticae) and peacock (Nymphalis io). The red admiral Vanessa atalanta) and the painted lady (V. cardui) occur in small numbers and are not known to have bred. The migrant clouded yellow (Colia croceus) is seen in favourable years and probably bred in 1983.

Moths on the reserve have been little studied, but those recorded include the chimney sweeper moth (Odezia otrata).

Other Invertebrates (contributed by Dr L Jones-Walters)

The physical characteristics of the vegetation are reflected in the composition of the invertebrate community at Parsonage Down. It is almost certainly species-poor in comparison with sites like Martin Down and Aston Rowant NNRs, both of them sites containing a mosaic of grassland types. The lack of structural diversity and relative homogeneity of the grassland contributes little in the way of cover for those species which require a more equitable microclimate and provides less 'niche space' than the botanically less interesting Arrhenatherum elatius and Bromus erectus grasslands.

Species indicative of this short-grass community include the wolf spider Alopecosa cuneata, the crab spider Oxyptila simplex and the money spider Meioneta simplicitarsis. The Devil's coach horse Staphylinus olens requires areas of short turf with some bare ground in which to oviposit and although a generalist predator is a species typical of tightly-grazed grassland, as is another beetle species recorded from the site, Byrrhus pilula. The leafhopper Batracomorphus irroratus is also closely associated with this habitat type and Sehirus dubius, a shield bug, feeds exclusively on bastard toadflax (Thesium humifusum) an uncommon plant of regularly grazed chalk grassland communities.

That the grassland attains a degree of structural diversity as the growing season progresses is evidenced by the presence of invertebrates more usually encountered in longer grassland. Typical of these are a variety of bug species including the common leafhoppers Turrutus socialis and the spittlebug Philaenus spumarius, and the plant bugs Trigonotylus ruficornis, Calocoris roseomaculatum and Leptopterna ferrugata. It is possible that these species may breed on the site where the grass retains its structure through the season, the surroundings of the dew pond for instance, but some of them may migrate from the rough grassland around the perimeter. A number of the butterflies regularly seen on the reserve illustrate this phenomenon particularly well and include marbled white Melanargia galathea and common blue Polyommatus icarus which breed off the reserve but only in small areas on it, if at all.

The Dew Pond

Following the renovation of the dew pond, it was colonised by a range of aquatic invertebrates which have not been identified in detail. These include Daphnia sp, Carixa sp, Tubifex sp and water mites. Several species of dragon and damselflies

have been recorded, some ovipositing; these include the azure damselfly Coenagrion puella) and the broad-bodied chaser (Libellula depressa). The dew pond is remote from other ponds and the aquatic flora and fauna are most likely the pioneer and opportunistic species.

Vertebrates

Mammals

Badger (Meles meles). Long established setts occur in the Hedgerow, (on the northern edge of No Mans Land compt 5) and in The Beeches (compt 16). The population appears to be expanding and a small sett was temporarily used in Castle Bushes in 1987. The setts tend to be on the periphery of the reserve, and the badgers mostly use arable and ley for feeding.

Fox (Vulpes vulpes). Long established earths occur in The Beeches, The Hedgerow, the hedge along the northern edge of Castle Down and in the open down itself. These are not all in permanent use.

Roe deer (Capreolus capreolus). In some years these are seen regularly on the reserve.

Brown hare (Lepus europaeus). Hares are common across the reserve. They use the permanent grassland and the adjacent arable at different times of the year. They probably breed in all the fields on the reserve and care has to be taken during hay-making not to kill leverets. Hares are illegally coursed over the winter months.

Rabbit (Oryctolagus cuniculus). There are over 10 rabbit warrens on the open downland, and populations also occur within the scrub and woodland areas. The population prior to myxomatosis was very large, and the resultant rabbit disturbance was intense in some areas. Several small but steep banks that are unlikely to have seen any ploughing are surprisingly poor in species, but have obviously been disturbed. Large rabbit warrens here (exacerbated by digging during rabbiting) are likely to be responsible for this. Myxomatosis almost eradicated the rabbit population in 1954. The resulting slack in the grazing was taken up by seven extra cows and the disturbed areas revegetated. Since myxomatosis the rabbit population has remained low, although numbers have increased recently. They are controlled as necessary by shooting, ferreting and gassing.

Grey squirrel (Sciurus carolinensis). Resident in Cherry Lodge and Drive Trees, and Castle Barn Beeches. They have used little owl nest holes and boxes in winter.

Stoat (Mustela erminea) and weasel (Mustela nivalis). Both these species have been seen on the down at Castle Barn.

Mole (Talpa europaea). Moles are active in many areas of the down, usually adjacent to arable fields. The main populations are on the valley slopes of China Bottom and Jonah's Well, as well as in Castle Bushes, Cherry Lodge Trees and adjacent to Lodge Field. Mole activity occurs mostly in autumn, winter and early spring. Moles have been controlled in the past and the hills are harrowed in spring.

Hedgehog (Erinaceus europaeus). Known to have bred at Cherry Lodge in 1986.

Small mammals were trapped in Castle Bushes in 1981. Wood mouse (Apodemus sylvaticus) and bank vole (Clethrionomys glareolus) occurred in reasonable numbers while pygmy shrew (Sorex minutus) was also recorded. Common shrew (Sorex araneus) occurs in Cherry Lodge Trees and the Drive Trees.

Amphibians and Reptiles

Newts (Triturus spp) occur in China Bottom Reservoir and common toad (Bufo bufo) has also been recorded there. Lizards (Lacerta agilis) occur at Cherry Lodge.

Birds

(From records made by Miss B Gillam 1981-1987.)

Grassland

Lapwing and skylark are the only bird species to breed on the open grassland, partridge, red-legged partridge and pheasant breed in hedge bottoms, Castle and occasionally the hay fields. Stone curlew bred at one time (see below).

Several species use the grassland as a feeding area, particularly in autumn, and early spring, when soil and dung invertebrates are most available. Mixed of fieldfare and starlings are regularly seen as are rooks and jackdaws, while birds recorded in winter include, lapwing, golden plover, common and black-h gulls and mallard. Flocks of up to 50 mistle thrushes become resident in late su while blackbirds and songthrushes also feed on the grassland. During sprin autumn migrating wheatears stop to feed, and whinchats and yellow wagta autumn. Small flocks of the latter feed on insects disturbed by the cattle and from the water troughs. Green woodpeckers which feed on ants can be seen at times of year.

Birds of prey hunt over the down, kestrel and buzzard being the most regular sp with sparrowhawk and merlin occurring occasionally.

Scrub

The blocks of scrub at Castle Bushes (compt 1) and Castle Scrub (1a) are the bird breeding areas on the reserve, twenty-three species having been recorded in 1981-87. The most numerous breeding species are willow warbler (6-10 chaffinch (4-6 prs) and blackbird (3-5 prs). Also breeding in most years are dove, wren, dunnock, lesser whitethroat, whitethroat, magpie and linnet. G warbler, longtailed tit and goldcrest bred in at least one of the seven yea recording.

In spring and autumn migrant passerines stop here to feed and rest; redstart, and spotted flycatcher, willow and sedge warbler have been recorded. In au hawthorn berries provide a food source for flocks of fieldfare and redwing.

Woodland and Shelterbelt

Most of the broadleaved plantations are beech dominated, with little or no shrub layer and poor ground flora. Of these areas Cherry Lodge Trees supports most breeding birds. Apart from rooks which have ten nests here there are one or two pairs of each species. Regular breeders include little owl, dunnock, wren, robin, blackbird, songthrush, mistle thrush, spotted flycatcher, blue tit, great tit, chaffinch and in some years greenfinch and yellowhammer. Breeding species in the Drive Trees and the Hedgerow are robin, blackbird, mistle thrush, great tit and chaffinch. These areas have rookeries of about 70 nests each (1987); numbers have dropped from 147 and 130 in 1981.

The Beeches (compt 16) supports few breeding species with chaffinch, blue tit and possibly blackbird the only passerines recorded. Tawny owl nested until 1984 when the nest tree was felled. Little owls have used a nest box provided and kestrels have also bred. The poverty of the bird species here is due to the lack of a shrub layer and the fact that it has been grazed by stock for many years. Great spotted woodpeckers bred in The Hedgerow in 1987 for the first time. Little owls have bred successfully in nest boxes at Castle Barn, and in the Hedgerow. Blue tit and house sparrow have benefitted from nest boxes at Cherry Lodge. In winter flocks of finches particularly chaffinch and brambling feed on the beech mast while redwing, fieldfare, jackdaw, rooks and wood pigeons use them for shelter and roosting.

Most of the hedges are old and gappy supporting few breeding species. Magpie, chaffinch, great tit and wood pigeon have bred with partridge, red-legged partridge and pheasant nesting in the hedge bottom.

Dew pond

The water is used throughout the year for drinking and bathing. Mallard, merlin, wood pigeon, turtle dove, chaffinch, mistle thrush and yellowhammer have been recorded.

Cherry Lodge Buildings

Bird species in the buildings are stock dove, swallow, wren and house sparrow and a pair of blue tits have used a purpose-built wall nest box for three years.

Stone Curlew

Stone curlews nested regularly for at least 20 years prior to NCC purchase. Two nest sites were regularly used on land subsequently sold (Lower Hundred Acres and

Old Parsonage Down). There was also a nest on the Hundred Acres on occasions and a regular site on Castle Barn. The land sold in November 1981 was immediately ploughed, and put to winter corn. Birds were heard but not seen that spring until April 6 when 5 were seen at Castle Barn during a snowstorm. They flew off over the trees at Castle Barn and have not been seen since. A few are however heard passing over each year and it is possible that they still feed on the down. The RSPB consider it likely that the species could nest again on the reserve should breeding habitat be recreated.

2.3 Communities

The floristic communities (NVC) and short turf invertebrate communities have been fully described in the previous sections. It is important to stress the connection between these two as the invertebrate community is very much dependent on the short nature of the turf. These two communities constitute the main biological interest of the site.

Table 1.2.2.c, Biological Recording

DATES	RECORDER	DETAILS
FLORA		
1967	D Wells	Descriptions and 2 quadrats for NCR.
1977	Miss B Gillam	Botanical survey, quadrats and grading. Wilts Chalk Grassland Survey.
1980-81	T Williams	Detailed species lists, DAFOR transects permanent quadrat establishment, distribution maps. Restricted species monitoring.
1980-87	Miss B Gillam	Permanent quadrat establishment and recording, restricted species monitoring.
1983	M Wilkinson	Habitat classification.
1987	R Wild	NVC. Sward height, distribution maps.
FAUNA		
1980	T Williams	Butterfly transect, moth recording. Bird and mammal recording.
1980	P Price	Pitfall trapping.
1980-87	Miss B Gillam	Invertebrate recording, bird census, mammal recording.
1983	J Evans	Mollusca recording.
1985-87	M Morris and E Rispin	Invertebrate sampling. Pitfall traps, turf samples, vaccum sampling.
1983	L Jones-Walters	Vaccum sampling.

Species lists of plants and animals are held at the reserve office.