INSTITUTE OF TERRESTRIAL ECOLOGY

(NATURAL ENVIRONMENT RESEARCH COUNCIL)

REPORT TO THE NATURE CONSERVANCY COUNCIL

ON

THE INVERTEBRATE FAUNA OF DUNE AND MACHAIR SITES IN SCOTLAND

Vol II Part (2)

The North Coast

Site Dossiers

NCC/NERC Contract No. F3/03/62 : ITE Project No. 469

Monks Wood Experimental Station

Abbots Ripton

Huntingdon

Cambs

February 1979

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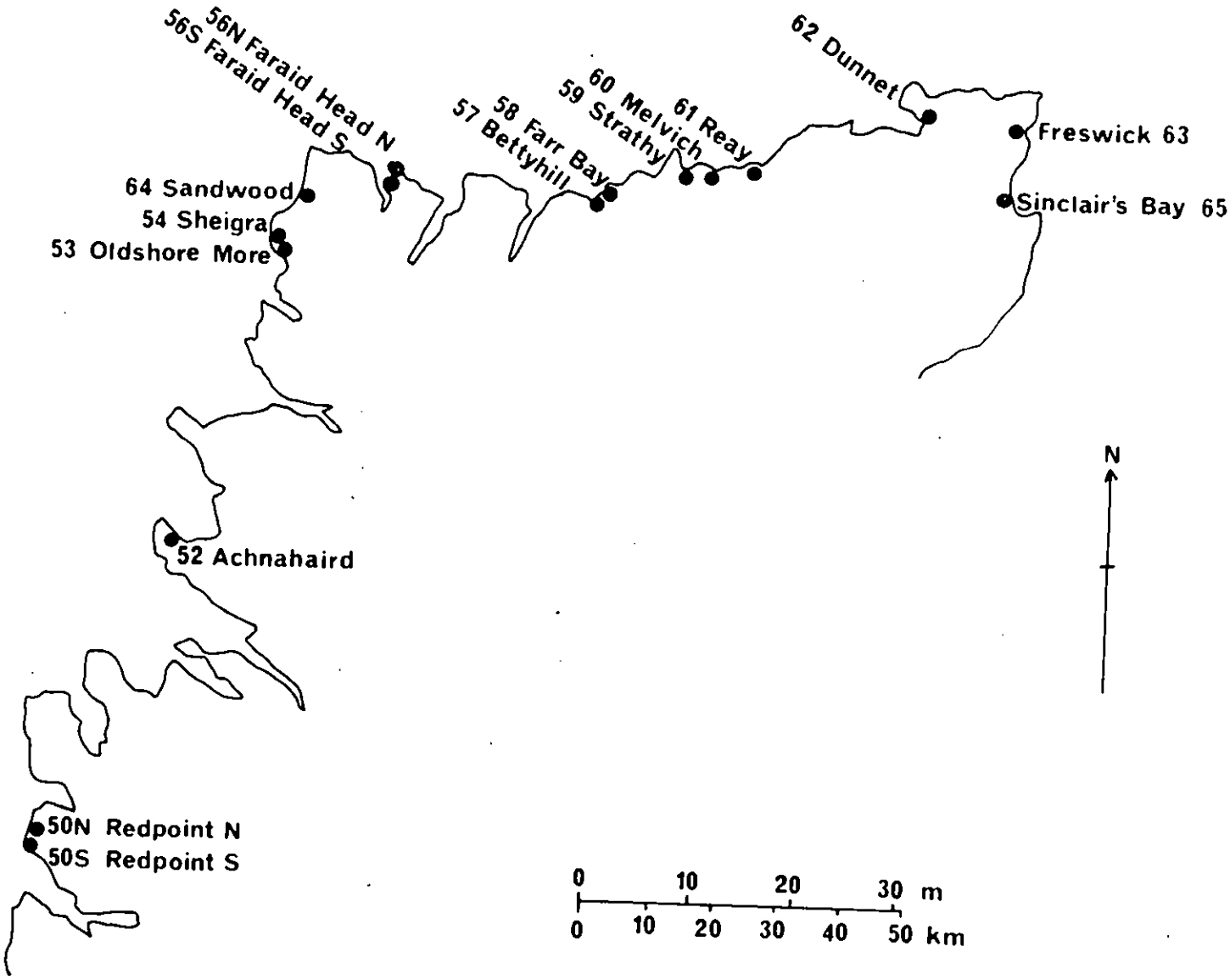
Map 1

North Coast



SITES SURVEYED

The sites selected for survey are listed in Table 1 in numerical order. The numbering and names used for the sites follow those adopted by the personnel of ITE Project 340 "Survey of sand-dune and machair sites in Scotland" in agreement with the Nature Conservancy Council. The geographical position of each site is shown in Map 1. The site reports in this volume are arranged in numerical order, as in Table 1. Each site report has separate page numbers.

Table 1 - List of sites surveyed

Site Number	Site Name	District
50S	REDPOINT SOUTH	Ross and Cromarty
50N	REDPOINT NORTH	Ross and Cromarty
52	ACHNAHAIRD	Ross and Cromarty
53	OLDSHORE MORE	Sutherland
54	SHEIGRA	Sutherland
56S	FARAID HEAD SOUTH	Sutherland
56N	FARAID HEAD NORTH	Sutherland
57	BETTYHILL	Caithness
58	FARR BAY	Caithness
59	STRATHY	Caithness
60	MELVICH	Caithness
61	REAY	Caithness
62	DUNNET	Caithness
63	FRESWICK	Caithness
64	SANDWOOD	Sutherland
65	SINCLAIR'S BAY	Caithness

SELECTION OF SITES

Fifteen sites in Caithness and on the west coasts of Sutherland and Ross and Cromarty (Numbers 50 and 52-65 inclusive) were listed by the Nature Conservancy Council and were covered in the botanical survey made by ITE staff as part of ITE Project 340.

With the exception of Site 55 (Durness) all these sites were covered in the survey of invertebrates. The Durness site, which consists of limestone grassland on shallow soils over rock, was omitted from the survey because sand dunes are not present there.

Two of the more extensive sites, Redpoint (Site 50) and Faraid Head (Site 56) were subdivided. Two complete sets of traps were placed at each, in an attempt to sample the variety of terrain and aspect within these sites.

The programme of the survey of invertebrates was determined by the estimated functional life of the battery-powered light traps, i.e. 7 or 8 nights in mid summer.

The selection of sampling sites was made by the participants of the first field trip - Dr E.A.G. Duffey and W.E. Rispin. Prior to this survey a number of coastal sites in Caithness were visited by Dr Duffey, Dr M.G. Morris and Dr R.C. Welch and collections of Aranaea and Coleoptera were made. Some records of additional species (Coleoptera) for Site 57, 58 and 59 result from surveys made by Drs Morris and Welch in 1972 whilst in receipt of a grant from the Shell Fund administered by the Nature Conservancy.

SAMPLING PERIODS

Sampling was by means of a light trap and eight pitfall traps at each site (for description of this equipment see following section). A single light trap operated for eight or nine nights at each site during sampling periods 1 and 3 only (see Table 2). The pitfall traps operated continuously during all three sampling periods.

Table 2 - Dates of sampling periods

Sites 57 and 58

Sampling period	Dates	Number of nights (Light traps)
(1)	14.6 - 23.6.76	9
(2)	23.6 - 19.7.76	-
(3)	19.7 - 28.7.76	9

Sites 56S and 56N

Sampling period	Dates	Number of nights (Light traps)
(1)	15.6 - 24.6.76	9
(2)	24.6 - 20.7.76	-
(3)	20.7 - 29.7.76	9

Site 64

Sampling period	Dates	Number of nights (Light traps)
(1)	15.6 - 24.6.76	9
(2)	24.6 - 21.7.76	-
(3)	21.7 - 29.7.76	8

Sites 53 and 54

Sampling period	Dates	Number of nights (Light traps)
(1)	17.6 - 25.6.76	8
(2)	25.6 - 22.7.76	-
(3)	22.7 - 30.7.76	8

Site 52

Sampling period	Dates	Number of nights (Light traps)
(1)	18.6 - 26.6.76	8
(2)	26.6 - 23.7.76	-
(3)	23.7 - 31.7.76	8

Sites 50S and 50N

Sampling period	Dates	Number of nights (Light traps)
(1)	19.6 - 27.6.76	8
(2)	27.6 - 24.7.76	-
(3)	24.7 - 1.8.76	8

Site 59

Sampling period	Dates	Number of nights (Light traps)
(1)	20.6 - 29.6.76	9
(2)	29.6 - 26.7.76	-
(3)	26.7 - 3.8.76	8

Sites 60 and 61

Sampling period	Dates	Number of nights (Light traps)
(1)	21.6 - 29.6.76	8
(2)	29.6 - 26.7.76	-
(3)	26.7 - 3.8.76	8

Sites 62, 63 and 65

Sampling period	Dates	Number of nights (Light traps)
(1)	22.6 - 30.6.76	8
(2)	30.6 - 26.7.76	-
(3)	26.7 - 3.8.76	8

DESCRIPTION OF TRAPPING EQUIPMENT

Light trap

The specially designed, portable, ultra-violet light trap was powered by a 12 volt, rechargeable lead/acid battery. The light was automatically controlled by a solar switch set to turn the light on at dusk and off at dawn. The catch of moths was killed inside the trap by vapours from "Mafu" strips and collected only at the end of the sampling period. One light trap was placed at each site.

Pitfall traps

A pitfall trap consisted of a conical plastic beaker of the following approximate internal dimensions: diameter of mouth 75 mm, diameter of base 55 mm, height 105 mm. Three small drainage holes were made 30 mm from the mouth of the beaker to facilitate the run-off of any excess rainwater that might accumulate in the trap. Each trap was charged with approximately 10 cl. of commercial grade 1, 2 Ethanediol (Ethylene Glycol) as a preservative and killing agent at the beginning of each sampling period. Each pitfall trap was placed in a hole in the ground so that the lip of the beaker was flush with the soil surface. Eight pitfall traps, arranged in pairs were placed at each site. On most sites the pairs of traps were positioned about 10 metres apart, with 1 - 2 metres between the individual traps of a pair.

SITE VEGETATION

The description of the vegetation at each site was made at the time of the site selection, ie during the first sampling period in the second half of June. By the end of July, at the time of the second visit, different species of flowers were recorded and the structure and height of the vegetation had altered significantly. Estimates of the extent of bare ground relate mainly to the first trapping period when vegetation growth had not reached its maximum. In some cases these estimates would have been reduced later in the summer.

PERSONNEL

ITE Nominated Officer: Dr M.G. Morris

Project leader: Dr E.A.G. Duffey

Identification

Lepidoptera:	M.J.L. Skelton[1]
Coleoptera:Carabidae:	J.N. Greatorex-Davies and Dr R.C. Welch
:Hydrophilidae to Scolytidae:	Dr R.C. Welch
Aranaea:	R.G. Snazell
Mollusca:	D. Green[2]
Diplopoda:	A.J.B. Beaumont[3] and J.G. Blower[4]
Terrestrial Isopoda:	P.T. Harding

Field work

1st Trip:	Dr E.A.G. Duffey and W.E. Rispin
2nd Trip:	W.E. Rispin and P.E. Jones

Site reports

Editor:	P.T. Harding
General Introduction:	P.T. Harding and Dr E.A.G. Duffey
Description and siting:	P.E. Jones
Lepidoptera:	J.N. Greatorex-Davies
Coleoptera:Carabidae:	Dr R.C. Welch
:Hydrophilidae to Scolytidae:	Dr R.C. Welch
Aranaea:	R.G. Snazell and Dr E.A.G. Duffey
Mollusca:	P.T. Harding and Dr R.A.D. Cameron[5]
Diplopoda:	P.T. Harding
Terrestrial Isopoda:	P.T. Harding
Additional species:	Dr R.C. Welch
Maps:	R.A. Plant, Miss H.A. Brundle and Miss S. Knight[6]
Data Handling:	G.J. Moller and J.N. Greatorex-Davies
General assistance:	Miss H.A. Brundle and R.A. Plant

Pitfall trap catches

Sorting:	W.E. Rispin, R.A. Plant, P.E. Jones, J.N. Greatorex-Davies

Maintenance of material: R.A. Plant

Equipment

Equipment supervision: W.E. Rispin

Light trap manufacture: T.E. Hughes (Entech Services)(7)

Special advisor on light traps: J. Heath

Transport of equipment: P.T. Harding, G.J. Moller and S. Porter(8)

Secretarial assistance: Mrs D.S. Plant and Mrs G. Sanderson

Notes:

(1): Formerly I.T.E. Staff, resigned.

(2): Sandwich course student, Trent Polytechnic.

(3): Undergraduate student, Manchester University.

(4): Zoology Department, Manchester University.

(5): Department of Extramural Studies, Birmingham University.

(6): Sandwich course student, Luton College of Higher Education.

(7): Entech Services, 46 Mersey View, Liverpool.

(8): Sandwich course student, Brunel University.

ACKNOWLEDGEMENTS

Storage and maintenance facilities for equipment were generously provided by the University of Aberdeen at the Wyllie Fenton Field Centre, Bettyhill. Special thanks are due to Dr J.B. Kenworthy and the warden for making possible the provision of these facilities.

Our colleagues engaged on ITE Project 340 have given invaluable help with information about sites, maps and data handling.

CONTENTS OF SITE REPORTS

REFERENCES

The following publications are referred to in the texts of the site reports.

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SOUTH, R. (1961). The moths of the British Isles, 2 vols. London, Warne.

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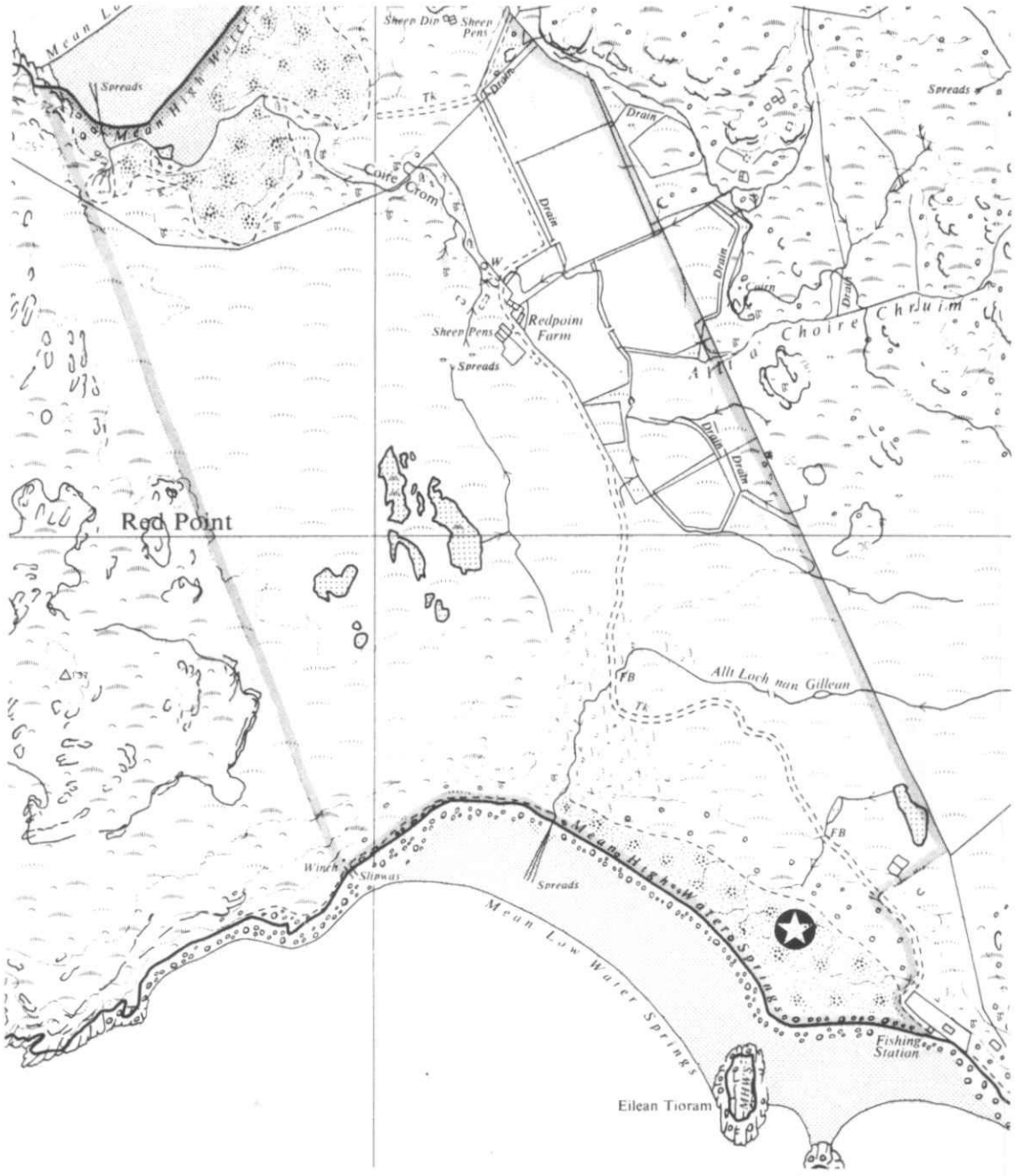
WELCH, R.C. (1974). Atheta (Phycoma) immigrans Easton (Col., Staphylinidae) and other Coleoptera from Keiss Links, Caithness. Entomologist's mon. Mag. 109:190.

Site 50S Redpoint South

Site 50S Redpoint South



0 500 Metres

0 500 Yards

Light trap & pitfall traps

SITE 50S

REDPOINT SOUTH

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

This was a small area of well-developed yellow dunes with eroded dunes among the marram transition zone. There was a flat area between these dunes. The south-facing dunes were reached by a farm track going from Redpoint Farm to the fishing station.

1.2 Vegetation

The vegetation surrounding the pitfall traps consisted of the following species:

Pair 1: 5% bare sand (marram transition zone) with 75% short grass herbs and moss, and 20% Ammophila arenaria. Mosses were the most common plants; Lotus corniculatus, Trifolium repens and Festuca sp. were also present.

Pair 2: 5% bare sand with 75% dwarf herbs, grass and moss, and 20% A. arenaria. The species of plants occurring around pair 1 also occurred here with the addition of Thymus drucei which was plentiful.

Pair 3: 3% bare sand with 57% dwarf herbs, moss and grass, and with 40% A. arenaria immediately around the traps. L. corniculatus, T. repens, T. drucei and Festuca sp. occurred.

Pair 4: 70% dwarf herbs, moss and grass with 30% A. arenaria. The flat areas between the dunes were vegetated with mosses, L. corniculatus, T. drucei, T. repens and Carex arenaria.

In some areas heathers extended over the dune meadow and several fine plants of Botrychium lunaria were found.

1.3 Disturbance

The area was not grazed and was therefore undisturbed except possibly by a few people using the track from the farm to the fishing station.

1.4 Distance from sea

The traps were placed about 60 metres inland from the shore.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The light trap was sited in a hollow in the dune meadow, in the last hollow on the seaward side, between Eastgate and the fishing station. The pitfall traps were placed in a straight line parallel to the beach and inland from the light trap.

2.2 Damage or malfunction

The light trap operated from 19 - 27.6.76 and 24.7. - 1.8.76, and was functional at the end of both periods when tested. The pitfall traps were all functional during the whole of each of the three periods 19 - 27.6.76, 27.6. - 24.7.76 and 24.7. - 1.8.76. A dead mouse was found in pitfall trap 1B on 1.8.76.

2.3 Colour slides available

Box 1, 120-125.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Macrothylacia rubi	2	0	2
Philudoria potatoria	2	0	2
Laothoe populi	1	0	1
Spilosoma lubricipeda	1	0	1
Euxoa tritici	0	208	208
Euxoa cursoria	0	25	25
Agrotis vestigialis	0	68	68
Noctua pronuba	0	4	4
Diarsia mendica	0	1	1
Hada nana	24	0	24
Ceramica pisi	3	0	3
Cerapteryx graminis	0	23	23
Blepharita adusta	1	0	1
Thalpophila matura	0	10	10
Apamea monoglypha	0	12	12
Mesapamea secalis	0	6	6
TOTAL	34	357	391

The species list was fairly short but the total catch was good compared with other North Coast sites. Euxoa tritici (53%) was the most

abundant species. It was trapped, often commonly, at many other sites except those around the Moray Firth.

Two sand dune species occurred. Agrotis vestigialis (17%) was trapped extensively and often commonly at many other sites especially on the North Coast. Euxoa cursoria was trapped at many North Coast sites but elsewhere only at three sites on the East Coast.

This was the most westerly occurrence of Thalpophila matura, a species which was recorded at all the East Coast and Moray Firth sites and at several along the North Coast. Diarsia mendica had a similar distribution but was not as common. Macrothylacia rubi was only taken elsewhere at two sites in the Moray Firth and two on the East Coast. The only other record of Philudoria potatoria was from the other Redpoint sampling site. Laothoe populi, is known to feed on Populus spp. and Salix spp. and was restricted to a few scattered mainland sites.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Carabus granulatus	0	0	1	1
Carabus problematicus	0	1	0	1
Nebria salina	0	4	0	4
Loricera pilicornis	0	0	1	1
Calathus fuscipes	9	83	13	105
Calathus melanocephalus	2	3	0	5
Calathus mollis	1	2	0	3
TOTAL	12	93	15	120

The three species of Calathus are characteristic of dry, open grassland, with C. mollis being the more typical of coastal dune systems. A single larva of Notiophilus biguttatus, a species not taken as an adult, was collected during the middle trapping period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Leiodes dubia/obesa	4	4	1	9
Bledius longulus	10	20	10	40
Stenus boops	0	0	2	2
Xantholinus linearis	0	0	1	1
Philonthus marginatus	0	1	0	1
Philonthus varius	0	1	0	1

	JUNE	JN/JL	JULY	TOTAL
Staphylinus aeneocephalus	1	0	0	1
Tachyporus chrysomelinus	0	2	3	5
Tachyporus pusillus	1	0	1	2
Atheta fungi	1	5	0	6
Atheta atramentaria	0	0	3	3
Geotrupes stercorarius	0	0	1	1
Geotrupes vernalis	0	2	2	4
Aphodius rufipes	0	0	2	2
Serica brunnea	14	70	0	84
Philopedon plagiatus	4	2	0	6
Sitona lineellus	1	1	0	2
TOTAL	36	108	26	170

The fauna caught at this site was dominated by two psammophile species, Serica brunnea and Bledius longulus although neither is in any way restricted to coastal habitats. Leiodes dubia and Philopedon plagiatus are also associated with sandy areas and the latter is virtually restricted to coastal areas.

The majority of the remaining species recorded are indicative of the presence of dung at the site, especially Aphodius rufipes, and the species of Geotrupes, Philonthus and Atheta.

Sitona lineellus is phytophagous on Trifolium spp..

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Haplodrassus signifer	0	3	0	3
Agroeca proxima	0	0	1	1
Xysticus cristatus	2	0	0	2
Pardosa palustris	7	14	6	27
Pardosa pullata	2	7	0	9
Alopecosa accentuata	0	1	0	1
Trochosa terricola	0	1	0	1
Arctosa perita	3	0	0	3
Pachygnatha degeeri	3	2	0	5
Walckenaera vigilax	1	0	0	1
Tiso vagans	2	10	3	15
Typhocrestus digitatus	1	1	0	2
Erigone promiscua	4	9	4	17
TOTAL	25	48	14	87

Considering the fairly high diversity of the vegetation and the lack of disturbance, this site produced a rather poor catch of spiders, including only four species of linyphiids. The diversity of the vegetation is probably reflected in the presence of five species of lycosids. Pardosa palustris and P. pullata were the most abundant of these; the former made up 31% of the catch. Both are generally common and widespread in open areas with perhaps a slight preference for fairly damp terrains. P. palustris seems to be rather more widespread in the north of Britain than in the south. Alopecosa accentuata was taken rarely during this survey, this being its only occurrence on the North Coast. It did not occur at sites on the Outer Hebrides or further north than site 70B in the Moray Firth. Arctosa perita, a lycosid that is restricted to sand dunes and dry sandy heaths, was present in small numbers. Agroeca proxima, a clubionid that is widespread in dry grassland sandy areas was taken here and at several other sites on the North Coast by elsewhere only at Dumbarnie (91) and Tyninghame (95). Although Erigone promiscua was present it was caught only in fairly low numbers probably due to the lack of grazed turf and bare ground. Tiso vagans is found commonly in grassland, but is not generally thought of as a sand dune species whereas Typhocrestus digitatus, although widespread, is often associated with sand dunes. Walckenaera vigilax is widespread in rather wetter habitats but is usually taken infrequently. The remaining species are common in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	0	6	2	8
Cochlicopa lubricella	4	0	0	4
Vitrina pellucida	1	5	10	16
Oxychilus alliarius	0	4	0	4
Candidula intersecta	0	1	0	1
Cochlicella acuta	1	0	0	1
TOTAL	6	16	12	34

The catch was small and comprised species that are usually associated with fixed dune areas with little bare ground.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	7	8	0	15

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

No terrestrial Isopoda were recorded at this site.

4. ADDITIONAL SPECIES

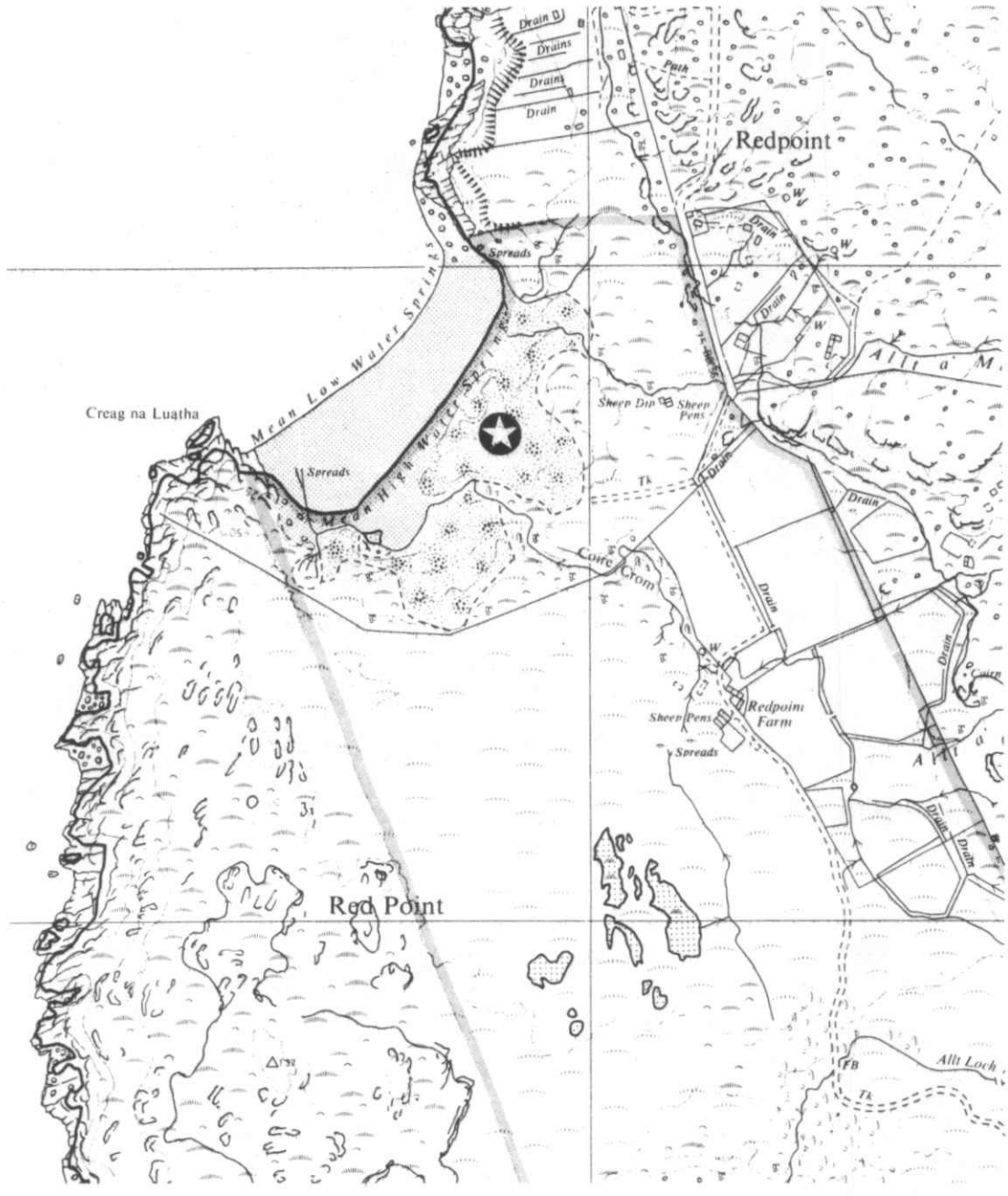
4.1 Lepidoptera : Lasiocampidae

The following species was observed in the field on 24.7.76:

Lasiocampa quercus larva

Site 50N Redpoint North

Site 50N Redpoint North



0 500Metres

0 500Yards

Light trap & pitfall traps

SITE 50N

REDPOINT NORTH

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

This site consisted of an area of "yellow dunes" reached by walking westward down a path at the end of the road at Redpoint. The dunes were tall but had fairly flat tops. There were large areas of bare sand, and much loose sand was visible among the vegetation.

1.2 Vegetation

The vegetation surrounding the pitfall traps consisted of the following species:

Pair 1: Ammophila arenaria 25%, mosses and a few herbs 60%, bare sand 15%.

Pair 2: A. arenaria 60%, mosses and a few herbs 20%, bare sand 20%. This pair was on the top of a small eroded dune.

Pair 3: A. arenaria 50%, mosses and a few herbs 30%, bare sand 20%.

Pair 4: A. arenaria 40%, mosses with a few herbs 60%.

1.3 Disturbance

It is possible that slight disturbance to the area was made by people using the path to get to the beach. A solitary caravan was parked on the dunes.

1.4 Distance from the sea

The traps were placed approximately 100 metres inland from high water mark.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The traps were placed in an accessible but apparently undisturbed area on the landward edge of the "yellow dunes". They were in the first hollow 100 metres to the north of the path leading to the beach. The pitfall traps were placed in a straight line inland from the light trap.

2.2 Damage or malfunction

The light trap was found to be inoperative on the 27.6.76, but had almost certainly been functioning for most of this first period (19 - 27.6.76) because a good number of specimens had been caught. It operated from 24.7. - 1.8.76. and was still functioning on 1.8.76. The pitfall traps were all functional during the whole of each of the three periods 19 - 27.6.76, 27.6. - 24.7.76 and 24.7. - 1.8.76.

2.3 Colour slides available

Box 1, 126-132

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Hepialus fusconebulosa	1	0	1
Philudoria potatoria	3	1	4
Xanthorhoe designata	1	0	1
Cosmorhoe ocellata	0	2	2
Eupithecia nanata	2	0	2
Aplocera plagiata	0	3	3
Abraxas grossulariata	3	0	3
Gnophos obfuscatus	0	1	1
Laothoe populi	1	0	1
Spilosoma lubricipeda	3	0	3
Euxoa tritici	0	36	36
Euxoa cursoria	0	45	45
Agrotis vestigialis	0	116	116
Agrotis exclamationis	1	0	1
Ochropleura plecta	2	0	2
Standfussiana lucernea	0	1	1
Noctua pronuba	0	2	2
Noctua comes	0	7	7
Lycophotia porphyrea	8	1	9
Diarsia mendica	0	1	1
Xestia triangulum	0	1	1
Hada nana	4	0	4
Lacanobia oleracea	2	1	3
Cerapteryx graminis	0	6	6

	JUNE	JULY	TOTAL
Acronicta rumicis	3	0	3
Rusina ferruginea	1	0	1
Thalpophila matura	0	10	10
Apamea monoglypha	0	42	42
Apamea lithoxylaea	0	3	3
Mesapamea secalis	0	10	10
Caradrina clavipalpis	0	1	1
Stilbia anomala	0	1	1
TOTAL	35	291	326

This site compared favourably with other North Coast sites, having a good species list and total catch. The most abundant moth, Agrotis vestigialis (36%), is a common sand dune species which was taken extensively and often commonly at many other sites, especially on the North Coast. Another sand dune species Euxoa cursoria, was also widespread on the North Coast but was taken elsewhere only at three East Coast sites.

Several species occurred very sparingly elsewhere, Philudoria potatoria occurred only at Site 50S (the other Redpoint site). Xanthorhoe designata was trapped only at Site 60. Xestia triangulum is usually associated with woodland areas and occurred here and at Sites 83 and 90. Acronicta rumicis was taken at Site 69, Stilbia anomala at Sites 59 and 65 and Aplocera plagiata at Site 57. The last two species tend to be more commonly found on the coast than elsewhere.

This was the only site where Abraxas grossulariata was recorded. It is generally distributed over much of the British Isles and feeds on a wide variety of plants, mostly trees and shrubs.

The two sites at Redpoint were the most westerly of those sampled on the mainland. Several species occurred here which were not collected further west, on the Outer Hebrides. These included Agrotis exclamationis, Noctua comes and Rusina ferruginea, which were widespread at many other mainland sites.

A number of species are confined to a limited range of larval food plants. Hepialus fusconebulosa, which feeds on the roots of Pteridium aquilinum, was taken widely at a number of sites. Cosmorhoe ocellata feeds on Galium spp., Aplocera plagiata on Hypericum perforatum and Laothoe populi on Populus spp. and Salix spp.. Three species feed

on Calluna vulgaris: Eupithecia nanata, Gnophos obfuscatus (also on Genista anglica) and Lycophotia porphyrea (also on Erica spp.).

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Carabus problematicus	0	1	0	1
Calathus erratus	1	0	0	1
Calathus fuscipes	0	21	1	22
Calathus melanocephalus	0	3	0	3
Calathus mollis	1	18	5	24
Amara aenea	2	2	0	4
TOTAL	4	45	6	55

Of the four Calathus spp. recorded C. mollis is the most indicative of a sandy coast but the record of a single specimen of C. erratus is of greater interest. This species is not recorded from the Outer Hebrides and this may represent its most westerly known site in northern Scotland. Amara aenea is also a xerophilous species. Three Amara sp. larvae were trapped during the second sampling period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Leiodes dubia/obesa	1	0	1	2
Quedius molochinus	0	1	0	1
Geotrupes stercorarius	0	0	1	1
Geotrupes vernalis	3	1	1	5
Aegialia arenaria	0	1	0	1
Serica brunnea	6	71	7	84
Byrrhus fasciatus	1	1	1	3
Apion loti	0	1	0	1
Otiorhynchus atroapterus	0	3	0	3
Philopedon plagiatus	1	1	0	2
TOTAL	12	80	11	103

Only ten species were recorded at this site. This was the lowest number of species recorded at any site during the survey. Serica brunnea constituted over 80% of all specimens trapped. Other psammophiles include Philopedon plagiatus and Aegialia arenaria, both coastal species, plus Leiodes dubia and Byrrhus fasciatus. Suprisingly, this was the only site at which A. arenaria, a typical sand dune species, was trapped.

The two species of Geotrupes are indicative of the presence of dung and Apion loti is phytophagous on Lotus corniculatus.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Drassodes cupreus	0	1	0	1
Clubiona trivialis	1	0	0	1
Agroeca proxima	0	0	1	1
Xysticus cristatus	0	1	0	1
Xysticus erraticus	0	0	2	2
Pardosa nigriceps	1	0	0	1
Alopecosa pulverulenta	1	0	0	1
Trochosa terricola	0	1	0	1
Arctosa perita	5	4	0	9
Pachygnatha degeeri	2	1	0	3
Walckenaera antica	0	1	0	1
Peponocranium ludicrum	0	1	0	1
Oedothorax retusus	1	0	0	1
Trichopterna thorelli	4	5	2	11
Pelecopsis mediocris	1	0	0	1
Erigone atra	1	0	0	1
Erigone promiscua	2	1	1	4
TOTAL	19	16	6	41

The most abundant species in the catch at this site was the erigonine Trichopterna thorelli (26.8%), which is usually associated with damp mossy and grassy areas. It is often locally common on wet heathland in southern England. Four species of lycosid were present, including Arctosa perita, a spider of sand dunes and dry sandy places. Pardosa nigriceps was taken here probably because it favours areas of longer vegetation. Alopecosa pulverulenta is a common grassland spider which occurred at many mainland sites but not at sites in the Hebrides. Two species of Xysticus were taken, X. cristatus is a very common grassland species which occurred at many sites usually in low numbers. However in the Hebrides it often formed a significant part of the fauna. X. erraticus, is a widespread species but is usually only taken commonly in dry grassland areas. During this survey it was taken only at two other sites, 70B and 90. Agroeca proxima, a clubionid associated with dry sandy places, was present here and at many North Coast sites. It was taken only at two sites outside the

North Coast. The erigonine, Oedothorax retusus, is often associated with pioneer habitats. Pelecopsis mediocris is very commonly taken on coastal sand dunes among marram grass and in shingle. It has, however, also been recorded inland. P. mediocris, which also occurred at Site 53, had not previously been recorded from Scotland. Erigone promiscua is often found on very short, grazed grassland and was present only in small numbers. The remaining species are all commonly found in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cepaea hortensis	1	11	7	19

Cepaea hortensis is known to occure on many dune systems in Scotland and tends to occur more commonly where grazing pressure is low.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	1	6	2	9

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

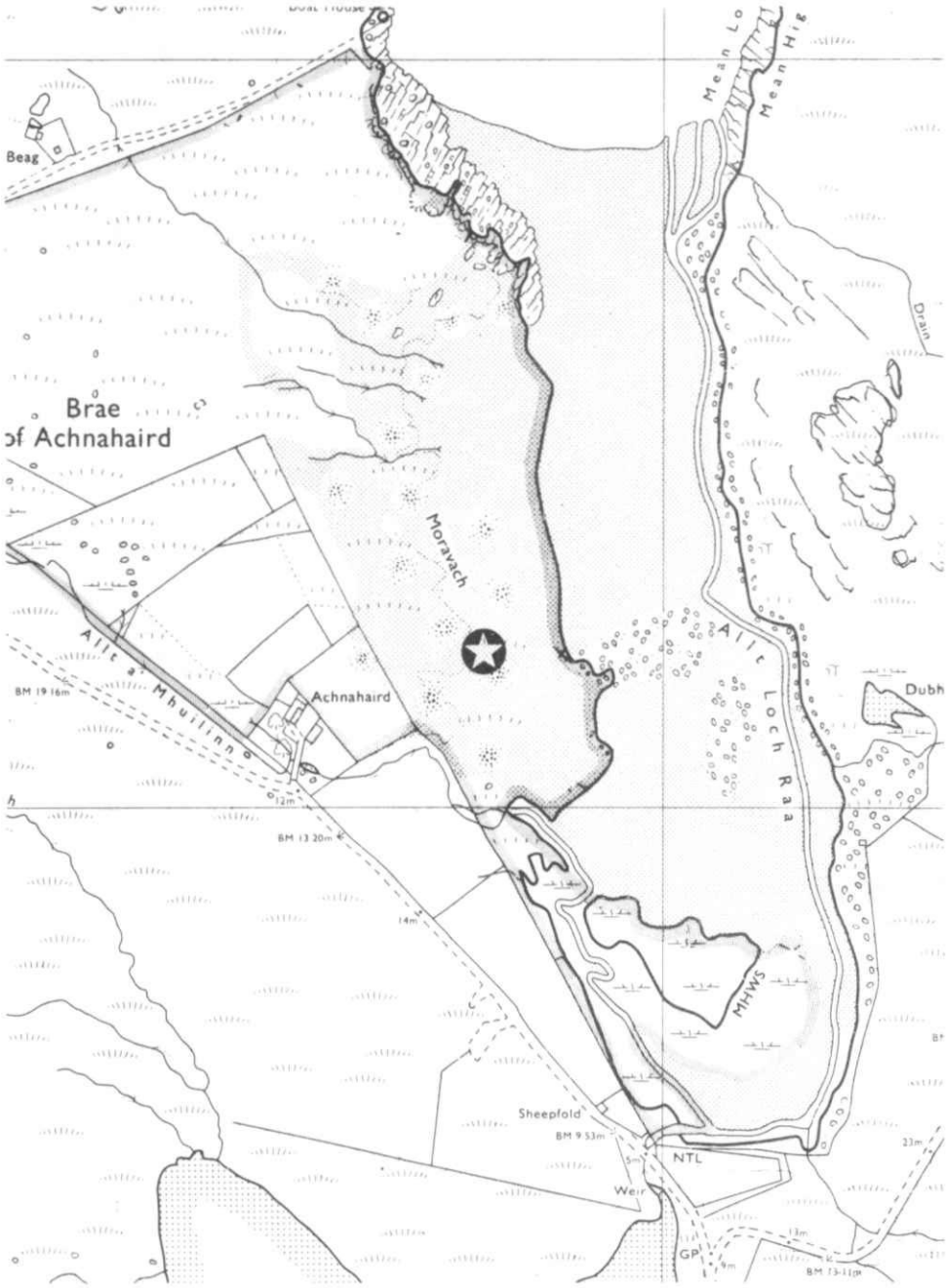
3.7 Terrestrial Isopoda

	JUNE	JN/JL	JULY	TOTAL
Porcellio scaber	0	3	2	5

Porcellio scaber is found widely on dry sandy soils.

Site 52 Achnahaird

Site 52 Achnahaird



Light trap & pitfall traps

SITE 52

ACHNAHAIRD

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The sampled area was on low dunes to the west of the Allt Loch Rea estuary. The site contained large areas of bare sand and wind-blown sand had been deposited recently over much of the area.

1.2 Vegetation

Mosses, including Polytrichum spp., were very widespread and abundant, and Peltigera sp. lichens were also present. Flowering plants in the area of the traps included Bellis perennis, Plantago sp., Festuca sp. (common), Trifolium repens, Cerastium sp., Taraxacum sp., Senecio jacobaea and Galium verum.

The vegetation surrounding the pitfall traps was assigned to the marram transition zone had the following structure:

Pair 1: 60% grass and herbs, 15% Ammophila arenaria and 15% bare sand, with very little moss.

Pair 2: 50% moss and grass, 25% A. arenaria and 25% bare sand. This pair was on a low dune.

Pair 3: 80% very short grass and moss, 10% short scattered A.arenaria and 10% bare sand.

Pair 4: 85% moss, grass and herbs, with 15% A. arenaria and a negligible amount of bare sand.

1.3 Disturbance

The whole site was heavily grazed by cattle, sheep and rabbits, and wind-blown sand was widespread. There was a caravan site nearby and some evidence of disturbance by people, mainly trampling, was observed.

1.4 Distance from sea

The traps were placed about 100 metres inland from the upper limit (MHWS) of tides in the estuary but about 850 metres from the sea itself.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The traps were placed in the second large depression on the dunes going

north-east from Achnahaird Farm towards the sea. The light trap was placed on a small ridge in the hollow, deliberately on an area of grass darkened by cow dung to deter disturbance by the grazing stock. The trap was visible from the bay, but from only a small corner of the nearby caravan site. The pitfall traps were arranged in a straight line running across the light trap from south-west to north-east.

2.2 Damage or malfunction

The light trap operated from 18 - 26.6.76, and although it was apparently undisturbed, only a small catch was made. During the second light trapping period, 23 - 31.7.76, the trap was vandalised, but a few moths were retrieved from inside the trap. The pitfall traps operated for three periods, 18 - 26.6.76, 26.6. - 23.7.76 and 23 - 31.7.76. All the traps functioned properly during the first period, but at the end of the second period all the pitfall traps contained large amounts of rainwater. In addition, two marker stakes had been broken off. At the end of the third period, apart from the damage to the light trap, all the marker stakes had been removed and all the traps except 4A and 4B had been dug up and the holes filled with sand. Traps 4A and 4B were left intact in their holes but had been filled with sand. The dry sand in these two traps was emptied out, and alcohol was added to the wet sand to preserve any catch that might have been among the sand.

2.3 Colour slides available

Box 1, 133-140

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Cosmorhoe ocellata	0	1	1
Gymnoscelis rufifasciata	1	0	1
Spilosoma lubricipeda	2	0	2
Euxoa tritici	0	16	16
Euxoa cursoria	0	1	1
Agrotis vestigialis	0	7	7
Noctua pronuba	0	1	1
Lycophotia porphyrea	1	0	1
Hada nana	2	0	2

	JUNE	JULY	TOTAL
Cerapteryx graminis	0	1	1
Blepharita adusta	1	0	1
Euplexia lucipara	1	0	1
Apamea remissa	1	0	1
Caradrina clavipalpis	0	1	1
TOTAL	9	28	37

This site produced a small species list and the lowest total catch of the North Coast sites. The trap was vandalised during the second trapping period.

Two sand dune species occurred. Euxoa cursoria was trapped at many North Coast sites but elsewhere only at three sites on the East Coast. Agrotis vestigialis was trapped extensively and often commonly at many other sites, especially on the North Coast.

Gymnoscelis rufifasciata occurred elsewhere only at Site 69. It is a species of cliffs, coastal dunes, chalk slopes and rough places. The larvae feed on the flowers of a variety of shrubs such as Ulex spp., Sarothamnus scoparius, Ilex aquilifolium, Clematis vitalba and Crataegus spp.. Euplexia lucipara is a generally distributed species but was taken elsewhere only at Sites 59, 60 and 90.

Two stenophagous species were collected, Cosmorhoe ocellata which feeds on Galium spp. and Lycophotia porphyrea on Calluna vulgaris and Erica spp..

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Nebria salina	1	0	0	1
Dyschirius politus	4	2	0	6
Broscus cephalotes	1	0	0	1
Asaphidion pallipes	1	0	0	1
Calathus erratus	27	5	0	32
Calathus melanocephalus	3	2	0	5
TOTAL	37	9	0	46

An unusual assemblage of Carabidae was taken here, notable for the apparent absence of Calathus fuscipes, although the absence of any carabids in the catch from the third period, due to vandalism, doubtless distorts any conlusions that may be made. Despite this,

the number of C. erratus caught was exceeded only at Sites 75, 90 and 70, but virtually all the specimens from this site were trapped during June. The single Asaphidion pallipes was the only specimen of this species taken during the survey. This is a rare species occurring in slightly moist sand and has been recorded from under sea cliffs. Broscus cephalotes is an almost exclusively coastal species of dry, barren sand, and Dyschirius politus, only taken at three other sites, occurs on sparsely vegetated sandy soils.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Cercyon haemorrhoidalis	0	1	0	1
Leiodes dubia/obesa	30	74	0	104
Bledius fuscipes	0	1	0	1
Bledius longulus	37	26	3	66
Oxytelus laqueatus	0	1	0	1
Gyrohypnus angustatus	1	0	0	1
Mycetoporus angularis	0	1	0	1
Aloconota gregaria	0	1	0	1
Atheta amicula	0	1	0	1
Atheta fungi	0	1	0	1
Atheta atramentaria	0	1	0	1
Aleochara bilineata	0	1	0	1
Geotrupes vernalis	1	0	0	1
Aphodius fimetarius	0	1	0	1
Aphodius rufus	1	1	0	2
Serica brunnea	0	101	0	101
Simplocaria semistriata	1	3	0	4
Longitarsus jacobaeae	0	2	0	2
Otiorhynchus atroapterus	3	4	0	7
Philopedon plagiatus	13	23	0	36
TOTAL	87	244	3	334

During the third sampling period due to vandalism, Coleoptera were trapped only in pitfall traps 4A and 4B.

The catch at this site was dominated by equally large numbers of two species, Serica brunnea and Leiodes dubia, which are characteristic of sandy areas, although not restricted to the coast. The next most abundant species, Bledius longulus has similar habitat requirements although its congener, B. fuscipes, is more specifically a sandy

coast and estuarine species. Philopedon plagiatus and Otiorhynchus atroapterus are coastal psammophiles.

The presence of dung on the site is indicated particularly by the occurrence of Geotrupes vernalis, Aphodius spp., Cercyon haemorrhoidalis, Atheta atramentaria and Oxytelus laqueatus. Longitarsus jacobaeae is phytophagous on Senecio jacobaea.

Single larvae of Bledius sp. (probably B. longulus) and S. brunnea were collected during the second sampling period.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Pardosa palustris	0	1	0	1
Arctosa perita	6	24	0	30
Oedothorax fuscus	1	3	0	4
Oedothorax retusus	10	17	0	27
Typhocrestus digitatus	2	2	0	4
Erigone promiscua	15	63	2	80
TOTAL	34	110	2	146

The catch from the third trapping period included only two spiders because of vandalism to the traps. Although only six species were recorded, the catches from the earlier period do not seem to have been affected by any interference or by the amount of rainwater that collected in the traps during the second period.

Arctosa perita, a species that is characteristic of sand dunes, was the commonest lycosid taken. This was the most westerly site at which A. perita was the commonest lycosid. Pardosa palustris is a lycosid which is widespread on open grassland. Oedothorax retusus and O. fuscus, two species often found on pioneer habitats, were taken, with the former being more abundant. This dominance of O. retusus over its congener was general on the mainland sites although the reverse was more usual in the Hebrides. Typhocrestus digitatus, although widespread and locally common is often associated with sand dune habitats.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicella acuta	2	21	0	23

This was a poor catch compared with most other North Coast sites.

Cochlicella acuta is associated with semi-fixed dunes with bare sand.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	1	3	0	4

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

No terrestrial Isopoda were recorded at this site.

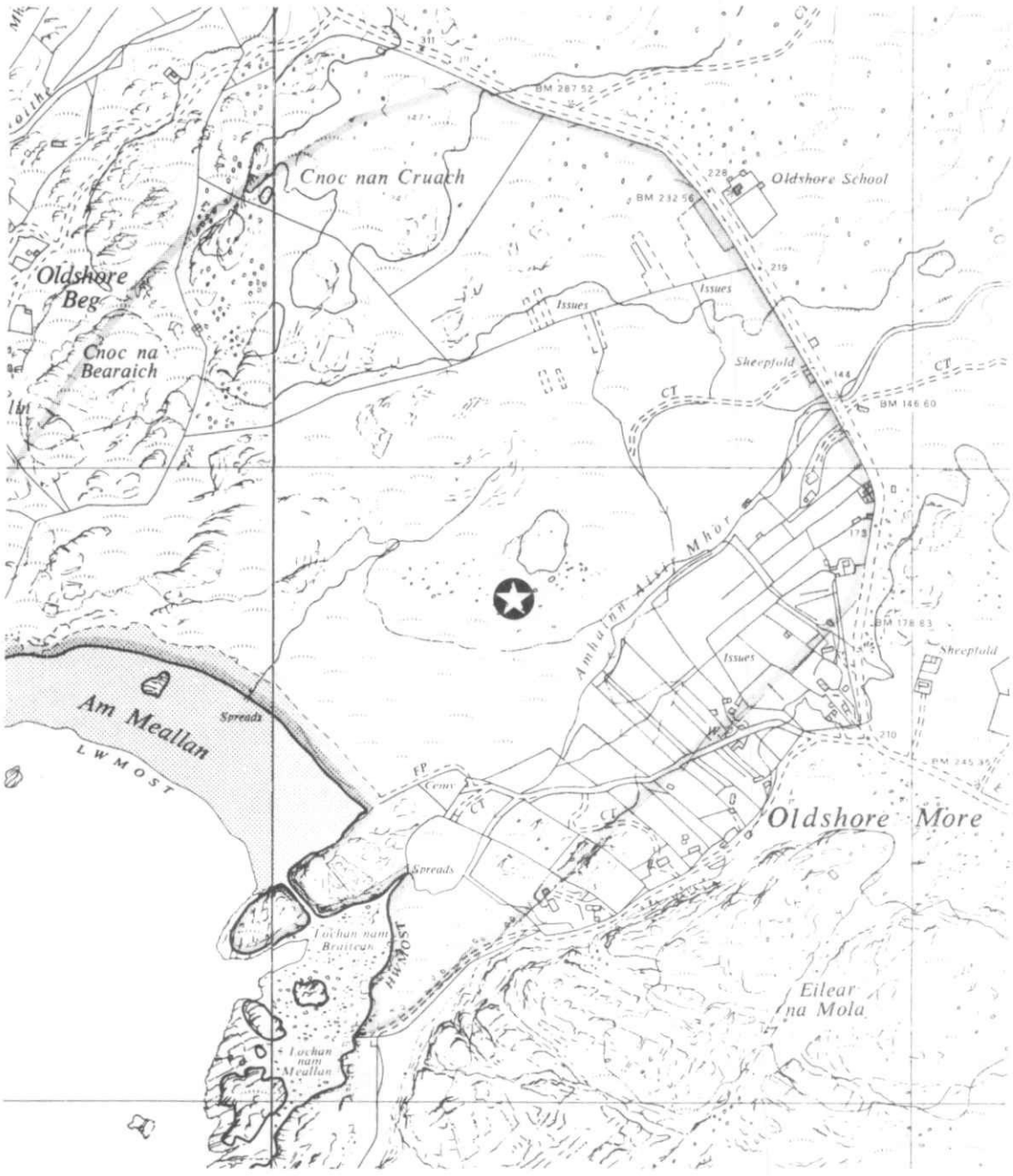
4. ADDITIONAL SPECIES

4.1 Lepidoptera : Satyridae

Maniola jurtina was observed in the field on 23.7.76.

Site 53 Oldshore More

Site 53 Oldshore More



Light trap & pitfall traps

SITE 53

OLDSHORE MORE

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The site consisted of large, steep, fixed dunes to the north of the small cemetery at Oldshore More. The traps were placed in a large hollow at the foot of a scarp of bare sand.

1.2 Vegetation

The traps were placed in an area of transition where Ammophila arenaria was rather scarce and the vegetation consisted mainly of dwarf herbs and moss with a little bare sand. The vegetation surrounding the pitfall traps had the following structure:

Pair 1: 50% moss, 30% dwarf herbs. 10% A. arenaria and 10% bare sand.

Pair 2: 90% dwarf herbs and moss, and 10% A. arenaria with a little bare sand where rabbits had scratched the surface.

Pair 3: 90% dwarf herbs and grass, 5% A. arenaria and 5% bare sand.

Pair 4: 90% dwarf herbs and moss, with 10% A. arenaria.

1.3 Disturbance

The dunes looked to be well used and trampled by people, and there were several areas of bare sand resulting from the activities of rabbits.

1.4 Distance from sea

The traps were placed about 340 metres inland from HW MOST.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The light trap was placed behind a dune out of sight of houses, but not out of sight of the cemetery. The pitfall traps were arranged in a crescent around the light trap on the west, north and east sides.

2.2 Damage or malfunction

The light trap operated from 17 - 25.6.76 and 22 - 30.7.76 and was

functional at the end of both periods when tested. The catch during the first period was small, compared with that taken during the second period. At the end of the first period, the trap was covered with bird droppings, suggesting that a bird might have been catching the moths attracted to the light. The pitfall traps were all functional during the whole of each of the three periods 17 - 25.6.76, 25.6. - 22.7.76 and 22 - 30.7.76. However a little sand was found in some of the traps on 25.6.76, and a mouse was found in trap 1B at the end of the second trapping period.

2.3 Colour slides available

Box 1, 141-146.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Spilosoma lubricipeda	1	0	1
Euxoa tritici	0	130	130
Euxoa cursoria	0	1	1
Agrotis vestigialis	0	126	126
Agrotis exclamationis	16	0	16
Noctua pronuba	1	24	25
Noctua janthina	0	1	1
Xestia sexstrigata	0	1	1
Hada nana	2	0	2
Mamestra brassicae	0	1	1
Lacanobia oleracea	0	2	2
Cerapteryx graminis	0	26	26
Mythimna conigera	0	8	8
Blepharita adusta	1	0	1
Apamea monoglypha	0	56	56
Apamea furva	0	1	1
Apamea remissa	1	0	1
Mesapamea secalis	0	33	33
Amphipoea lucens	0	16	16
Amphipoea oculea	0	1	1
Diachrysia chrysitis	0	1	1
Autographa pulchrina	0	3	3
Autographa bractea	0	3	3
TOTAL	22	434	456

This site compared favourably with other North Coast sites, the species list was of average length but the total catch was high. The most abundant species was Euxoa tritici (29%) which was caught in some numbers at many sites except around the Moray Firth

Two sand dune species occurred. Euxoa cursoria was trapped at many North Coast sites but elsewhere only at three sites on the East Coast. Agrotis vestigialis was abundant (28%) and was trapped extensively and often commonly at many other sites, especially on the North Coast.

Several species were recorded at few other sites. Amphipoea lucens (17 specimens) taken elsewhere only as single specimens at Sites 65, 82 and 83 and two specimens at Site 21. Two species, Noctua janthina and Mamestra brassicae only occurred elsewhere at Sites 87 and 95. Amphipoea oculea occurred only at this site.

This was the most westerly locality for Xestia sexstrigata, Apamea furva, Mythimna conigera and Autographa bractea; all were well represented further to the east.

Diachrysia chrysitis feeds on Urtica dioica and a few other common species. The remaining species are all considered to be oligophagous.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Nebria salina	0	1	0	1
Calathus fuscipes	11	180	20	211
Calathus melanocephalus	3	5	1	9
Calathus mollis	0	10	2	12
Amara aenea	2	3	0	5
Amara familiaris	2	2	0	4
TOTAL	18	201	23	242

Species of the genus Calathus dominated the catch of carabids at this site. C. mollis is characteristic of dry, coastal sandy soils. Amara aenea is also a xerophilous species of open sandy ground with sparse vegetation. Three Amara sp. larvae were taken during the last two trapping periods. Two Notiophilus biguttatus larvae were taken during the second period and one larva of Broscus cephalotes was taken during the third period, but adults of neither species were collected at this site.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Megasternum obscurum	2	7	1	10
Leiodes dubia/obesa	1	17	0	18
Xantholinus linearis	1	3	0	4
Staphylinus brunnipes	0	2	0	2
Tachyporus chrysomelinus	0	2	0	2
Atheta fungi	1	1	1	3
Aleochara sparsa	0	1	0	1
Geotrupes vernalis	0	2	0	2
Serica brunnea	4	16	1	21
Byrrhus fasciatus	2	10	1	13
Longitarsus jacobaeae	0	0	5	5
Longitarsus luridus	0	0	1	1
Longitarsus succineus	1	2	0	3
Otiorhynchus atroapterus	1	0	0	1
Philopedon plagiatus	16	2	0	18
TOTAL	29	65	10	104

The relative abundance of the most numerous species at this site was reminiscent of that for many of the Outer Hebridean sites in that the eurytopic, but more hygrophilous, Megasternum obscurum was present with the psammophilous Serica brunnea, Leiodes dubia, Philopedon plagiatus and Byrrhus fasciatus. A single specimen of Otiorhynchus atroapterus, another species of sandy coasts, was also taken.

Among the phytophagous species Longitarsus jacobaeae feeds on Senecio spp., L. succineus on a wide variety of Compositae and L. luridus on Plantago spp. and Cirsium arvense.

Geotrupes vernalis is indicative of the presence of dung.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Haplodrassus signifer	0	2	0	2
Xysticus cristatus	10	20	0	30
Pardosa palustris	6	3	0	9
Arctosa perita	5	14	0	19
Pachygnatha degeeri	1	1	0	2
Oedothorax fuscus	1	16	2	19
Oedothorax retusus	12	7	0	19

	JUNE	JN/JL	JULY	TOTAL
Pelecopsis mediocris	4	1	1	6
Tiso vagans	3	7	0	10
Typhocrestus digitatus	0	5	0	5
Erigone promiscua	15	48	19	82
Erigone arctica	0	1	0	1
TOTAL	57	125	22	204

The most abundant species in the catch at this site was Erigone promiscua, a spider normally associated with short disturbed turf and barer open areas. E. arctica is a drift line species in most of Britain although it is apparently more widespread on the coasts of north west Scotland. Oedothorax fuscus and O. retusus were frequent; both species are very often taken in pioneer habitats, the former being dominant in the Hebrides and the latter on the mainland. Arctosa perita, a spider of sand dunes and dry sandy places, was the more abundant of the two lycosids present. Typhocrestus digitatus is a fairly widespread species over a range of mostly dry habitat types, and is often associated with sand dunes. The remaining species are taken commonly in grassland habitats.

Pelecopsis mediocris taken here and at Redpoint North (Site 50N), constitutes a new record for Scotland. This species has been recorded from inland areas but is more frequent on coastal sand dunes.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	2	2	3	7
Vitrina pellucida	0	0	1	1
Oxychilus alliarius	0	1	0	1
Helicella itala	0	4	1	5
Cochlicella acuta	4	15	9	28
TOTAL	6	22	14	42

This was a small catch consisting of species that are typical of fixed dune areas with some bare sand.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	4	12	3	19

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

No terrestrial Isopoda were recorded at this site.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field on 21.7.76:

Lycaenidae

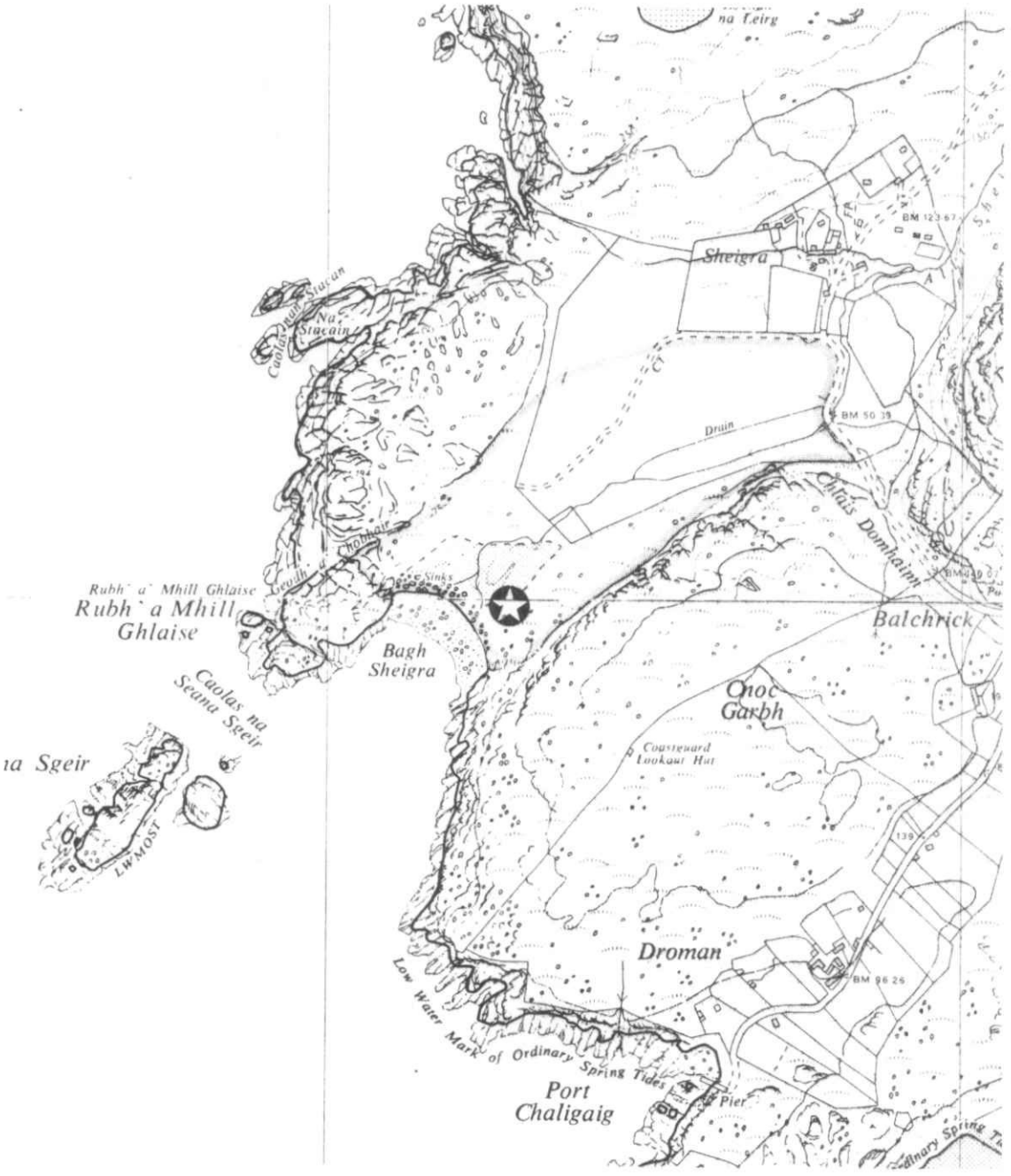
Polyommatus icarus

Satyridae

Maniola jurtina

Site 54 Sheigra

Site 54 Sheigra



Light trap & pitfall traps

SITE 54

SHEIGRA

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

There were no true dunes at this site, only a sandy beach and a flat area of very short dune meadow which seemed to be used as an unofficial caravan/camp site and on which the traps were set. The area was crossed by a small burn. An 'island' of dune meadow between two branches of the burn was selected as the site for the pitfall traps. Freshly wind-blown sand was distributed over most of the trapping area.

1.2 Vegetation

The sampled area was in very short dune meadow, perhaps only 2 cm in depth, without Ammophila arenaria. The light trap was placed in a large area of bare sand, the dry bed of a branch of the burn. All four pairs of pitfall traps were placed in the short meadow vegetation consisting of various grasses, Carex arenaria, Lotus corniculatus, Plantago spp., Galium verum, Bellis perennis, Trifolium repens, mosses and occasional plants of Senecio jacobaea, Cirsium spp. and Centaurea nigra. There was about 5% bare sand in the area of the pitfall traps.

1.3 Disturbance

The sampling area was moderately grazed by sheep, but clearly heavily grazed by rabbits. There was evidence that people from the nearby camp site trampled the vegetation.

1.4 Distance from sea

The traps were sited about 100 metres inland from the lower shore.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The light trap was placed on loose sand in the dry bed of a branch of the burn, within sight of the caravans but as far away from them as possible. Some concern was felt lest the water table of the burn should rise and inundate the battery. The pitfall traps were placed in a straight line on an island of very short dune meadow to the north-east of

the light trap between two branches of the burn where there was no marram grass.

2.2 Damage or malfunction

The light trap operated from 17 - 25.6.76 and 22 - 30.7.76 and was functional at the end of both periods when tested. On 25 June the light trap was covered by a large number of gnats (slide 149). The pitfall traps were all functional during the whole of each of the three periods 17 - 25.6.76, 25.6. - 22.7.76 and 22 - 30.7.76. When trap 1A was collected on 30 July it looked as if it had been dug up and emptied and then replaced; the level of liquid was much lower than when the trap was set out and was mainly rainwater. All the other traps at this date contained large amounts of rainwater.

2.3 Colour slides available

Box 1, 147-150

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Hepialus fusconebulosa	1	0	1
Euxoa tritici	0	3	3
Euxoa cursoria	0	21	21
Agrotis vestigialis	0	59	59
Agrotis exclamationis	3	0	3
Standfussiana lucerna	0	1	1
Xestia sexstrigata	0	1	1
Hada nana	6	0	6
Ceramica pisi	1	0	1
Cerapteryx graminis	0	3	3
Blepharita adusta	3	0	3
Apamea monoglypha	0	3	3
Autographa bractea	0	1	1
TOTAL	14	92	106

This site produced a poor species list and total catch compared with other North Coast sites. The most abundant species was Agrotis vestigialis (54%). This common sand dune species was trapped extensively and often commonly at many other sites, especially on the North Coast. Another species of coastal dunes, Euxoa cursoria, also occurred

at many sites on the North Coast but elsewhere only at three East Coast sites.

Hepialus fusconebulosa feeds only on the roots of Pteridium aquilinum and was recorded widely at a number of sites.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Loricera pilicornis	0	2	0	2
Calathus fuscipes	0	1	0	1
Calathus mollis	23	75	26	124
Amara bifrons	0	1	0	1
Amara familiaris	0	1	0	1
TOTAL	23	80	26	129

The number of Calathus mollis trapped here was exceeded during the survey only by the number taken at Site 61. C. mollis and Amara bifrons were the only xerophilous species trapped at this site.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Leiodes dubia/obesa	0	2	0	2
Othius angustus	0	1	0	1
Philonthus cognatus	1	13	0	14
Philonthus succicola	0	0	1	1
Philonthus varius	0	1	0	1
Tachyporus chrysomelinus	1	0	0	1
Tachyporus pusillus	1	1	0	2
Atheta atramentaria	0	1	0	1
Aleochara bipustulata	0	1	0	1
Serica brunnea	0	1	1	2
Simplocaria semistriata	1	0	0	1
Longitarsus jacobaeae	0	0	1	1
Longitarsus luridus	0	0	1	1
Otiorhynchus atroapterus	6	3	0	9
Philopedon plagiatus	12	1	0	13
Sitona lepidus	1	0	0	1
Sitona lineellus	3	0	1	4
TOTAL	26	25	5	56

This site produced the second lowest catch of individuals, recorded at any of the sites sampled during the survey. Approximately 30% of the

traps contained no non-carabid Coleoptera despite the fact that they were fully functional throughout all trapping periods. Indeed the only trap (1A, second period) regarded as providing an incomplete sample, caught the largest number of Coleoptera. Of the seventeen species caught Philonthus cognatus, an indicator of dung or carrion, and Philopedon plagiatus, a coastal psammophile, were equally numerous, although occurring almost exclusively in different samples.

Other species that are typical of sandy or coastal regions are Otiorhynchus atroapterus, Serica brunnea and Leiodes dubia, whereas other dung species are Atheta atramentaria, Aleochara bipustulata and the other two species of Philonthus.

Several phytophagous species were trapped. The two Sitona spp. feed on Trifolium spp., Longitarsus jacobaeae on Senecio spp., and L. luridus on Plantago spp. and Cirsium arvense.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Pardosa nigriceps	1	0	0	1
Oedothorax fuscus	14	6	1	21
Oedothorax retusus	2	5	1	8
Savignya frontata	0	1	0	1
Erigone dentipalpis	2	16	3	21
Erigone atra	0	13	4	17
Erigone promiscua	5	22	4	31
Erigone arctica	283	161	13	457
TOTAL	307	224	26	557

The vegetation structure at this site was unusual compared with most of the other sites sampled on the mainland (see section 1.2) and, probably as a result, the catch of spiders was distinctive for the abundance of the genus Erigone (94.6%), with E. arctica contributing 82.1%. The site was very open and typical of the situation usually favoured by this species. It is normally found in the drift line on beaches and salt marshes. E. promiscua was also present as would be expected on a site with such short vegetation. Two species of Oedothorax were taken with O. fuscus more abundant that O. retusus, a situation more common on the Hebridean sites than on the mainland. The other species of linyphiids are all common in grassland.

The only non-linyphiid to occur was Pardosa nigriceps, a lycosid that is normally associated with long vegetation.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicella acuta	0	1	1	2

This was a very poor catch compared with most other North Coast sites. Cochlicella acuta is associated with semi-fixed dunes with bare sand.

3.6 Diplopoda

9

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	0	0	1	1

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

No terrestrial Isopodae were recorded at this site.

4. ADDITIONAL SPECIES

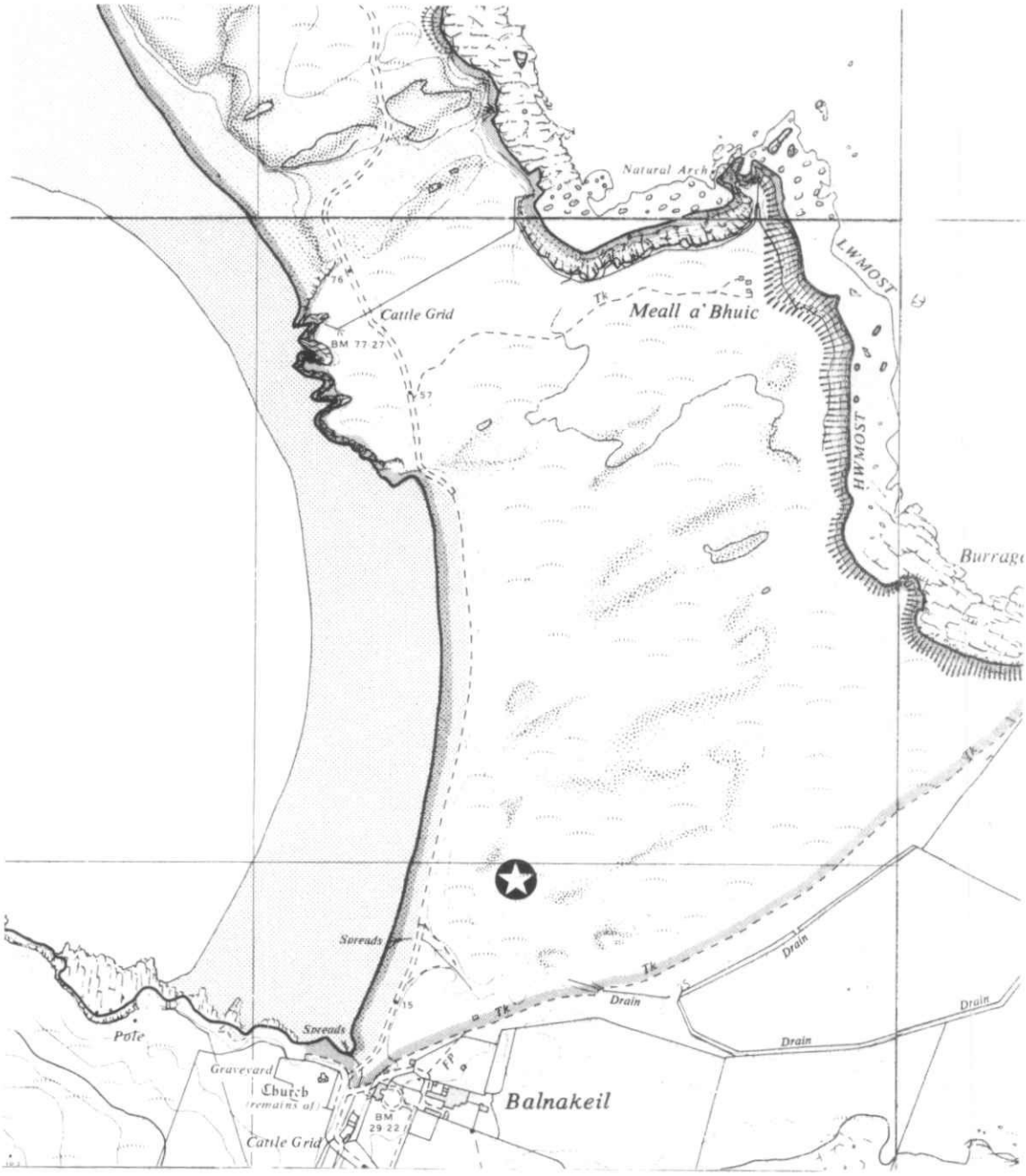
4.1 Siphonaptera : Pulicidae

The following species was recorded by Dr R.C. Welch:

Spilopsyllus cuniculi, 22.7.76, one specimen in pitfall trap 2A

Site 56S Faraid Head South

Site 56S Faraid Head South



0 500 Metres
0 500 Yards

Light trap & pitfall traps

SITE 56S

FARAID HEAD SOUTH

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The sampling area was among moderately high dunes inland from Balnakeil Beach. Access was through Balnakeil Farm, by permission.

1.2 Vegetation

The vegetation in the general area of the traps consisted of luxuriant grass and herbs, including Thymus drucei, Galium verum, much Thalictrum minus, Viola tricolor, Lathyrus spp., Ranunculus spp., Bellis perennis, Trifolium repens, Myosotis spp., Polygala spp., Plantago spp., Lotus corniculatus, Euphrasia spp., Luzula campestris, Cerastium arvense and moss. The composition of the vegetation surrounding the pitfall traps was as follows:

Pair 1: 60% Ammophila arenaria, 40% grass and herbs - the marram transition zone.

Pair 2: as for pair 1.

Pair 3: as for pair 1, but the trap was in a trackway with A. arenaria on either side.

Pair 4: in a sligthly more open area than the other pairs, but still with 60% A. arenaria and 40% grass and herbs.

1.3 Disturbance

The area had been moderately grazed by sheep and cattle. There was apparently no disturbance from people as there was no general access to this part of the dunes.

1.4 Distance from sea

The traps were placed about 200 metres inland from HW MOST.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

All the traps (including the light trap) were placed on the slopes of the dunes, in an attempt to reduce the possibility of damage by stock. The pitfall traps were placed in a semicircle around the light trap, one pair on the side of each of the four surrounding dune hillocks.

2.2 Damage or malfunction

The light trap operated from 15 - 24.6.76 and 20 - 29.7.76. The trap was not functional at the end of this second period when tested. The pitfall traps were all functional during the whole of each of the three periods 15 - 24.6.76, 24.6. - 20.7.76 and 20 - 29.7.76. Several pitfall traps contained a single Sorex araneus when emptied: 24.6.76 - trap 3A, 20.7.76 - trap 2B, 3A and 4B. Sheep grazed in the trapping area, especially during the first period (15 - 24.6.76) when wool was found on the marker post for pair 4, but the traps themselves were undisturbed.

2.3 Colour slides available

General views of Faraid Head and Balnakeil Bay: Box 1, 151-152.
Sampling area etc. Site 56S: Box 1, 153-160.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Hepialus fusconebulosa	24	0	24
Cosmorhoe ocellata	3	0	3
Perizoma albulata	0	11	11
Opisthograptis luteolata	1	0	1
Arctia caja	0	2	2
Agrotis vestigialis	0	1	1
Ochropleura plecta	20	0	20
Noctua pronuba	0	1	1
Lycophotia porphyrea	1	0	1
Xestia sexstrigata	0	1	1
Ceramica pisi	1	0	1
Cerapteryx graminis	0	58	58
Mythimna conigera	0	1	1
Mythimna impura	0	2	2
Blepharita adusta	5	0	5
Rusina ferruginea	2	0	2
Apamea crenata	1	0	1
Oligia fasciuncula	2	0	2
TOTAL	60	77	137

This site produced a species list and total catch which were below average compared with other North Coast sites. Cerapteryx graminis was the most abundant species and made up 42% of the total catch.

Agrotis vestigialis was the only sand dune species to occur. It was trapped extensively and often commonly at many other sites, especially on the North Coast.

This was the most western site for Apamea crenata and Oligia fasciuncula, two generally common species which feed on grasses. Opisthograptis luteolata, occurred elsewhere only at Sites 58, 87 and 90, and feeds on a number of shrubs such as Crataegus spp., Prunus spp., Sorbus spp., etc.

Several species are confined to a limited range of larval food plants. Hepialus fusconebulosa feeds on the roots of Pteridium aquilinum and was taken widely at a number of sites. Cosmorhoe ocellata feeds on Galium spp. and Perizoma albulata on the seeds of Rhinanthus minor. Lycophotia porphyrea feeds on Calluna vulgaris and Erica spp..

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Leistus rufescens	0	0	2	2
Calathus fuscipes	3	16	1	20
Calathus melanocephalus	1	3	2	6
Amara bifrons	1	1	0	2
Amara communis	1	0	0	1
TOTAL	6	20	5	31

This was a very poor catch of carabids, both in terms of numbers of species and of individuals.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Megasternum obscurum	3	3	1	7
Acrotrichus atomaria	1	2	0	3
Leiodes dubia/obesa	2	7	5	14
Sciodrepoides watsoni	0	36	0	36
Catops fuliginosus	1	0	0	1
Catops tristis	0	18	0	18
Nicrophorus investigator	0	1	0	1
Silpha atrata	0	1	0	1
Stenichnus collaris	0	0	1	1

	JUNE	JN/JL	JULY	TOTAL
Stenus brunnipes	1	4	1	6
Stenus impressus	0	1	0	1
Xantholinus linearis	3	1	0	4
Staphylinus brunnipes	1	0	0	1
Quedius fuliginosus	0	2	0	2
Quedius molochinus	0	2	2	4
Tachyporus chrysomelinus	0	2	1	3
Tachinus elongatus	0	1	0	1
Amischa cavifrons	5	4	0	9
Atheta amicula	0	1	0	1
Atheta fungi	1	0	1	2
Aleochara sparsa	0	1	0	1
Serica brunnea	0	47	3	50
Phyllopertha horticola	2	0	0	2
Rhagonycha femoralis	1	0	0	1
Cryptophagus setulosus	1	1	2	4
Atomaria nitidula	1	0	0	1
Longitarsus luridus	0	1	11	12
Longitarsus succineus	0	16	13	29
Apion dichroum	2	5	1	8
Philopedon plagiatus	3	2	0	5
TOTAL	28	159	42	229

The most abundant species in the catch at this site was the psammophilous Serica brunnea although other sand dune species, such as Philopedon plagiatus and Leiodes dubia, were poorly represented.

Carrion-frequenting species comprised a significant element of the fauna with Sciodrepoides watsoni and Catops tristis being the most numerous. Other species associated with carrion include Nicrophorus investigator, C. fuliginosus and Aleochara sparsa.

Cryptophagus setulosus occurs in the nests of solitary bees whilst Phyllopertha horticola is a species whose larvae are usually found in areas with a permanent dense turf.

Of the phytophagous species, Longitarsus succineus feeds on a variety of Compositae, L. luridus on Plantago spp. and Cirsium spp., and Apion dichroum on Trifolium repens.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Drassodes cupreus	0	1	0	1
Haplodrassus signifer	2	5	0	7
Micaria pulicaria	1	1	0	2
Agroeca proxima	0	0	1	1
Xysticus cristatus	1	1	1	3
Pardosa pullata	11	18	2	31
Pardosa nigriceps	3	1	0	4
Alopecosa pulverulenta	15	5	0	20
Trochosa terricola	0	4	1	5
Hahnia nava	6	16	1	23
Pachygnatha degeeri	19	7	2	28
Walckenaera antica	2	1	0	3
Dicymbium nigrum	1	1	0	2
Pocadicnemis pumila	2	1	0	3
Oedothorax retusus	1	0	0	1
Tiso vagans	37	31	1	69
Erigone dentipalpis	0	1	0	1
Erigone promiscua	2	1	0	3
Agyneta cauta	2	2	0	4
Meioneta beata	33	19	0	52
Centromerus prudens	0	0	1	1
Lepthyphantes mengei	2	16	8	26
TOTAL	140	132	18	290

Twenty-two species of spiders were recorded, almost exactly duplicating the spider fauna taken at the other sampling site (56N) on this large area of dunes and grassland. The chief difference is that four species of lycosid were recorded here, and three were very numerous, but at Site 56N the lycosids made up only an insignificant part of the catch. Of the two Pardosa species, P. pullata, (the most abundant lycosid) is very common and widespread, with a slight preference for damper situations. P. nigriceps, a lycosid of longer vegetation, occurred in small numbers. Alopecosa pulverulenta and Trochosa terricola are both very common, widespread spiders although the former is more frequent in open habitats than the latter.

The most abundant species in the catch at this site was the erigonine Tiso vagans, a common and widespread spider usually associated with

grassland but not one which is usually dominant on sand dunes. Meioneta beata was again present in large numbers. This species is much more abundant in the south but occurred in some numbers on several sites during this survey. Hahnia nava, a widespread but rather local grassland spider was, as at the other Faraid Head site, taken in quite large numbers. Micaria pulicaria, a gnaphosid of open habitats with sparse vegetation, has a rather southern distribution, and was taken at both the Faraid Head sites but not elsewhere on the North Coast or Hebrides. It was, however, quite widespread on the Moray Firth and East Coast Sites. The clubionid, Agrocea proxima, widespread and locally common in drier habitats, was present at many North Coast sites but only at Dumbarnie (91), and Tyninghame (95) elsewhere. The linyphiine, Centromerus prudens, is usually found in grassy and heathery areas and is rather commoner in the north than the south. During this survey it was only taken here, at two sites on the Moray Firth (70 and 72) and at Lunan Bay 87. The remaining species are all common in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	0	4	1	5
Vertigo pygaea	1	0	0	1
Lauria cylindracea	0	0	1	1
Vallonia costata	1	0	0	1
Vitrina pellucida	0	1	0	1
Oxychilus cellarius	0	1	0	1
Oxychilus alliarius	1	3	1	5
Helicella itala	1	2	4	7
Cepaea hortensis	1	2	0	3
TOTAL	5	13	7	25

A high number of species, but few individuals, was taken here. The assemblage of species is characteristic of fixed dune areas with little bare ground and only moderate grazing pressure. Lauria cylindracea and Oxychilus cellarius were not recorded at any other North Coast site. Vallonia costata is sparsely recorded in Scotland.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Polydesmus inconstans	1	1	0	2

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	1	0	1	2
Brachyiulus pusillus	1	0	0	1
TOTAL	3	1	1	5

Polydesmus inconstans rarely occurs in large numbers but appears to be recorded from a wide variety of habitat types. It was not recorded in samples from any of the other North Coast sites. Cylindroiulus latestriatus is common on sandy coasts throughout Britain. Brachyiulus pusillus is a soil dwelling species and therefore uncommonly occurs in pitfall traps. It is known to occur abundantly on some sand dunes in Britain but was recorded at only 3 other sites in the survey.

3.7 Terrestrial Isopoda

	JUNE	JN/JL	JULY	TOTAL
Trichoniscus pusillus	0	2	0	2
Philoscia muscorum	0	4	0	4
TOTAL	0	6	0	6

Philoscia muscorum and Trichoniscus pusillus are commonly associated with damp grassland, although P. muscorum also occurs in dry grassland. P. muscorum is locally distributed in Scotland, mainly on the coast and in river valleys.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Pieridae

Pieris napi

Lycaenidae

Polyommatus icarus

Nymphalidae

Vanessa atalanta

Aglais urticae

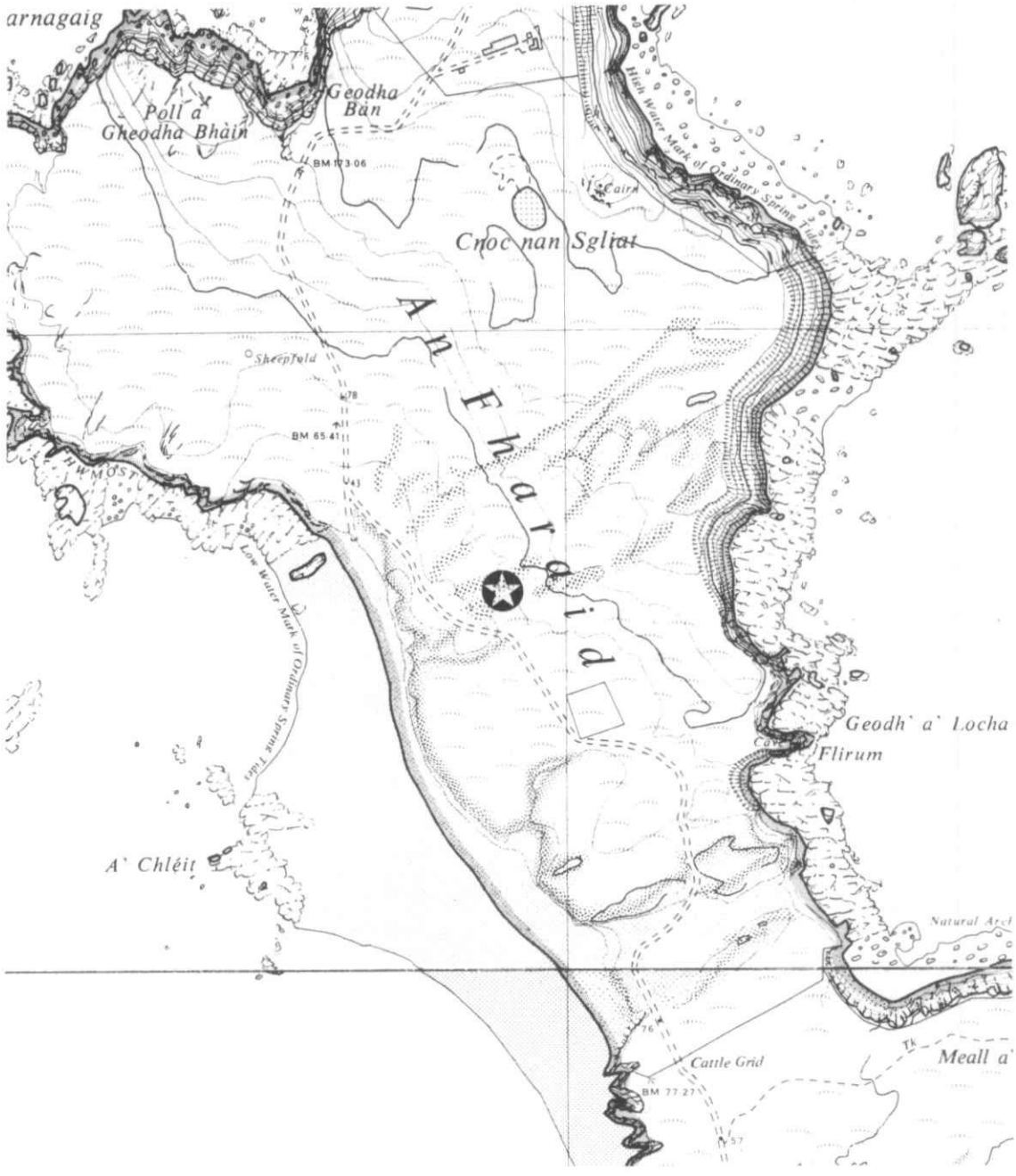
Argynnis aglaja

Satyridae

Maniola jurtina

Site 56N Faraid Head North

Site 56N Faraid Head North



Light trap & pitfall traps

I.T.E. (N.E.R.C.) Bangor

SITE 56N

FARAID HEAD NORTH

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

Faraid Head itself was reached by driving along the beach and then along an army road through the dunes. The dunes were tall and large, with plenty of wind-blown sand. The traps were sited in a deep depression to the east of the army road just beyond a stone sheepfold.

1.2 Vegetation

The vegetation surrounding the traps was similar to that around the traps at the Faraid Head South sample site. It included the following species: Ammophila arenaria, Festuca spp., Lotus corniculatus, Galium verum, Bellis perennis, Cerastium spp., Luzula spp., Thymus drucei, Plantago spp. and Potentilla anserina. The vegetation surrounding the pitfall traps had the following composition:

Pair 1: 50% A. arenaria and 50% grass and herbs.

Pair 2: 50% A. arenaria, including some large tussocks, and 50% grass and herbs.

Pair 3: 16% bare sand, with 42% A. arenaria and 42% grass and herbs.

Pair 4: The traps were by the edge of thick marram grass on the short grass and herbs of a track along a ridge.

1.3 Disturbance

Although disturbance to the area by humans was restricted to the area of the army road, disturbance by sheep was noticeable. Fairly heavy grazing was observed, and wool was found rubbed off onto marker stakes. There were two sheepfolds in the area. Strong winds caused considerable movement of sand over the area.

1.4 Distance from sea

The traps were placed about 200 metres inland from HWMOST on the western shore.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The light trap was placed on a small ridge in the centre of a deep

depression. The pitfall traps were placed in a straight line which crossed the light trap. It started on the seaward side of a dune about 10 metres west of the light trap and ascended the steep side of a tall dune nearby.

2.2 Damage or malfunction

The light trap operated from 15 - 24.6.76 and 20 - 29.7.76 and was functional at the end of both periods. The pitfall traps were all functional during the whole of each of the three periods 17 - 24.6.76, 24.6. - 20.7.76 and 20 - 29.7.76, although some contained rainwater at the end of the first period. A number of small mammals were caught in the pitfall traps:

17 - 24.6.76	Traps 4A and 4B	1 Sorex araneus
24.6. - 20.7.76	Trap 2A	1 Sorex araneus
	Trap 2B	1 Sorex (minutus?)
20 - 29.7.76	Trap 1A	1 Sorex minutus
	Trap 2B	1 Sorex araneus
	Trap 4A	1 Mouse (Apodemus sylvaticus?)

2.3 Colour slides available

Box 1, 161-166.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Hepialus fusconebulosa	32	0	32
Epirrhoe alternata	2	2	4
Cosmorhoe ocellata	0	3	3
Eupithecia subfuscata	11	0	11
Euxoa tritici	0	5	5
Agrotis vestigialis	0	2	2
Ochropleura plecta	1	0	1
Standfussiana lucerna	0	6	6
Noctua pronuba	1	15	16
Xestia sexstrigata	0	13	13
Cerapteryx graminis	0	18	18
Mythimna conigera	0	2	2
Mythimna impura	0	1	1
Blepharita adusta	7	0	7
Apamea monoglypha	0	11	11

	JUNE	JULY	TOTAL
Apamea lithoxylaea	0	3	3
Apamea furva	0	3	3
Oligia fasciuncula	1	0	1
Autographa gamma	0	1	1
Autographa bractea	0	3	3
TOTAL	55	88	143

Compared with the rest of the North Coast, a fairly low total catch but an average species list was recorded here. Most species were widespread and well represented at other sites.

Agrotis vestigialis is a common sand dune species which was trapped extensively and often commonly at many other sites, particularly on the North Coast.

A few species are confined to a limited range of larval food plants. Hepialus fusconebulosa feeds on the roots of Pteridium aquilinum and was taken widely at a number of sites. Epirrhoe alternata and Cosmorhoe ocellata feed on Galium spp..

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Cychrus caraboides	0	1	0	1
Notiophilus aquaticus	1	0	0	1
Notiophilus biguttatus	0	1	0	1
Calathus fuscipes	26	114	45	185
Calathus melanocephalus	11	37	8	56
Calathus mollis	0	1	0	1
Amara bifrons	1	1	0	2
Badister bipustulatus	1	1	0	2
TOTAL	40	156	53	249

Both Calathus fuscipes and C. melanocephalus, the only species to be trapped in any numbers, are common in dry grassland. Cychrus caraboides, although primarily a woodland species does frequent open and mountainous country in northern Scotland. Three first instar Notiophilus biguttatus larvae were trapped during the second sampling period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Megasternum obscurum	1	3	3	7
Leiodes dubia/obesa	4	17	0	21
Agathidium laevigatum	4	10	0	14
Choleva glauca	0	1	1	2
Sciodrepoides watsoni	0	48	0	48
Catops coracinus	0	1	0	1
Catops tristis	0	25	0	25
Thanatophilus rugosus	0	2	1	3
Stenichnus collaris	0	1	0	1
Micropeplus staphylinoides	0	4	1	5
Stenus boops	0	4	0	4
Stenus brunnipes	1	5	3	9
Stenus impressus	0	1	0	1
Stenus nanus	0	0	2	2
Xantholinus linearis	2	2	0	4
Philonthus varius	0	4	1	5
Staphylinus brunnipes	2	1	1	4
Quedius fuliginosus	2	1	0	3
Quedius molochinus	0	2	4	6
Quedius semiobscurus	0	1	0	1
Quedius tristis	0	0	1	1
Tachyporus chrysomelinus	12	32	5	49
Tachyporus pusillus	1	1	0	2
Amischa cavifrons	2	2	0	4
Atheta divisa	0	1	0	1
Atheta amicula	0	3	0	3
Atheta gagatina	0	1	0	1
Drusilla canaliculata	0	4	0	4
Tinotus morion	0	0	1	1
Aleochara sparsa	0	1	0	1
Geotrupes vernalis	0	1	0	1
Serica brunnea	0	227	38	265
Phyllopertha horticola	3	2	0	5
Byrrhus fasciatus	1	1	0	2
Rhagonycha femoralis	1	0	0	1
Cryptophagus setulosus	0	5	6	11
Atomaria nitidula	0	5	2	7

	JUNE	JN/JL	JULY	TOTAL
Nephus redtenbacheri	0	2	0	2
Corticaria punctulata	0	1	0	1
Corticaria umbilicata	0	0	1	1
Longitarsus luridus	0	0	1	1
Apion loti	1	2	1	4
Apion dichroum	1	0	0	1
Philopedon plagiatus	0	1	1	2
Sitona lineellus	1	7	1	9
Hypera punctata	0	0	1	1
TOTAL	39	432	76	547

The large and varied catch taken here was dominated by large numbers of Serica brunnea. Other psammophile species were very poorly represented with only Leiodes dubia being at all numerous and with very few Philopedon plagiatus.

The considerable numbers of Sciodrepoides watsoni and Catops tristis together with the smaller number of Thanatophilus rugosus indicate the presence of carrion. These species occurred almost exclusively in the traps containing dead small mammals (see section 2.2).

Megasternum obscurum, Xantholinus linearis, Philonthus varius, Tinotus morion and Geotrupes vernalis are indicative of dung. The relative abundance of the moss-frequenting species, Agathidium laevigatum, is unusual and Atheta divisa is a species which is rarely recorded. Tachyporus chrysomelinus ascends herbaceous vegetation to predate aphids and other small invertebrates but is also found in litter etc. This and the presence of many other species would indicate a well established sward with a well developed litter or mossy layer providing a moister environment. The larvae of Phyllopertha horticola are usually associated with permanent pasture or a fairly dense turf.

Among the phytophagous species Apion dichroum, Hypera punctata and Sitona lineellus feed on Trifolium spp.; Apion loti on Lotus corniculatus, and Longitarsus luridus on Plantago spp. and Cirsium spp..

Cryptophagus setulosus occurs in the nests of bumble bees and Choleva glauca is usually associated with the nests and runs of small mammals.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Drassodes cupreus	1	2	0	3
Haplodrassus signifer	4	5	0	9
Micaria pulicaria	0	3	0	3
Xysticus cristatus	3	1	0	4
Pardosa pullata	0	1	0	1
Alopecosa pulverulenta	0	1	0	1
Trochosa terricola	0	1	1	2
Hahnia nava	16	10	0	26
Pachygnatha degeeri	10	4	0	14
Walckenaera acuminata	0	1	0	1
Dicymbium nigrum	0	1	0	1
Pocadicnemis pumila	0	1	0	1
Pocadicnemis juncea	1	0	0	1
Oedothorax retusus	7	2	0	9
Tiso vagans	13	1	2	16
Erigone atra	0	1	0	1
Erigone promiscua	4	0	0	4
Agyneta decora	5	1	0	6
Meioneta beata	38	30	2	70
Lepthyphantes tenuis	0	2	0	2
Lepthyphantes mengei	0	15	7	22
TOTAL	102	83	12	197

The catch at this site was dominated by Meioneta beata (35.5%). This spider is fairly widespread in grassland but is most common in the south of Britain. It was therefore unexpected to find it as a dominant species in the catch at several of the North Coast sites. It was very infrequent in the Hebrides and although it was present at the more southern of the East Coast sites it was recorded only in small numbers. Hahnia nava is generally widespread in Britain but local in occurrence. In this survey it was taken at both the Faraid Head sites and Strathy but nowhere else on the North Coast. It occurred at most of the Moray Firth sites but only at Lunan Bay on the East Coast.

The gnaphosid Micaria pulicara, a spider of open areas with sparse vegetation, has with a rather southern distribution, but was present at both the Faraid Head sites. It was not recorded elsewhere on the North Coast although it was widespread at sites in the Moray Firth and

on the East Coast. Lepthyphantes tenuis and L. mengei are common grassland spiders associated with somewhat longer vegetation. Tiso vagans is also a widespread and fairly common species although it is not generally thought of as a sand dune spider. The two British species of Pocadicnemis were taken. These are both thought to be grassland species, however as they have only recently been separated, little is known of the comparative habitat preferences. It is strange that, although the vegetation at this site is very similar to that at Faraid Head South, the lycosids made up an insignificant part of the catch. The remaining species are all common in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	0	2	0	2
Vallonia costata	0	6	2	8
Vallonia excentrica	0	1	2	3
Oxychilus alliarius	1	13	0	14
Helicella itala	10	16	4	30
Cochlicella acuta	10	131	51	192
Cepaea hortensis	4	20	12	36
TOTAL	25	189	71	285

An assemblage of species similar to that recorded at some Hebridean sites was taken here. The more abundant species are typical of areas of fixed dunes with little bare ground. Cochlicella acuta made up 67.4% of the catch. Vallonia excentrica was not recorded at any other site on the North Coast. Vallonia costata is sparsely recorded in Scotland.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	9	3	4	16

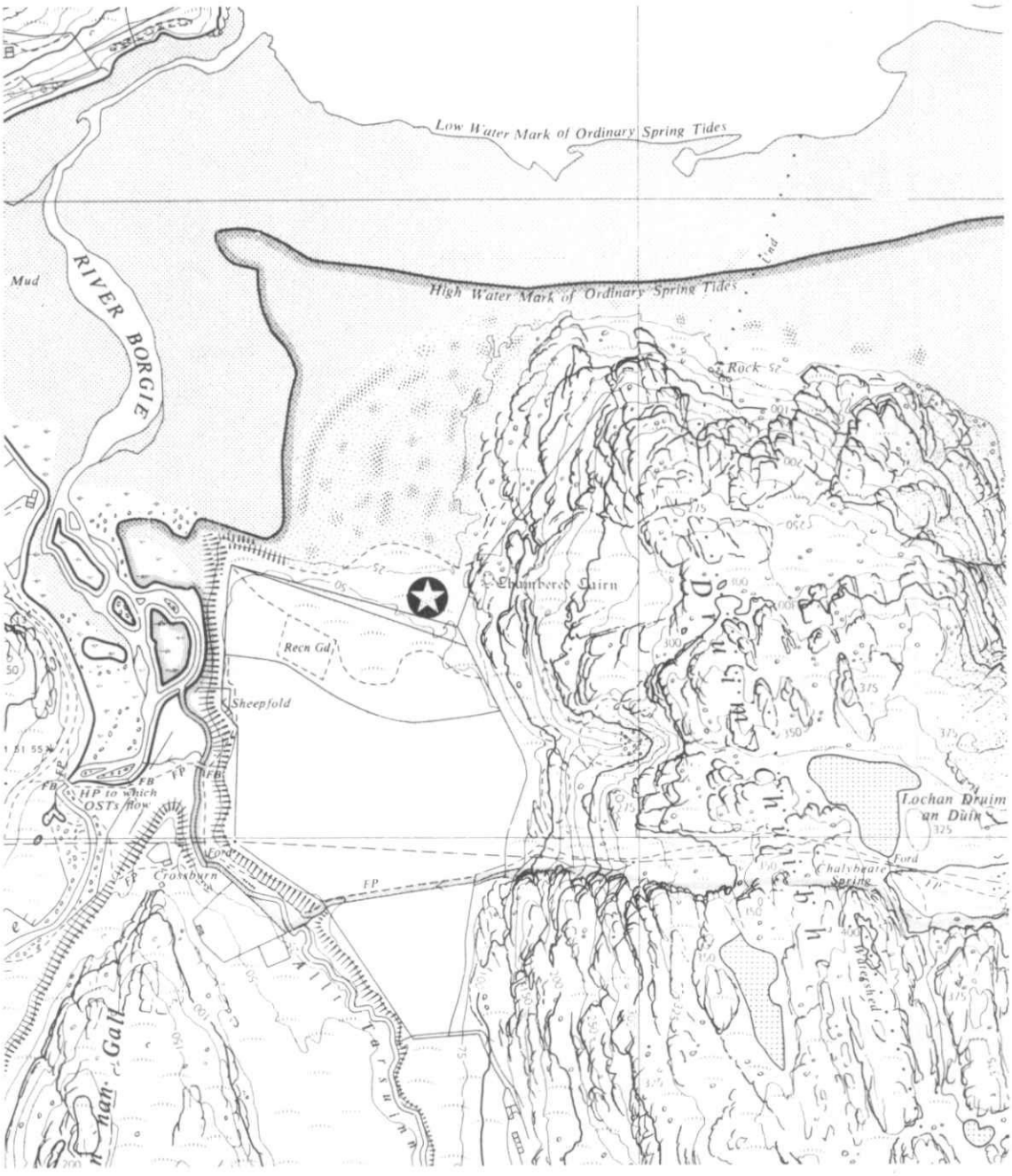
Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

No terrestrial Isopoda were recorded at this site.

Site 57 Bettyhill

Site 57 Bettyhill



0 500 Metres

0 500 Yards

Light trap & pitfall traps

SITE 57

BETTYHILL

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The sampled site consisted of an area of small dunes to the east of the mouth of the River Borgie. It was bounded by the river mouth to the west, by a rocky area (Druim Chuibhe) to the east, and partly by a football pitch on the south side.

1.2 Vegetation

The vegetation surrounding the pitfall traps consisted of the following species:

Pair 1: open rather sparse vegetation with scattered small Ammophila arenaria tussocks forming 50% of the cover.

Pair 2: 55% A. arenaria, with moss, Blechnum spicant, Festuca sp., Lotus corniculatus, Hypochaeris sp., Cerastium sp. and Peltigera sp..

Pair 3: a fairly thick growth of A. arenaria (50%) and grasses (50%) without bare ground, and with moss growing over the ground surface.

Pair 4: a short growth of grass, herbs and moss with scattered A. arenaria forming about 20% cover.

1.3 Disturbance

There was no obvious evidence of disturbance to the area, but it was accessible to sheep which were grazing on the nearby football field.

1.4 Distance from sea

The light trap and pitfall traps were placed about 200 metres above HWMOST, towards the eastern end of the dunes. The pitfall traps were placed in pairs in a straight line of about 60 metres, running west to east, parallel to the shore.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The traps were placed near the eastern end of the dunes to minimise

any disturbance from people using the river estuary area for fishing or people using the recreation ground.

2.2 Damage or malfunction

The light trap operated from 14 - 23.6.76 and 19 - 28.7.76, and was functional at the end of both periods when tested. The pitfall traps were all functional during the whole of each of the three periods 14 - 23.6.76, 23.6. - 19.7.76 and 19 - 28.7.76. Pitfall trap 4A contained a young frog on 28.7.76.

2.3 Colour slides available

Box 1, 168-175
(River Naver and associated dunes: Box 1, 167)

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Camptogramma bilineata	1	0	1
Thera obeliscata	0	1	1
Thera cognata	0	4	4
Eupithecia subfuscata	3	0	3
Eupithecia pusillata	0	4	4
Aplocera plagiata	0	3	3
Gnophos obfuscatus	0	2	2
Euxoa tritici	0	19	19
Euxoa cursoria	0	4	4
Agrotis vestigialis	0	210	210
Agrotis exclamationis	1	0	1
Standfussiana lucernea	0	4	4
Noctua pronuba	0	3	3
Noctua comes	0	1	1
Xestia xanthographa	0	1	1
Hada nana	2	0	2
Cerapteryx graminis	0	1	1
Mythimna impura	0	1	1
Blepharita adusta	2	0	2
Thalpophila matura	0	3	3
Apamea monoglypha	0	4	4
Mesapamea secalis	0	2	2
TOTAL	9	267	276

The catch was below average compared with other North Coast sites, and was dominated by the widespread sand dune species Agrotis vestigialis (76%). This species was trapped extensively and often commonly at many sites, especially on the North Coast. Euxoa cursoria, also a sand dune species, was recorded at many North Coast sites but elsewhere only at three sites on the East Coast. Aplocera plagiata which is known to feed on Hypericum perforatum is generally associated with sand dunes but also occurs on sea cliffs and rough places on chalk downs. It was recorded elsewhere only at Site 50N.

Several species are restricted to a limited range of larval food plants. Thera obeliscata feeds on Pinus sylvestris and some other conifers. Thera cognata and Eupithecia pusillata both feed on Juniperus communis; the latter species was not recorded elsewhere. Gnophos obfuscatus feeds on Calluna vulgaris and Genista anglica. According to South (1961) this species is confined, in Britain, to Scotland.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Carabus granulatus	6	1	0	7
Carabus nemoralis	1	0	0	1
Carabus problematicus	1	1	0	2
Nebria salina	20	3	0	23
Pterostichus madidus	8	11	2	21
Calathus fuscipes	7	51	29	87
TOTAL	43	67	31	141

The catch included a unique assemblage of carabid species, as far as this survey was concerned. This was the only site at which Pterostichus madidus was trapped, which was most unusual because this is a very common species occurring in a wide range of habitat types including open country and cultivated ground. The number of Nebria salina, a species of drier, open country, was only exceeded at Site 88. Of the three species of Carabus recorded only C. problematicus is a species of dry, open county whilst C. granulatus, the most numerous, is a rather hygrophilous species. The records for C. granulatus and C. nemoralis considerably extend the known northern limits of both species. The only other sites at which three Carabus spp. were trapped are on the East Coast (82, 83 and 84). A single larva of Notiophilus biguttatus was caught in the first sampling

period but this species was not recorded as an adult from this site. Eight Carabus nemoralis larvae were trapped during the first two periods.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Leiodes dubia/obesa	0	2	0	2
Othius laeviusculus	0	1	0	1
Xantholinus laevigatus	3	2	1	6
Xantholinus linearis	0	2	0	2
Staphylinus brunnipes	0	1	0	1
Staphylinus olens	0	0	3	3
Quedius semiobscurus	2	0	0	2
Quedius tristis	0	1	0	1
Mycetoporus rufescens	0	1	0	1
Tachyporus chrysomelinus	0	0	2	2
Falagria thoracica	0	1	0	1
Atheta fungi	1	1	0	2
Oxypoda soror	1	0	0	1
Geotrupes vernalis	0	0	1	1
Serica brunnea	0	32	1	33
Byrrhus fasciatus	1	2	1	4
Agriotes obscurus	1	2	0	3
Cryptophagus setulosus	2	1	2	5
Coccinella undecimpunctata	0	1	0	1
Philopedon plagiatus	6	6	3	15
Ceutorhynchus contractus	0	1	0	1
TOTAL	17	57	14	88

This was a fairly poor catch, low in numbers of individuals, with the exception of the psammophilous Serica brunnea and Philopedon plagiatus. The only other species which are at all indicative of sandy or coastal habitats are Leiodes dubia, Coccinella undecimpunctata and Byrrhus fasciatus. Geotrupes vernalis and the Xantholinus spp. reflect the presence of dung on the site and Cryptophagus setulosus inhabits the nests of bumble bees. Falagria thoracica a species with some possible association with ants, was trapped elsewhere only at Site 64. Both these records provide a considerable increase in its known range in Britain. Oxypoda sorror is a northern species regarded, on the continent, as a boreo-montane insect. Ceutorhynchus contractus is

phytophagous on a wide range of Cruciferae.

The single Othius laeviusculus collected during the second sampling period is of particular interest from a distributional viewpoint. This not only represents its most northerly known locality in Britain, (single specimens were also taken at Sites 39 and 43 during a fourth sampling period) but possibly in Europe as a whole, since it is essentially a species of southern Europe and is apparently absent from Scandinavia. Although more usually found in the litter layer, Fowler (1888) mentions it as being found "often in sand pits".

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Drassodes cupreus	1	2	0	3
Haplodrassus signifer	1	0	0	1
Agroeca proxima	0	0	1	1
Xysticus cristatus	0	1	1	2
Pardosa palustris	0	1	0	1
Alopecosa pulverulenta	2	0	0	2
Trochosa terricola	0	1	0	1
Arctosa perita	0	3	1	4
Walckenaera antica	1	1	0	2
Tiso vagans	6	5	2	13
Agyneta decora	16	2	0	18
Agyneta cauta	1	2	0	3
Meioneta beata	2	1	0	3
Lepthyphantes mengei	0	2	2	4
TOTAL	30	21	7	58

Only 58 individuals of 14 species were recorded, dominated by the erigonine Tiso vagans and the linyphiine Agyneta decora. The latter is an infrequent spider of mossy, grassy habitats with a rather northern distribution, whereas the former is common and widespread in grassy places, although not a characteristic sand dune species. Four species of lycosid were present, Pardosa palustris, Alopecosa pulverulenta, Trochosa terricola and Arctosa perita, all in very small numbers considering the apparent suitability of the site. The first three are all common in grassland but Arctosa perita is restricted to sand dunes and dry sandy places such as open, bare heathland. Agrocea proxima, a clubionid of dry grassland and heaths, occurred at many of the North Coast sites and Dumbarnie and Tyninghame

on the East Coast, but nowhere else. The linyphiine Meioneta beata is generally commoner in grassland areas in the south and is quite common along the south coast. However, it occurred quite commonly at North Coast and East Coast sites during this survey. All the remaining species are common in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	0	0	1	1
Columella aspera	1	0	0	1
Helicella itala	147	170	47	364
TOTAL	148	170	48	366

Helicella itala is characteristic of semi-fixed dune areas with some bare ground. Columella aspera has only recently been recognised from Britain and its range and habitats are as yet uncertain. It occurred in the catch at only one other site in the survey, No. 59, also on the North Coast.

3.6 Diplopoda

No Diplopoda were recorded at this site.

3.7 Terrestrial Isopoda

No terrestrial Isopoda were recorded at this site.

4. ADDITIONAL SPECIES

4.1 Coleoptera

The following species were recorded by Dr R.C. Welch unless otherwise stated:

Carabidae

Notiophilus aquaticus, 28.7.72, among sand dunes.

Broscus cephalotes, 4.8.72, crawling among sand dunes.

* Patrobus assimilis, 4.8.72, in moss by lochan.

Trechus obtusus, 4.8.72, in detritus on shore of Lochan Druim an Duin.

Bembidion femoratum, 6.8.72, at roots of plants on Druim Chuibhe (Coll. E.C. Pelham-Clinton and G.E. Woodroffe).

Calathus erratus, 28.7.72, under stones.

Dytiscidae

Platambus maculatus, 6.8.72, under stones at edge of Loch Mer.

Agabus guttatus, 28.7.72, under stones in dried up stream.

Hydrophilidae

Helophorus aquaticus, 6.8.72, on Iris spp. in stream north of Loch Mer.

Coelostoma orbiculare, 4.8.72, in detritus on shore of Lochan Druim an Duin.

Cercyon littoralis, 28.7.72, in dead gull on sandy shore.

Laccobius bipunctatus, 4.8.72, in detritus by Lochan Druim an Duin.

Histeridae

Hister unicolor, 28.7.72, in dead sheep.

Hydraenidae

Limnebius truncatellus, 28.7.72, under stones in dried up stream.
6.8.72, under stones at edge of Loch Mer.

Ptiliidae

Ptenidium pusillum, 6.8.72, in leaf litter under birch/hazel by Loch Mer.

Acrotrichis intermedia, 6.8.72, in leaf litter under birch/hazel by Loch Mer.

Leiodidae

Nargus wilkini, 6.8.72, in moss under birch/hazel.

Catops grandicollis, 28.7.72, dead sheep in dunes.

C. morio, 4.8.72, in detritus by Lochan Druim an Duin.

Scymaenidae

Stenichnus collaris, 6.8.72, in leaf litter under birch/hazel by Loch Mer.

Staphylinidae

Lesteva longoelytrata, 6.8.72, in Juncus refuse north of Loch Mer.

Eusphalerum lutem, 4.8.72, sweeping ferns.

Omalium rugilipenne, 28.7.72, in dead gulls on sandy shore.

Anotylus maritimus, 28.7.72, in dead gulls on sandy shore.

Stenus butrintensis, 4.8.72, in moss by lochan.

Philonthus politus, 28.7.72, in dead sheep.

P. sordidus, 28.7.72, in dead sheep.

Cafius xantholoma, 30.7.72, under drift-wood on the shore.

Quedius maurorufus, 4.8.72, in detritus by Lochan Druim an Duin.

Q. nigriceps, 6.8.72, in moss under birch/hazel.

Tachinus elongatus, 6.8.72, at roots of plants on Druim Chuibhe.

• Gymnusa brevicollis, 4.8.72, in moss by lochan.

Myllaena brevicornis, 4.8.72, in moss at base of Juncus spp..

M. dubia, 4.8.72, in detritus by Lochan Druim an Duin.

Phytosus balticus, 28.7.72, under drift-wood above high-water mark.

Falagria thoracica, 4.8.72, under stone.
6.8.72, sweeping by Loch Chuibhe (Coll. G.E. Woodroffe).

Geostiba circellaris, 28.7.72, under drift-wood above high-water mark.

Liogluta longiuscula, 6.8.72, in sheep dung.

Atheta excellens, 4.8.72, in dead gull.

A. amicula, 28.7.72, in dead sheep in dunes.

A. sodalis, 6.8.72, in Juncus spp. refuse north of Loch Mer.

A. trinotata, 28.7.72, in dead gulls on sandy shore.

A. aterrima, 28.7.72, among the dunes.

A. graminicola, 6.8.72, in Juncus spp. refuse north of Loch Mer.

A. atramentaria, 6.8.72, in dead gulls on sandy shore.

A. puncticollis, 6.8.72, in dead gulls on sandy shore and in dead sheep.

A. longicornis, 6.8.72, in dead gulls on sandy shore.

A. vestita, 6.8.72, in dead gulls on sandy shore.

Ocalea picata, 4.8.72, in detritus by Lochan Druim an Duin.

Ocyusa hibernica, 6.8.72, at roots of plants on Druim Chuibhe.

Oxypoda haemorrhoa, 28.7.72, under drift-wood above high-water mark.

Aleochara bipustulata, 6.8.72, in sheep dung.

A. obscurella, 28.7.72. in dead gulls on sandy shore.

A. sparsa, 28.7.72, in dead sheep.

Scarabaeidae

Aphodius sordidus, 28.7.72, under drift-wood on sandy shore.

Scritidae

• Cyphon ochraceus, 6.8.72, sweeping by Loch Chuibhe (Coll. G.E. Woodroffe).

Byrrhidae

Morychus aeneus, 6.8.72, sweeping by Loch Chuibhe (Coll. G.E. Woodroffe).

Dryopidae

Dryops luridus, 28.7.72, under stones in dried-up stream.

Cleridae

Necrobia violacea, 28.7.72, in dead sheep.

Nitidulidae

Epuraea aestiva, 6.8.72, sweeping by Loch Chuibhe (Coll. G.E. Woodroffe).

Lathridiidae

Lathridius pseudominutus, 6.8.72, sweeping by Loch Chuibhe (Coll. G.E. Woodroffe).

Chrysomelidae

Plateumaris discolor, 6.8.72, sweeping by Loch Chuibhe (Coll. G.E. Woodroffe).

Chrysolina hyperici, 28.7.72, under stone in dried-up stream.

C. staphylea, 6.8.72, in Juncus spp. refuse north of Loch Mer.

Curculionidae

Otiorhynchus desertus, 28.7.72, on Ammophila arenaria (Coll. Dr M.G. Morris).

O. nodosus, 5.8.72, on ferns in gulley (Coll. G.E. Woodroffe).

O. rugifrons, 28.7.72, under stones. (Coll. Dr M.G. Morris).
6.8.72, in leaf litter under birch/hazel by Loch Mer.

O. singularis, 28.7.72, beating Betula spp. (Coll. Dr M.G. Morris).

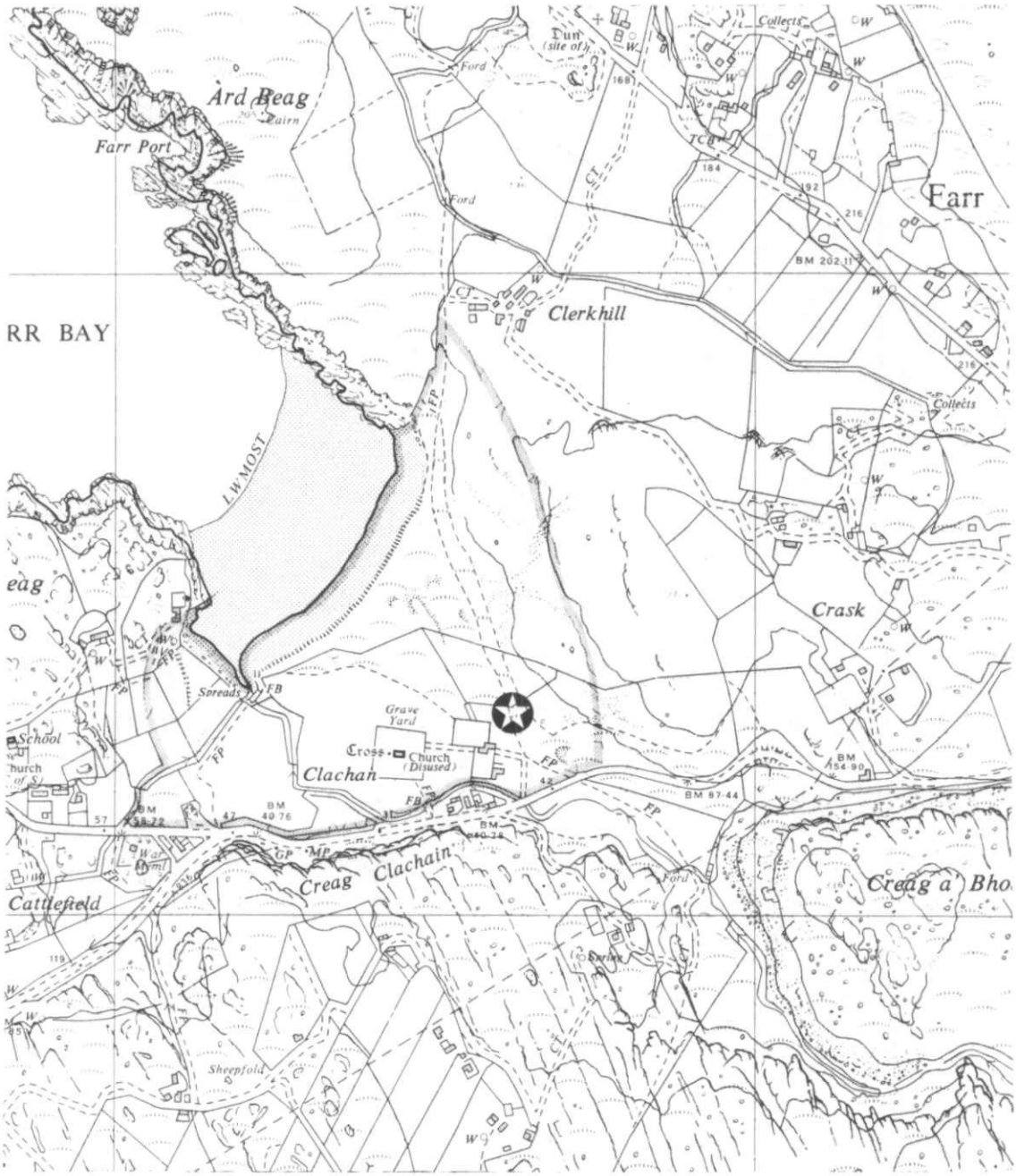
Anoplus plantaris, 6.8.72, on Betula spp. by Loch Mer.

Micrelus ericae (Ayll.), 28.7.72, general sweeping. (Coll. Dr M.G. Morris).

* = species taken within the National Nature Reserve but outside the boundary of Site 57.

Site 58 Farr Bay

Site 58 Farr Bay



Light trap & pitfall traps

I.T.E. N.E.R.C. Bangor

SITE 58

FARR BAY

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The site consisted of a triangular area of low dunes with several large areas of bare sand, and with a track at the north-east edge leading down to the beach.

1.2 Vegetation

The traps were placed in an area of dune meadow and marram transition zone. The light trap was near pitfall trap pair 1. The vegetation surrounding the pitfall traps consisted of the following:

Pair 1: a type of dune meadow with tussocks of Ammophila arenaria forming about 15% cover. The remaining vegetation included Festuca sp., Veronica chamaedrys, Galium verum, Lotus corniculatus, Ranunculus sp. and a short growth of moss.

Pair 2: a similar vegetation to that surrounding pair 1, but generally rather thicker.

Pair 3: open short moss and grass with scattered tussocks of A. arenaria (marram transition zone).

Pair 4: a moss "carpet" with Anthyllis vulneraria, Linum catharticum, Ononis repens, Galium verum, Festuca sp. and scattered small tussocks of A. arenaria.

1.3 Disturbance

The area was moderately rabbit-grazed with some holes near pitfall trap pair 2. The tenant grazed cattle on part of the dunes, and two of the marker stakes had been broken off presumably by cattle. The pitfall traps were placed along a transect which crossed a track (marked on 6" maps as a footpath) and so there may also have been some disturbance from humans.

1.4 Distance from sea

The light trap and pitfall traps were sited about 270 metres above HWMOST in a transect of about 40 metres, running parallel to the beach.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The traps were placed on the landward side of a cattle-proof fence in an attempt to prevent disturbance by the cattle. The light trap was placed in a shallow hollow out of sight of people using the track.

2.2 Damage or malfunction

The light trap operated from 14 - 23.6.76 and 19 - 28.7.76 and was functional at the end of both periods when tested. The pitfall traps were all functional during the whole of each of the three periods 14 - 23.6.76, 23.6. - 19.7.76 and 19 - 28.7.76 except that trap 2A was found on 19.7.76 to have been dug up and emptied. Two marker stakes were broken off, presumably by cattle.

2.3 Colour slides available

Box 1, 176-184.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Hepialus fusconebulosa	4	0	4
Xanthorhoe montanata	1	0	1
Epirrhoe alternata	2	0	2
Cosmorhoe ocellata	1	6	7
Eulithis pyraliata	0	17	17
Opisthograptis luteolata	1	0	1
Dyscia fagaria	0	1	1
Spilosoma lubricipeda	2	0	2
Euxoa tritici	0	22	22
Euxoa cursoria	0	8	8
Agrotis vestigialis	0	119	119
Agrotis exclamationis	25	0	25
Standfussiana lucerna	3	1	4
Noctua pronuba	0	6	6
Xestia c-nigrum	0	1	1
Xestia sexstrigata	0	1	1
Xestia xanthographa	0	4	4
Hada nana	19	0	19
Cerapteryx graminis	0	12	12

	JUNE	JULY	TOTAL
Mythimna conigera	0	7	7
Blepharita adusta	3	0	3
Apamea monoglypha	0	37	37
Apamea remissa	1	0	1
Mesoligia literosa	0	7	7
Mesapamea secalis	0	4	4
Diachrysia chrysitis	0	5	5
Autographa gamma	0	1	1
Autographa pulchrina	0	1	1
TOTAL	62	260	322

Compared with other North Coast sites, this site produced an above average species list and total catch. Agrotis vestigialis (37%), a common sand dune species, was the most abundant. It was trapped extensively and often commonly at many sites particularly on the North Coast. Euxoa cursoria is another sand dune species which was widely taken on the North Coast but occurred elsewhere only at three East Coast sites.

Opisthograptis luteolata occurred elsewhere only at Sites 56S, 87 and 90, and feeds on a number of shrubs such as Crataegus spp., Prunus spp., Sorbus spp., etc. Several species are restricted to a limited range of larval food plants. Hepialus fusconebulosa feeds on the roots of Pteridium aquilinum and was taken widely at a number of sites. Epirrhoe alternata, Cosmorhoe ocellata and Eulithis pyraliata feed on Galium spp.. The only other records of E. pyraliata were on the East Coast. Diachrysia chrysitis feeds on Urtica dioica and a few other common species.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Nebria salina	2	3	0	5
Notiophilus aquaticus	0	1	0	1
Calathus fuscipes	7	86	87	180
Calathus melanocephalus	2	5	12	19
Calathus mollis	0	1	1	2
Amara familiaris	1	0	0	1
Dromius linearis	1	0	0	1
TOTAL	13	96	100	209

The catch of carabids at this site was dominated by the three Calathus species. The single specimen of Dromius linearis is of interest for, although this is a common species on drier soils in the south, both inland and on the coast, Moore (1957) and Lindroth (1974) record it only from the west Lowlands in Scotland. Although it must have been taken elsewhere in Scotland this must surely be its most northerly known station in Britain. A single larva of Notiophilus biguttatus, a species not taken as an adult, was trapped during the first sampling period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Megasternum obscurum	2	2	0	4
Leiodes dubia/obesa	0	0	2	2
Othius angustus	1	0	0	1
Xantholinus glabratus	0	1	0	1
Xantholinus linearis	1	5	0	6
Philonthus cognatus	0	1	0	1
Staphylinus aeneocephalus	0	1	2	3
Staphylinus brunnipes	2	0	0	2
Quedius semiobscurus	0	5	0	5
Quedius tristis	0	2	2	4
Tachyporus chrysomelinus	2	2	5	9
Amischa cavifrons	2	0	0	2
Atheta orbata	1	0	0	1
Oxypoda haemorrhoa	2	0	0	2
Oxypoda soror	1	0	0	1
Geotrupes stercorarius	0	1	0	1
Serica brunnea	0	69	6	75
Byrrhus fasciatus	0	0	3	3
Ctenicera cuprea	1	0	0	1
Cryptophagus setulosus	0	1	0	1
Longitarsus jacobaeae	0	1	5	6
Longitarsus luridus	0	0	1	1
Longitarsus succineus	1	1	0	2
Otiorhynchus arcticus	1	2	0	3
Otiorhynchus atroapterus	1	0	0	1
Philopedon plagiatus	13	5	0	18
Mecinus pyraster	1	0	0	1
TOTAL	32	99	26	157

The psammophilous species, Serica brunnea, made up nearly half the total number of specimens trapped, with another psammophile, Philopedon plagiatus, being the next most numerous species. Otiorhynchus atroapterus, a species of sandy coasts, and O. arcticus, a sub-arctic, occurred in low numbers.

Phytophagous species, although present in small numbers, were better represented than at Site 57, with Longitarsus jacobaeae which feeds on Senecio spp., L. succineus on various Compositae and L. luridus and Mecinus pyraster on Plantago spp..

Geotrupes stercorarius and the Xantholinus spp. are indicative of the presence of dung. Cryptophagus setulosus occurs in the nests of bumble bees. Oxypoda soror is a rare northern species in Britain.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Clubiona diversa	0	1	0	1
Agroeca proxima	0	1	3	4
Xysticus cristatus	3	3	5	11
Pardosa palustris	42	19	5	66
Pardosa pullata	4	9	1	14
Alopecosa pulverulenta	0	1	0	1
Trochosa terricola	0	1	0	1
Ceratinella brevipes	0	1	0	1
Walckenaera vigilax	1	0	0	1
Tiso vagans	16	7	2	25
Erigone promiscua	0	1	0	1
Agyneta conigera	1	0	0	1
Agyneta decora	1	1	0	2
Agyneta cauta	6	2	0	8
Meioneta beata	0	2	0	2
Lepthyphantes mengei	0	0	1	1
TOTAL	74	49	17	140

Pardosa palustris was the commonest lycosid although the vegetation was a closed sward in the marram transition zone. This species is usually associated with more open terrain. P. pullata, a species usually associated with rather damper areas than P. palustris was also present in some numbers. Tiso vagans is generally fairly common in grassland but rarely forms an important part of the sand

dune fauna. The three species of Agyneta all are fairly common in grassland but A. decora and A. cauta are more frequent in the north than the south. Walckenaera vigilax is widespread in grassy habitats but is taken infrequently. The remaining species are commonly taken in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	1	0	3	4
Euconulus fulvus	0	1	0	1
Helicella itala	53	32	8	93
Cochlicella acuta	0	0	1	1
TOTAL	54	33	12	99

Euconulus fulvus is usually associated with wet areas such as dune slacks. This species was recorded elsewhere only at Site 67 during the survey. The other species are typically associated with fixed dunes.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	0	1	1	2

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

	JUNE	JN/JL	JULY	TOTAL
Philoscia muscorum	0	1	0	1
Porcellio scaber	0	25	1	26
TOTAL	0	26	1	27

Philoscia muscorum, although rather locally distributed in Scotland, mainly on the coast and in river valleys, is, like Porcellio scaber, often common in coastal grassland and dunes.

4. ADDITIONAL SPECIES

4.1 Coleoptera

The following species were recorded by Dr R.C. Welch on the 9.8.72 from wet hay in a field:

Staphylinidae

Quedius scintillans

Nehemitropia sordida.

Atheta monticola.

A. trinotata.

A. aterrima.

A. nigra.

The following species were recorded by Dr M.G. Morris:

Apionidae

Apion onopordi, 30.7.72, sweeping Centaurea nigra.

A. spencii, 30.7.72 and 2.8.72, sweeping Vicia cracca.

A. viciae, 30.7.72 and 2.8.72, sweeping Vicia cracca.

A. virens, 30.7.72 and 2.8.72, sweeping Trifolium repens.

A. assimile, 30.7.72 and 2.8.72, sweeping Trifolium repens.

Curculionidae

Otiorhynchus singularis, 30.7.72, on Heracleum sphondylium.

Sitona lineellus, 30.7.72, sweeping Ononis spp..

S. sulcifrons, 2.8.72, on Trifolium repens.

Ceutorhynchus contractus, 30.7.72, general sweeping.

C. floralis, 2.8.72, general sweeping.

Site 59 Strathy

Site 59 Strathy

0 500 Metres
0 500 Yards

Light trap & pitfall traps

SITE 59

STRATHY

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The site consisted of an area of well-formed yellow dunes with a marram transition zone abutting a rocky cliff line to give a steep sand-covered slope. The whole site lay to the east of the River Strathy. The traps were placed to the seaward side of a small graveyard and immediately below it.

1.2 Vegetation

The vegetation in the general area of the traps included Ammophila arenaria, Lotus corniculatus, Lathyrus sp., Thalictrum minus, Thymus drucei, Daucus carota, Leontodon spp., Festuca sp., Anthyllis vulneraria, Euphrasia spp., Cerastium spp., Galium verum, Polygala sp., Senecio jacobaea, Scilla verna, Linaria vulgaris, Primula veris, Ranunculus sp., Trifolium repens, Tragapogon pratensis and abundant mosses. The vegetation surrounding the pitfall traps had the following composition:

Pair 1: 70% moss and herbs, 20% A. arenaria and 10% bare sand.

Pairs 2, 3 and 4: 60% moss, herbs and grass, 40% A. arenaria, with a thick sward.

1.3 Disturbance

The area was heavily rabbit-grazed. No sheep or cattle were seen but the area obviously had been grazed by stock at some time. On 26.7.76 one of marker stakes missing, possibly due to human disturbance.

1.4 Distance from sea

The traps were sited about 60 metres inland above HWMOST.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The light trap was placed in a fairly small hollow in the dune meadow where it would be out of sight. The pitfall traps were placed in pairs in a transect running downhill throught the location of the light trap.

2.2 Damage or malfunction

The light trap operated from 20 - 29.6.76 and 26.7. - 3.8.76. It was not functional at the end of the second period when tested. The trap contained two snails (Cepaea hortensis) on 29.6.76 and others were seen. A paper label on the light trap had apparently been chewed off by snails.

The pitfall traps were all functional during the whole of each of the three periods 20 - 29.6.76, 29.6. - 26.7.76 and 26.7. - 3.8.76. Several traps contained small mammals when they were collected:

29.6.76	Trap 4A	1 young Apodemus sylvaticus
26.7.76	Trap 2A	1 Sorex araneus
	Trap 3A	1 Sorex araneus
3.8.76	Trap 2A	1 Sorex araneus

2.3 Colour slides available

Box 1, 185-192.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Hepialus fusconebulosa	4	0	4
Xanthorhoe montanata	3	0	3
Scotopteryx chenopodiata	0	31	31
Epirrhoe alternata	0	2	2
Camptogramma bilineata	2	0	2
Cosmorhoe ocellata	0	2	2
Perizoma albulata	15	0	15
Arctia caja	3	0	3
Euxoa tritici	0	11	11
Euxoa cursoria	0	33	33
Agrotis vestigialis	0	52	52
Agrotis exclamationis	3	0	3
Ochropleura plecta	2	0	2
Standfussiana lucernea	0	1	1
Noctua pronuba	0	24	24
Lycophotia porphyrea	0	1	1
Xestia sexstrigata	0	4	4
Xestia xanthographa	0	37	37

	JUNE	JULY	TOTAL
Hada nana	2	0	2
Cerapteryx graminis	0	56	56
Mythimna conigera	0	13	13
Mythimna impura	0	1	1
Blepharita adusta	20	0	20
Rusina ferruginea	25	0	25
Thalpophila matura	0	91	91
Euplexia lucipara	1	0	1
Apamea monoglypha	0	13	13
Apamea lithoxylaea	0	3	3
Apamea crenata	5	0	5
Mesapamea secalis	0	9	9
Caradrina clavipalpis	0	2	2
Stilbia anomala	0	1	1
Diachrysia chrysitis	0	2	2
Autographa gamma	1	0	1
Autographa bractea	0	10	10
TOTAL	86	399	485

This site compared favourably with other North Coast sites producing a good species list and a high total catch.

Two sand dune species occurred. Euxoa cursoria was trapped at many North Coast sites but elsewhere only at three East Coast sites. Agrotis vestigialis was trapped extensively and often commonly at many sites especially on the North Coast.

Stilbia anomala is a local species but it is sometimes not uncommon on heaths, or in rocky places by the sea (South 1961). It occurred elsewhere only at Site 50N and 65. Caradrina clavipalpis, a migrant species, occurred on the Hebrides and elsewhere on the North Coast, but did not occur further east than this site.

A number of species are restricted to a limited range of larval food plants. Hepialus fusconebulosa feeds on the roots of Pteridium aquilinum and was taken widely at a number of sites. Epirrhoe alternata and Cosmorhoe ocellata feed on Galium spp. and Perizoma albulata on the seeds of Rhinanthus minor. Lycophotia porphyrea feeds on Calluna vulgaris and Erica spp., and Diachrysia chrysitis on Urtica dioica and a few other common species.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Leistus rufescens	0	1	0	1
Trechus obtusus	0	1	0	1
Pterostichus niger	1	0	0	1
Calathus fuscipes	3	176	37	216
Calathus melanocephalus	7	55	23	85
Calathus mollis	0	1	0	1
Amara aulica	1	2	0	3
Amara bifrons	0	3	1	4
Amara communis	26	2	0	28
TOTAL	38	241	61	340

Calathus fuscipes and C. melanocephalus were by far the most abundant carabids in the catches at this site during the latter two sampling periods, but Amara communis, a eurytopic species of all kinds of moderately dry country, was the most numerous species in June. A single Notiophilus biguttatus larva was taken during the middle trapping period although adults of this species were not recorded from this site.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Megasternum obscurum	2	1	0	3
Leiodes dubia/obesa	10	5	0	15
Agathidium laevigatum	1	0	0	1
Choleva oblonga	1	0	0	1
Catops fuliginosus	1	2	0	3
Metopsia retusa	0	1	0	1
Stenus clavicornis	0	1	0	1
Xantholinus glabratus	0	1	4	5
Xantholinus linearis	2	0	0	2
Staphylinus brunnipes	2	5	0	7
Quedius tristis	0	3	1	4
Mycetoporus splendidus	0	0	1	1
Tachyporus chrysomelinus	1	4	0	5
Tachinus corticinus	0	1	0	1
Aloconota gregaria	1	0	0	1
Amischa cavifrons	0	2	0	2
Atheta fungi	0	1	0	1

	JUNE	JN/JL	JULY	TOTAL
Atheta triangulum	0	1	0	1
Atheta atramentaria	1	0	0	1
Serica brunnea	0	89	5	94
Byrrhus fasciatus	4	8	4	16
Cantharis nigricans	1	0	0	1
Cryptophagus setulosus	0	1	0	1
Nephus redtenbacheri	1	1	0	2
Longitarsus jacobaeae	0	3	17	20
Longitarsus luridus	0	1	2	3
Apion loti	0	1	0	1
Otiorhynchus atroapterus	3	1	0	4
Philopedon plagiatus	4	4	0	8
Sitona lepidus	0	1	0	1
Sitona lineellus	0	2	1	3
TOTAL	35	140	35	210

Psammophile species tended to predominate in the catch at this site, with Serica brunnea, Leiodes dubia and Byrrhus fasciatus plus small numbers of Philopedon plagiatus and Otiorhynchus atroapterus. Two Byrrhus sp. larvae were also trapped during the second sampling period.

The phytophagous species Longitarsus jacobaeae which feeds on Senecio spp. was particularly numerous in the final trapping period. Small numbers of other phytophagous species occurred, including Sitona lineellus and S. lepidus which feed on Trifolium spp., L. luridus off Plantago spp. and Cirsium spp., and Apion loti off Lotus corniculatus.

The presence of the species of Xantholinus and Atheta reflects the presences of dung on the site, and Cryptophagus setulosus frequents the nests of solitary bees.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Drassodes cupreus	2	0	0	2
Haplodrassus signifer	8	4	0	12
Agroeca proxima	0	1	3	4
Xysticus cristatus	3	2	1	6
Pardosa palustris	8	5	0	13
Pardosa pullata	2	7	0	9

	JUNE	JN/JL	JULY	TOTAL
Pardosa nigriceps	2	1	0	3
Alopecosa pulverulenta	3	0	0	3
Trochosa terricola	1	5	0	6
Hahnia nava	0	1	0	1
Pachygnatha degeeri	16	14	0	30
Walckenaera antica	0	2	0	2
Pocadicnemis pumila	0	1	0	1
Oedothorax retusus	2	2	0	4
Tiso vagans	5	25	4	34
Troxochrus scabriculus	3	4	0	7
Troxochrus cirrifrons	0	1	0	1
Agyneta decora	2	2	1	5
Agyneta cauta	8	2	0	10
Meioneta beata	24	24	0	48
Lepthyphantes tenuis	1	0	0	1
Lepthyphantes mengei	0	5	1	6
Microlinyphia pusilla	0	1	0	1
TOTAL	90	109	10	209

The diversity of the vegetation at this site probably explains the presence of five species of lycosid. Pardosa palustris and P. pullata are both common species of open ground with the latter preferring slightly damper situations while P. nigriceps is associated with longer vegetation. The most abundant species was Meioneta beata, which is fairly widespread but much more common in the south of Britain than the north and is not usually thought of as a sand dune species. Tiso vagans is a common grassland species but is not especially associated with the sand dunes. It too occurred in some numbers. Troxochrus scabriculus and T. cirrifrons are both associated with sand dunes and dry sandy places and were present in small numbers. Microlinyphia pusilla, which is common and widespread in grassland, occurred at only three other sites in the survey. All the other species are common and widespread in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	0	2	1	3
Cochlicopa lubricella	0	1	0	1
Columella aspera	1	4	0	5

	JUNE	JN/JL	JULY	TOTAL
Vertigo pygmaea	2	0	0	2
Pupilla muscorum	0	1	7	8
Vitrina pellucida	6	10	14	30
Oxychilus alliarius	1	0	0	1
Helicella itala	29	8	8	45
Arianta arbustorum	17	16	4	37
Cepaea hortensis	3	9	3	15
TOTAL	59	51	37	147

The greatest number of species to be taken at a North Coast site was recorded here, including one species recorded nowhere else in the survey - Pupilla muscorum. The assemblage of species was typical of fixed dunes with little bare ground. Pupilla muscorum is associated with dry calcareous areas including sand dunes and is recorded from several 10 km squares on the north Scottish coast, but elsewhere is apparently uncommon in Scotland. Columella aspera and Arianta arbustorum were each recorded from only one other site in the survey; in both cases the sites were on the North Coast. Arianta arbustorum which made up 25.2% of the catch is usually associated with lush, but not marshy, vegetation.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	1	0	4	5

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

	JUNE	JN/JL	JULY	TOTAL
Porcellio scaber	1	10	1	12

Porcellio scaber is found widely on dry sandy soils.

4. ADDITIONAL SPECIES

4.1 Lepidoptera : Lycaenidae

The following species was observed in the field during the course of the survey:

Polyommatus icarus

4.2 Coleoptera

The following species were recorded by Dr R.C. Welch unless otherwise

stated:

Ptiliidae

Acrotrichis atomaria, 2.8.72, in moss near a pond.

Leiodidae

Catops morio, 2.8.72, marshy area near graveyard (Coll. G.E. Woodroffe).

Staphylinidae

Olophrum fuscum, 2.8.72, at roots of Iris spp..

Lesteva heeri, 31.7.72, in dead gull on shore.
2.8.72, at roots of Iris spp..

Omalium riparium, 31.7.72, in dead gull on the shore.

Stenus bifoveolatus, 2.8.72, in moss near a pond.

S. juno, 2.8.72, in moss near a pond.

S. nanus, 2.8.72, in moss near a pond.

S. tarsalis, 2.8.72, marshy area near graveyard (Coll. G.E. Woodroffe).

Othius laeviusculus, 31.7.72, under stone on a hill behind dunes.

Quedius curtipennis, 2.8.72, in moss near a pond.

Q. fulvipennis, 2.8.72, in moss near a pond.

Q. umbrinus, 2.8.72, in moss near a pond.

Boreaphila islandica, 2.8.72, in moss near a pond.

Atheta graminicola, 2.8.72, at roots of Iris spp..

Ocalea picata, 2.8.72, in moss near a pond.

Aleochara obscurella, 31.7.72, in dead gull on the shore.

Dryopidae

Dryops ernesti, 2.8.72, under stones in dry stream bed.

Nitidulidae

Meligethes erythropus, 31.7.72, sweeping behind dunes.
2.8.72, sweeping by a pond.

Cryptophagidae

Anterophagus pallens, 2.8.72, in marshy area near graveyard (Coll. G.E. Woodroffe).

Chrysomelidae

Plateumaris discola, 2.8.72, sweeping by a pond.

Prasocuris phellandrii, 2.8.72, in moss close to a pond.

Longitarsus melanocephalus, 2.8.72, in marshy area near graveyard (Coll. G.E. Woodroffe).

Psylliodes marcida, 31.7.72, on a dead gull on the shore (Coll. G.E. Woodroffe).

The following species were recorded by Dr M.G. Morris:

Apionidae

Apion violaceum, 2.8.72, sweeping Rumex sp..

A. aethiops, 2.8.72, sweeping Vicia sp..

A. viciae, 2.8.72, sweeping Vicia cracca.

A. apricans, 31.7.72, general sweeping.

A. assimile, 2.8.72, general sweeping.

A. dichroum, 31.7.72, under Trifolium repens.

Curculionidae

Otiorhynchus desertus, 2.8.72, grubbing in dunes.

Sitona lepidus, 2.8.72, general sweeping.

Hypera plantaginis, 31.7. - 2.8.72, grubbing etc.

H. venusta, 31.7. - 2.8.72, under Anthyllis vulneraria.

Dorytomus taeniatus, 2.8.72, beating Salix spp..

Ceutorhynchus contractus, 31.7.72, sweeping Sisymbrium spp..

Anthonomus brunnipennis, 2.8.72, sweeping Potentilla erecta.

Ramphus pulicarius, 2.8.72, sweeping Salix repens.

Site 60 Melvich

Site 60 Melvich

Light trap & pitfall traps

SITE 60

MELVICH

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The site consisted of a small system of well-formed but low dunes lying to the west of the mounth of the Halladale River. The area was reached by a footpath, signposted to Melvich Beach, opposite the home of the agent for the estate. There were several large areas of bare sand in the area.

1.2 Vegetation

The vegetation surrounding the pitfall traps was rather short and included the following species: Ammophila arenaria, Veronica officinale, Primula veris, Lotus corniculatus, Polygala sp., Plantago spp., Trifolium repens, Ranunculus spp., Galium verum, Thalictrum minus, Cerastium spp., Linum catharticum, Luzula campestris, Bellis perennis, Centaurea nigra, Festuca spp., Cirsium spp., Potentilla anserina, Sencio jacobaea and mosses. The vegetation had the following composition:

Pair 1: 90% moss, herbs and grasses, 10% A. arenaria.

Pair 2: 70% herbs and mosses (mainly mosses), 25% A. arenaria and 5% bare sand.

Pair 3: 90% herbs, 5% A. arenaria and 5% bare sand.

Pair 4: on the landward edge of the yellow dunes; 5% A. arenaria, 30% herbs and grasses, 20% bare sand.

1.3 Disturbance

The area was subject to moderate grazing by rabbits, and also a few sheep were present. Disturbance from people leaving the footpath to the beach was possible, and some rubbish had been dumped, near pitfall pair 3.

1.4 Distance from sea

The traps were placed about 80 metres inland above HWMOST.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The light trap was placed on the slope of a hollow in the dune meadow

transition zone in an attempt to conceal the trap from the road, whilst giving a wide area over which the light might be effective. The pitfall traps were placed in a crescent around the light trap.

2.2 Damage or malfunction

The light trap operated from 21 - 29.6.76 and 26.7. - 3.8.76, and was functional at the end of both periods when tested. The pitfall traps were all functional during the whole of each of the three periods 21 - 29.6.76, 29.6. - 26.7.76 and 26.7. - 3.8.73. On 26.7.76, when the traps were collected up, traps 4A and 4B each contained a single specimen of Sorex araneus.

2.3 Colour slides available

Box 1, 193-199.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Xanthorhoe designata	0	1	1
Scotopteryx chenopodiata	0	1	1
Cosmorhoe ocellata	0	11	11
Chloroclysta truncata	0	1	1
Perizoma albulata	1	0	1
Eupithecia nanata	1	0	1
Laothoe populi	1	0	1
Arctia caja	7	0	7
Spilosoma lubricipeda	6	0	6
Euxoa tritici	0	23	23
Euxoa cursoria	0	5	5
Agrotis vestigialis	0	135	135
Agrotis exclamationis	6	0	6
Ochropleura plecta	3	0	3
Noctua pronuba	0	12	12
Noctua comes	0	2	2
Xestia sexstrigata	0	7	7
Xestia xanthographa	0	18	18
Hada nana	6	0	6
Cerapteryx graminis	0	8	8
Mythimna conigera	0	17	17

	JUNE	JULY	TOTAL
Mythimna impura	0	3	3
Blepharita adusta	15	0	15
Amphipyra tragopoginis	0	1	1
Rusina ferruginea	10	0	10
Thalpophila matura	0	75	75
Euplexia lucipara	1	0	1
Apamea monoglypha	1	91	92
Apamea lithoxylaea	0	8	8
Apamea crenata	5	0	5
Apamea furva	0	4	4
Apamea remissa	1	0	1
Mesapamea secalis	0	28	28
Diachrysia chrysitis	0	3	3
Autographa gamma	0	1	1
Autographa pulchrina	1	5	6
Autographa bractea	0	5	5
Abrostola triplasia	3	0	3
TOTAL	68	465	533

This site produced the largest number of species and of specimens recorded on the North Coast. Three species predominated, comprising 56% of the catch. Agrotis vestigialis, the most abundant, is a common sand dune species and occurred extensively and often commonly at many sites, especially along the North Coast. The other two were, Apamea monoglypha which was the most widely taken species of the survey, and Thalpophila matura. Another sand dune species, Euxoa cursoria also occurred at many other North Coast sites, but elsewhere only at three East Coast sites.

Xanthorhoe designata, a species of moist woodland, was taken elsewhere only at Site 50N and Chloroclysta truncata, another woodland species, was taken elsewhere only at Site 93.

Several species are restricted to a limited range of larval food plants. Cosmorhoe ocellata feeds on Galium spp. and Perizoma albulata on the seeds of Rhinanthus minor. Eupithecia nanata feeds on Calluna vulgaris, and Laothoe populi on Populus spp. and Salix spp.. Abrostola triplasia feeds on Urtica dioica, as does Diachrysia chrysitis which also feeds on a few other common species.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Nebria salina	1	1	0	2
Notiophilus aquaticus	0	0	2	2
Notiophilus biguttatus	0	0	1	1
Loricera pilicornis	2	4	0	6
Calathus fuscipes	6	82	30	118
Calathus melanocephalus	0	0	1	1
Calathus mollis	3	68	23	94
Synuchus nivalis	0	1	0	1
Amara bifrons	1	6	3	10
TOTAL	13	162	60	235

Calathus fuscipes and C. mollis were present in almost equal numbers. Amara bifrons is a xerophilous species of sparsely vegetated sandy soils. The less common species Synuchus nivalis is usually found on more open drier soils and was only recorded elsewhere at Sites 21 and 72 during this survey. Two larvae of Notiophilus biguttatus were caught during the first two sampling periods.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Megasternum obscurum	0	3	1	4
Leiodes dubia/obesa	2	9	1	12
Choleva glauca	0	2	1	3
Choleva oblonga	1	0	0	1
Catops fuliginosus	0	1	0	1
Xantholinus glabratus	0	0	2	2
Philonthus laminatus	3	0	0	3
Philonthus varians	0	0	1	1
Quedius semiaeneus	0	1	0	1
Tachyporus chrysomelinus	2	16	0	18
Tachyporus hypnorum	3	0	1	4
Aloconota gregaria	1	0	0	1
Atheta gagatina	0	0	1	1
Atheta fungi	0	3	0	3
Atheta atramentaria	0	2	0	2
Aleochara sparsa	0	1	0	1
Serica brunnea	0	300	41	341
Byrrhus fasciatus	6	6	0	12

	JUNE	JN/JL	JULY	TOTAL
Atomaria atricapilla	7	28	1	36
Atomaria nitidula	1	2	1	4
Longitarsus jacobaeae	0	3	8	11
Longitarsus luridus	1	1	0	2
Longitarsus succineus	69	237	86	392
Otiorhynchus atroapterus	2	2	0	4
Philopedon plagiatus	9	2	0	11
TOTAL	107	619	145	871

The catch at this site was dominated by equally large numbers of Longitarsus succineus and Serica brunnea. L. succineus is a phytophagous species on a wide range of Compositae and was trapped here in much larger numbers than at any other site. The psammophilous S. brunnea was more numerous only in the catch at some of the Hebridean sites. Other species of sandy and/or coastal habitats include Philopedon plagiatus, Otiorhynchus atroapterus, Leiodes dubia and Quedius semiaeneus.

The presence of moderately large numbers of Atomaria atricapilla and Tachyporus chrysomelinus suggest a well developed litter layer and accumulations of decaying vegetable matter. Xantholinus glabratus, together with the Philonthus spp., and Atheta spp. indicate the existence of dung on the site.

Of the other phytophagous species, Longitarsus jacobaeae feeds on Senecio spp. and L. luridus on Plantago spp. and Cirsium spp..

Tachyporine larvae were fairly numerous during the middle sampling period when larval Byrrhus sp. and Atomaria sp. were also trapped.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Clubiona trivialis	0	1	0	1
Xysticus cristatus	1	0	0	1
Pardosa palustris	28	42	0	70
Pardosa pullata	3	5	0	8
Alopecosa pulverulenta	1	0	0	1
Trochosa terricola	0	1	0	1
Arctosa perita	2	1	0	3
Pachygnatha degeeri	25	20	0	45
Walckenaera antica	0	1	0	1

	JUNE	JN/JL	JULY	TOTAL
Peponocranium ludicrum	1	0	0	1
Oedothorax retusus	37	64	6	107
Tiso vagans	31	52	3	86
Erigone dentipalpis	24	15	1	40
Erigone atra	4	4	2	10
Erigone promiscua	8	21	2	31
Erigone arctica	0	3	0	3
Lepthyphantes tenuis	1	3	0	4
Microlinyphia pusilla	1	0	0	1
TOTAL	167	233	14	414

The rather open nature of the sampling area and particularly the short vegetation, probably accounts for the high number of Pardosa palustris, a species of open habitats, on the site, compared with the low numbers of P. pullata which prefers a better developed vegetation cover. One of the other lycosids, Arctosa perita, is restricted to sand dunes and dry sandy places.

Oedothorax retusus was the most abundant spider at this site and is often associated with pioneer habitats. On the mainland sites this species was usually found in larger numbers than its congener O. fuscus, whereas on the Hebrides the latter was more abundant. Tiso vagans is widespread and quite common in grassland but is not particularly associated with sand dunes. Erigone promiscua, a spider of short exposed turf was found here in some numbers, although E. dentipalpis was the most abundant species of Erigone. The former species was very abundant in the Hebrides, much less common on the North Coast and absent from the East Coast, its place being largely taken by E. dentipalpis. E. arctica is a species of beach and salt marsh drift lines in the south which seems to occur further inland in the north west. Clubiona trivialis is quite common on low vegetation is grassy and heathery areas and was taken here and at only two other sites. Microlinyphia pusilla is also very common in grassland and was taken elsewhere only at Sites 59 and 61. All other species are common in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubricella	2	1	2	5
Vitrina pellucida	0	12	32	44

	JUNE	JN/JL	JULY	TOTAL
Candidula intersecta	0	0	3	3
Helicella itala	9	12	1	22
Cepaea hortensis	0	2	1	3
TOTAL	11	27	39	77

The assemblage of species recorded here is typical of fixed dune areas with little bare ground.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	4	10	10	24
Ommatoiulus sabulosus	2	0	0	2
TOTAL	6	10	10	26

Cylindroiulus latestriatus and Ommatoiulus sabulosus are both common on sandy coasts throughout Britain, although this was the most north-westerly site at which O. sabulosus was recorded.

3.79 Terrestrial Isopoda

	JUNE	JN/JL	JULY	TOTAL
Oniscus asellus	0	1	0	1

Oniscus asellus is ubiquitous in Britain and is a common synanthrope, but does not usually occur on sand dunes. At this site the single specimen was from a pitfall trap placed near to some dumped rubbish. It was not recorded in samples from any other site in the survey although specimens were collected by hand at three Hebridean sites.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Pieridae

Pieris brassicae

Nymphalidae

Aglais urticae

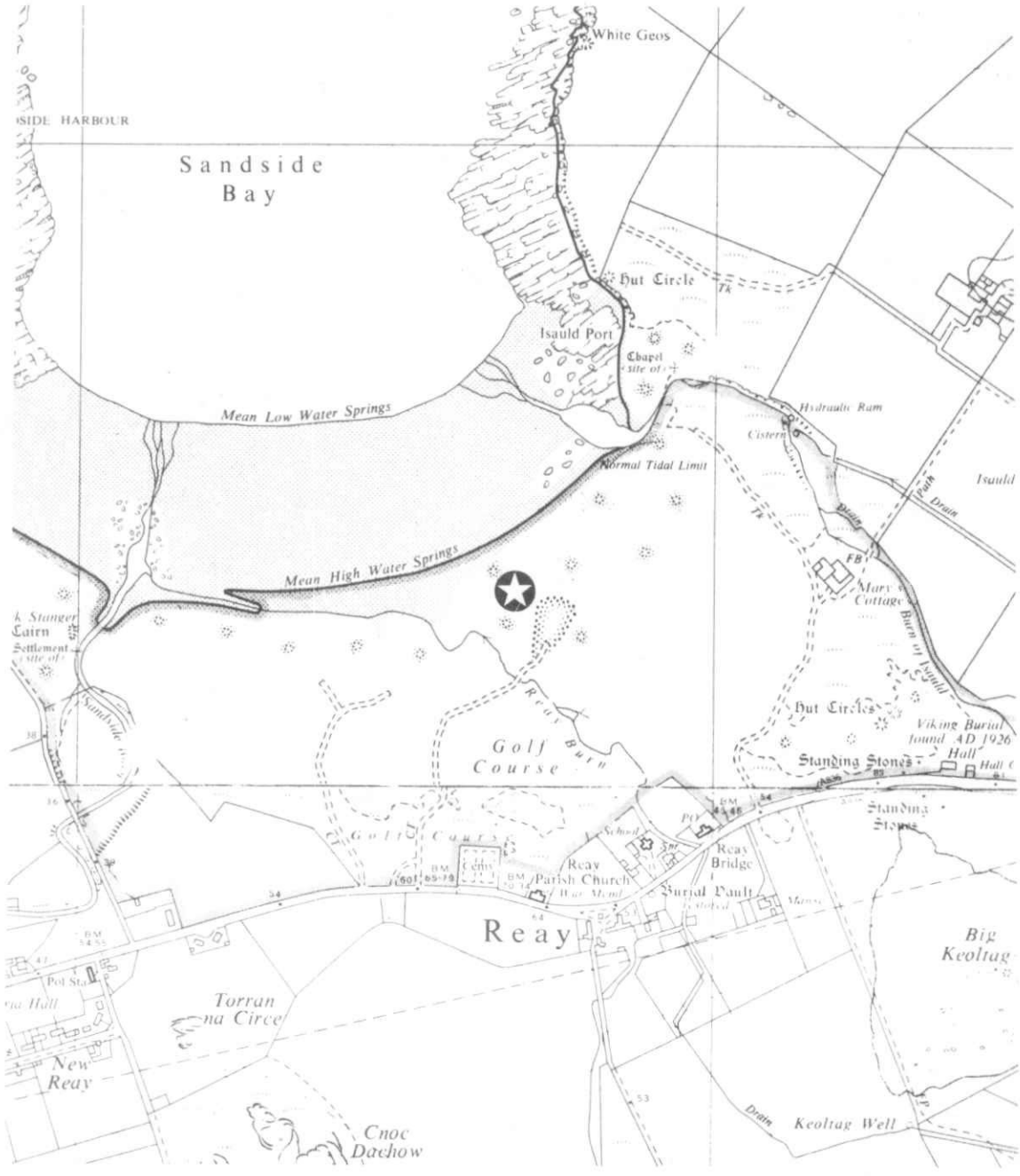
4.2 Siphonaptera: Hystrichopsyllidae

The following species was recorded by Dr R.C. Welch:

Palaeopsylla soricis soricis, 29.6. - 26.7.76, one specimen of this shrew flea in pitfall trap 4A.

Site 61 Reay

Site 61 Reay



Light trap & pitfall traps

SITE 61

REAY

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The site consisted of an area of tall dunes on the northern (seaward) side of Reay Golf Course, and was reached by driving through the golf course. Large areas of bare sand were present and there was loose sand between the tussocks of Ammophila arenaria.

1.2 Vegetation

The vegetation surrounding the pitfall traps had the following composition:

Pair 1: 70% Ammophila arenaria, 25% herbs, with very little moss, and 5% bare sand. The herbs included the following species which were mostly low growing between the tussocks of A. arenaria, on the landward edge of the yellow dunes: Lotus corniculatus, Bellis perennis, Vicia sp., Ranunculus spp., Senecio jacobaea, Trifolium repens, Galium verum and Potentilla anserina.

Pair 2: 55% A. arenaria, 20% low herbs and 25% bare sand.

Pair 3: similar to pair 2, but with taller vegetation and more L. corniculatus.

Pair 4: 50% A. arenaria, 45% low herbs, mainly L. corniculatus and 5% bare sand.

1.3 Disturbance

None was noted, but golfers may enter the area to look for lost golf balls.

1.4 Distance from sea

The traps were placed about 95 metres inland from MHWS.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The traps were placed in a hollow on the crest of the yellow dunes, on the seaward side of the golf course. The pitfall traps were arranged

in a crescent around the light trap.

2.2 Damage or malfunction

The light trap operated from 21 - 29.6.76 and 26.7. - 3.8.76 and was functional at the end of both periods when tested. The pitfall traps were all functional during the whole of each of the three periods 21 - 29.6.76, 29.6. - 26.7.76 and 26.7. - 3.8.76. All the traps contained sand at the end of the first period and the hedgehog, found on 3.7.76 (see below) had clearly prevented any invertebrates falling into trap 3A during the third period. Several small mammals were taken in the pitfall traps:

21 - 29.6.76	Trap 1A	1 Sorex araneus
	Trap 2B	1 Sorex araneus
29.6. - 26.7.76	Trap 1A	3 Sorex araneus
	Trap 1B	1 Sorex araneus
	Trap 2B	1 Sorex araneus
	Trap 3A	2 Sorex araneus
	Trap 4A	1 Sorex araneus
26.7. - 3.8.76	Trap 3A	1 Erinaceus europaeus

This hedgehog had fallen head first into the trap, and its back legs, which were infested with Diptera larvae on 3.8.76, were sticking up out of the trap. The trap was found not to have caught any invertebrates during this period.

2.3 Colour slides available

Box 2, 1-6.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Hepialus fusconebulosa	6	0	6
Xanthorhoe montanata	5	0	5
Scotopteryx chenopodiata	0	2	2
Colostygia pectinataria	1	0	1
Laothoe populi	1	0	1
Spilosoma lubricipeda	2	0	2
Euxoa tritici	0	9	9
Euxoa cursoria	0	2	2
Agrotis vestigialis	1	27	28

	JUNE	JULY	TOTAL
Agrotis exclamationis	2	0	2
Ochropleura plecta	2	0	2
Noctua pronuba	0	1	1
Noctua comes	0	3	3
Xestia c-nigrum	0	1	1
Xestia sexstrigata	0	1	1
Mythimna impura	0	6	6
Blepharita adusta	2	0	2
Rusina ferruginea	7	0	7
Apamea monoglypha	1	3	4
Apamea lithoxylaea	0	1	1
Mesoligia literosa	0	7	7
Mesapamea secalis	0	3	3
Plusia festucae	0	1	1
Autographa bractea	0	1	1
TOTAL	30	68	98

An above average number of species but a low total catch was taken at this site compared with others on the North Coast.

Most of the species are common and widespread, but two sand dune species occurred. Euxoa cursoria was trapped at many North Coast sites but elsewhere only on three East Coast sites. Agrotis vestigialis was trapped extensively and often commonly at many sites, especially on the North Coast.

Two species are restricted to a limited range of larval food plants. Hepialus fusconebulosa feeds on the roots of Pteridium aquilinum and was taken widely at a number of sites. Laothoe populi feeds on Populus spp. and Salix spp..

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Leistus rufescens	0	2	2	4
Notiophilus biguttatus	0	1	0	1
Loricera pilicornis	0	5	0	5
Calathus fuscipes	0	5	5	10
Calathus melanocephalus	10	51	33	94
Calathus mollis	6	97	71	174
TOTAL	16	161	111	288

The catch of carabids at this site was dominated by the three Calathus spp. with C. mollis being trapped in larger numbers than at any other site during this survey. A single Loricera pilicornis larva was trapped in the middle period and two Amara sp. larvae were taken during the middle and last sampling periods.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Megasternum obscurum	8	5	0	13
Leiodes dubia/obesa	1	1	0	2
Agathidium laevigatum	0	1	0	1
Choleva glauca	1	1	0	2
Sciodrepoides watsoni	0	7	0	7
Catops chrysomeloides	0	1	1	2
Catops fuliginosus	2	8	0	10
Catops kirbii	1	1	0	2
Nicrophorus investigator	0	5	0	5
Thanatophilus rugosus	0	24	1	25
Micropeplus staphylinoides	0	2	0	2
Anotylus rugosus	1	1	0	2
Stenus clavicornis	1	2	0	3
Othius angustus	2	2	0	4
Xantholinus glabratus	0	1	2	3
Xantholinus linearis	4	9	0	13
Philonthus marginatus	0	3	0	3
Philonthus succicola	0	1	0	1
Philonthus varians	0	1	0	1
Quedius boops	0	1	0	1
Quedius fuliginosus	1	0	0	1
Quedius molochinus	0	1	0	1
Quedius tristis	0	7	2	9
Tachyporus chrysomelinus	4	3	2	9
Tachyporus hypnorum	1	0	0	1
Tachyporus pusillus	0	1	0	1
Tachinus marginellus	0	3	0	3
Tachinus signatus	0	1	0	1
Boreophila islandica	0	1	0	1
Aloconota gregaria	0	2	0	2
Amischa analis	0	3	0	3
Atheta elongatula	0	1	0	1

	JUNE	JN/JL	JULY	TOTAL
Atheta divisa	0	1	0	1
Atheta euryptera	0	3	0	3
Atheta amicula	0	1	0	1
Atheta gagatina	0	1	0	1
Atheta fungi	0	3	0	3
Atheta parvula	0	2	0	2
Atheta triangulum	0	1	0	1
Atheta atramentaria	0	5	0	5
Atheta macrocera	0	1	0	1
Atheta setigera	0	1	0	1
Oxypoda spectabilis	1	0	0	1
Aleochara sparsa	0	1	0	1
Serica brunnea	0	139	10	149
Cytilus sericeus	0	1	0	1
Meligethes erythropus	2	1	0	3
Cryptophagus setulosus	0	4	0	4
Atomaria atricapilla	0	1	0	1
Corticaria punctulata	1	0	0	1
Longitarsus jacobaeae	0	2	6	8
Longitarsus succineus	5	27	3	35
Apion loti	1	1	0	2
Apion dichroum	2	0	0	2
Otiorhynchus atroapterus	0	5	0	5
Philopedon plagiatus	4	1	1	6
Sitona lepidus	0	1	0	1
Sitona lineellus	3	0	3	6
Miccotrogus picirostris	0	1	0	1
TOTAL	46	304	31	381

Although Serica brunnea was by far the most abundant species at this site, other psammophile species such as Philopedon plagiatus, Otiorhynchus atroapterus and Leiodes dubia were present in very low numbers, but no Byrrhus spp. were collected.

The presence of carrion in the vicinity is indicated by the occurrence of Thanatophilus rugosus, Nicrophorus investigator, Catops spp., Sciodrepoides watsoni, Philonthus spp. and many of the Atheta spp.. These latter species, together with the Xantholinus spp. and Tachinus spp. also occur in dung.

Atheta divisa is rarely taken in Britain and Oxypoda spectabilis occurs in the nests of burrowing mammals.

Among the phytophagous species Longitarsus succineus feeds on a variety of Compositae, L. jacobaeae on Senecio spp., Apion dichroum, and the two Sitona spp. on Trifolium spp., and A. loti, Miccotrogus picirostris and Meligethes erythropus feed on Lotus corniculatus.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Clubiona neglecta	0	1	0	1
Agroeca proxima	0	1	5	6
Xysticus cristatus	1	2	0	3
Pardosa palustris	1	0	0	1
Pardosa pullata	23	55	2	80
Pardosa nigriceps	10	22	3	35
Arctosa perita	1	3	0	4
Ero cambridgei	1	0	0	1
Pachygnatha degeeri	12	13	0	25
Walckenaera acuminata	0	2	0	2
Walckenaera vigilax	0	1	0	1
Dicymbium nigrum	0	2	0	2
Dismodicus bifrons	0	1	0	1
Hypomma bituberculatum	0	1	0	1
Pocadicnemis pumila	1	4	0	5
Oedothorax retusus	64	66	4	134
Trichopterna thorelli	5	21	2	28
Tiso vagans	8	16	1	25
Monocephalus fuscipes	0	2	0	2
Savignya frontata	0	0	1	1
Erigone atra	1	0	0	1
Erigone arctica	1	0	0	1
Meioneta beata	0	2	0	2
Lepthyphantes cristatus	0	2	0	2
Lepthyphantes mengei	0	1	0	1
Microlinyphia pusilla	0	1	0	1
Allomengea scopigera	0	0	1	1
TOTAL	129	219	19	367

The sampling site was in fairly thick marram grass in the transition zone to dune meadow. The abundance of Pardosa pullata and P. nigriceps

in the catch is perhaps an indication of this type of vegetation. Pardosa pullata and P. nigriceps are both very common grassland spiders, the former shows a slight preference for damper situations and the latter preferring longer vegetation.

Allomengea scopigera was taken only at this site during the survey. It is typically a species of freshwater and brackish marshes and is not usually found on sand-dunes.

Oedothorax retusus, a spider often associated with pioneer habitats, was common at this site, as is often the case in open terrain. Clubiona neglecta and Hypomma bituberculatum, although more frequent in other habitat types, are quite commonly taken on sand dunes. Arctosa perita is a lycosid which is more or less restricted to sand dunes and dry sandy heaths, while Erigone arctica, although restricted to drift lines on beaches and salt marshes in the south, seems to occur further inland on dunes in the north-west of Scotland. Trichopterna thorelli was present in quite large numbers. This species is widespread but local in damp grassy and mossy areas such as wet heathland in southern Britain. Ero cambridgei, a very common species in grass and low vegetation, was taken elsewhere only at Dunnet (Site 62). All the remaining species are commonly found in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	5	5	0	10
Cochlicopa lubricella	1	2	1	4
Vitrina pellucida	0	5	15	20
Oxychilus alliarius	0	2	2	4
Helicella itala	169	193	128	490
Capaea hortensis	40	69	20	129
TOTAL	215	276	166	657

The assemblage of species recorded at this site is typical of fixed dune areas with little bare ground. The fact that 70.3% of the catch was Helicella itala is notable, and the number of specimens was among the highest recorded for this species. Helicella itala was not recorded further east than this site, a distribution which agrees well with its known occurrence in Scotland. The number of specimens of Cepaea hortensis was the second highest recorded in the survey.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Ophyiulus polosus	0	1	1	2
Cylindroiulus latestriatus	2	8	0	10
Ommatoiulus sabulosus	50	126	4	180
TOTAL	52	135	5	192

Cylindroiulus latestriatus and Ommatoiulus sabulosus are common on sand dunes throughout most of mainland Britain. Ophyiulus polosus is mainly recorded from soil and is known to occur on sand dunes.

3.7 Terrestrial Isopoda

No terrestrial Isopoda were recorded at this site.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Lycaenidae

Polyommatus icarus

Nymphalidae

Aglais urticae

Lasiocampidae

Lasiocampa quercus larva

Site 62 Dunnet

Site 62 Dunnet

Light trap & pitfall traps

SITE 62

DUNNET

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The site consisted of a very long and wide system of dunes running parallel to the Castletown - Dunnet road. The traps were placed in an area of failed Pinus nigra plantation.

1.2 Vegetation

The vegetation surrounding the pitfall traps consisted of the following species:

Pair 1: 70% Ammophila arenaria, 20% herbs, including Ranunculus spp., Trifolium repens, Festuca sp., Holcus sp. and Heracleum sphondylium, but with no moss, and 10% bare sand. This was in the marram transition zone, and both traps were in a sandy area.

Pair 2: 65% A. arenaria, 25% moss, some grasses and also T. repens, Senecio jacobaea and H. sphondylium, 10% bare sand.

Pairs 3 and 4: 70% A. arenaria, 20% grass, moss and tall herbs, 10% bare sand.

1.3 Disturbance

As the area was generally accessible from the road via a track, it was used by campers, and cars were parked wherever possible along the track. However, the site was some distance from the caravan site at the Castletown end of the dunes. On 26.7.76 there was evidence of someone having camped next to the pitfall traps. There were no obvious signs of grazing in the area.

1.4 Distance from sea

The traps were placed about 230 metres inland from HWMOST.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The light trap and pitfalls were placed in a narrow steep-sided valley in the marram transition zone, orientated north-south. The light

trap was placed at northern end of the valley, and the pitfall traps were arranged in a straight line along the valley. It was not an ideal situation for the traps but it was well hidden from most people using the area for walking, camping etc..

2.2 Damage or malfunction

The light trap operated from 22 - 30.6.76 and 26.7. - 3.8.76, and was functional at the end of both periods when tested. The pitfall traps were all functional during the whole of each of the three periods 22 - 30.6.76, 20.6. - 26.7.76 and 26.7. - 3.8.76, except that trap 1B had been dug up and was missing at the end of the second period. There was evidence of someone having camped recently immediately next to this trap. Several traps contained small mammals:

22.- 30.6.76: There was a Sorex araneus in one of each pair of pitfall traps.

30.6. - 26.7.76	Trap 3A	1	Sorex minutus (det H.R. Arnold)
	Trap 3B	1	Sorex araneus
	Trap 4A	1	Sorex araneus

2.3 Colour slides available

Box 2, 7-12.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Xanthorhoe montanata	2	0	2
Scotopteryx chenopodiata	0	3	3
Camptogramma bilineata	1	0	1
Perizoma albulata	2	0	2
Arctia caja	1	0	1
Euxoa tritici	0	5	5
Agrotis vestigialis	0	20	20
Noctua pronuba	0	1	1
Mythimna conigera	0	2	2
Mythimna impura	0	4	4
Blepharita adusta	4	0	4
Apamea monoglypha	1	6	7
Apamea remissa	1	0	1
Mesologia literosa	0	2	2
Autographa bractea	0	1	1
TOTAL	12	44	56

Relatively few species and a low total catch were recorded here compared with other North Coast sites. All the species are generally common and most of them were collected at many other sites during the survey.

Agrotis vestigialis is a common sand dune species and was trapped extensively and often commonly at many sites, especially on the North Coast. Perizoma albulata is known to feed only on the seeds of Rhinanthus minor.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Cychrus caraboides	0	2	0	2
Leistus rufescens	1	4	1	6
Loricera pilicornis	1	2	1	4
Broscus cephalotes	0	0	1	1
Trechus obtusus	0	1	0	1
Calathus erratus	0	7	1	8
Calathus fuscipes	0	1	1	2
Calathus melanocephalus	0	9	2	11
Calathus mollis	1	12	13	26
Amara communis	0	1	0	1
Amara familiaris	0	1	0	1
TOTAL	3	40	20	63

Although the catch was low in numbers of individuals, particularly during the first trapping period, more species of Carabidae were recorded here than at any other North Coast site during this survey. Only Calathus mollis, the most abundant species, Broscus cephalotes, and, to a lesser extent C. erratus, are indicative of a sandy coastal area. One larva of an Amara species and few Notiophilus biguttatus larvae were trapped during the middle period, and one probable first instar larva of N. substriatus was taken during the first period. No adult Notiophilus species were recorded from this site.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Cercyon melanocephalus	0	3	0	3
Megasternum obscurum	3	43	6	52
Ptenidium nitidum	0	8	0	8
Acrotrichus atomaria	0	2	0	2
Leiodes dubia/obesa	6	26	3	35

	JUNE	JN/JL	JULY	TOTAL
Choleva fragniezi	0	1	0	1
Choleva glauca	0	4	1	5
Choleva oblonga	0	1	0	1
Sciodrepoides watsoni	0	41	0	41
Catops chrysomeloides	0	6	0	6
Catops coracinus	0	3	0	3
Catops fuliginosus	1	0	0	1
Catops grandicollis	1	0	0	1
Catops kirbii	1	0	0	1
Nicrophorus vespilloides	0	3	0	3
Thanatophilus rugosus	0	1	0	1
Silpha atrata	0	1	0	1
Micropeplus staphylinoides	0	9	1	10
Omalium laticolle	0	10	0	10
Bledius longulus	8	5	0	13
Anotylus rugosus	2	0	0	2
Stenus boops	0	1	0	1
Stenus brunnipes	0	1	0	1
Othius angustus	0	1	0	1
Philonthus marginatus	0	2	0	2
Philonthus varians	0	2	0	2
Philonthus varius	0	1	0	1
Quedius molochinus	0	1	0	1
Quedius tristis	0	0	1	1
Tachyporus chrysomelinus	6	45	1	52
Tachyporus hypnorum	1	0	0	1
Tachyporus pusillus	0	6	4	10
Tachinus signatus	0	5	0	5
Aloconota gregaria	1	0	0	1
Liogluta granigera	0	15	0	15
Atheta excellans	0	2	0	2
Atheta glabricula	0	1	0	1
Atheta indubia	0	10	0	10
Atheta liliputana	0	23	0	23
Atheta gagatina	0	0	1	1
Atheta celata	0	12	0	12
Atheta triangulum	3	9	1	13
Atheta atramentaria	1	6	0	7

	JUNE	JN/JL	JULY	TOTAL
Atheta macrocera	0	5	0	5
Atheta longicornis	0	1	0	1
Drusilla canaliculata	73	418	34	525
Ocalea picata	0	1	0	1
Oxypoda spectabilis	0	0	1	1
Serica brunnea	0	1	0	1
Cytilus sericeus	0	1	0	1
Hypnoides riparius	6	17	2	25
Ctenicera cuprea	2	0	0	2
Cryptophagus setulosus	1	0	0	1
Micrambe villosus	0	0	1	1
Micrambe vini	0	8	9	17
Atomaria atricapilla	0	4	0	4
Corticaria umbilicata	0	2	0	2
Longitarsus luridus	2	0	0	2
Longitarsus suturellus	0	1	0	1
Apion dichroum	0	3	0	3
Otiorhynchus atroapterus	2	12	0	14
Phyllobius viridicollis	6	1	0	7
Philopedon plagiatus	0	1	2	3
Sitona lepidus	2	10	5	17
Sitona lineellus	1	1	1	3
TOTAL	129	797	74	1000

The catch from this site shows a rich and abundant fauna. The number of species trapped (65) was surpassed at only two other sites (81 and 95) and was equalled at Site 91, all considerably further south. The number of specimens trapped was enhanced by the large numbers of Drusilla canaliculata, a species which was also abundant at Site 82, the only other non-Hebridean site where a larger catch of this species was taken. This species, also taken in large numbers in the larval stage, has a non-obligate association with various species of ants, and is often abundant close to their nests.

This site was unusual in that only a single Serica brunnea was caught. Of the other coastal psammophiles, Leiodes dubia, Otiorhynchus atroapterus and Bledius longulus were fairly well represented, but very few Philopedon plagiatus and no Byrrhus spp. were taken.

The fairly large numbers of Megasternum obscurum and Tachyporus chrysomelinus, together with such species as Ptenidium punctatum, Acrotrichis atomaria, Ocalia picata and many of the other Staphylinidae, indicate the presence of a well developed litter layer or some other abundance of decaying vegetable material with associated moulds and fungi. Nicrophorus vespilloides and Thanatophilus rugosus indicate the presence of carrion whilst Philonthus spp., Cercyon melanocephalus and many of the Atheta spp. are associated with dung. Cryphophagus setulosus occurs in bees' nests and Oxypoda spectabilis is a common inhabitant of moles' nests but has been recorded from the nests of other small mammals. The 9 species of Leiodidae on p.62-4 were probably associated with shrew nests. Omalium laticolle and Liogluta granigera both have a more northerly distribution in Britain, whilst Joy (1932) recorded Atheta liliputana as very rare from Hampshire and Devon. Nowadays in Scandinavia and northern Germany it is regarded as an alpine species and a single specimen was swept by G.E. Woodroffe on Ben Loyal, Sutherland on 5.8.72. It is of particular interest to note that all twenty-three specimens were taken in one pitfall trap (1A) during the second sampling period, which perhaps emphasises the local nature of this rare species.

Phytophagous species were well represented with two species of Micrambe which feed on Ulex or Sarothamnus, two species of Sitona and Apion dichroum on Trifolium spp., Longitarsus luridus on Plantago spp. and Cirsium arvense and L. suturellus on Senecio spp..

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Clubiona stagnatilis	0	1	0	1
Clubiona diversa	0	1	0	1
Agroeca proxima	0	0	1	1
Xysticus cristatus	1	1	0	2
Pardosa palustris	0	1	0	1
Pardosa pullata	2	5	0	7
Pardosa nigriceps	1	3	0	4
Trochosa terricola	0	2	1	3
Arctosa perita	0	3	0	3
Ero cambridgei	0	1	0	1

	JUNE	JN/JL	JULY	TOTAL
Ero furcata	0	1	0	1
Pachygnatha degeeri	3	15	0	18
Ceratinella brevipes	3	4	2	9
Walckenaera acuminata	2	2	0	4
Walckenaera antica	2	8	2	12
Dicymbium nigrum	0	1	0	1
Dismodicus bifrons	1	2	0	3
Hypomma bituberculatum	0	1	0	1
Gonatium rubens	0	1	0	1
Pocadicnemis pumila	7	20	2	29
Oedothorax retusus	4	2	0	6
Trichopterna thorelli	7	15	2	24
Tiso vagans	12	22	0	34
Tapinocyba praecox	0	0	1	1
Monocephalus fuscipes	4	23	2	29
Micrargus herbigradus	0	1	0	1
Micrargus apertus	0	0	1	1
Epigonella hiemalis	1	0	0	1
Diplocephalus latifrons	0	3	0	3
Erigone dentipalpis	2	2	0	4
Erigone promiscua	0	1	0	1
Agyneta cauta	1	0	0	1
Meioneta beata	15	28	0	43
Lepthyphantes obscurus	0	1	0	1
Lepthyphantes mengei	1	13	10	24
Lepthyphantes ericaeus	0	2	0	2
TOTAL	69	186	24	279

This large and varied site clearly supports a rich fauna which is reflected in the 36 species taken there. Twenty-four species were linyphiids and include one specimen of Micrargus apertus. This species has only recently been recognised and very little is known about its distribution in Britain. This record is almost certainly the first for Scotland.

The most abundant spider at this site, Meioneta beata, is widespread but is more common in the south. It is often associated with grassland habitats but is not generally associated with sand dunes.

Arctosa perita is restricted to sand dunes and dry sandy places and Hypomma bituberculatum, although typically a wetland species, is often found on sand dunes fauna. Ero cambridgei, a common and widespread grassland spider, was found elsewhere only at Site 61. Trichopterna thorelli is widespread but local in damp grass and moss, but can be common on wet heathland in southern England. Lepthyphantes obscurus, although widespread, is not common. In the south it is usually found on longer vegetation such as gorse bushes and very long heather. Agroeca proxima is widespread and common in dry grassland, and on sandy heaths. The remaining species are taken quite commonly in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	2	0	2	4
Cochlicopa lubricella	0	10	1	11
Vitrina pellucida	0	8	0	8
Oxychilus alliarius	0	5	0	5
Candidula intersecta	69	79	34	182
Arianta arbustorum	3	8	1	12
Cepaea hortensis	6	16	2	24
TOTAL	80	126	40	246

This assemblage of species is typical of fixed dune areas with some bare sand. Candidula intersecta made up 74% of the catch. This species is very local in northern Scotland. It was probably introduced to the British Isles in Roman times or later. Arianta arbustorum was recorded elsewhere only at Site 59, also on the North Coast. It is usually associated with lush, but no marshy, vegetation.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Polydesmus angustus	0	8	0	8
Julus scandinavus	1	7	0	8
Ophyiulus pilosus	9	16	7	32
Cylindroiulus punctatus	1	0	1	2
Cylindroiulus latestriatus	0	1	1	2
Ommatoiulus sabulosus	159	450	75	684
TOTAL	170	482	84	736

The largest numbers of species and of specimens taken on the North Coast was recorded at this site. Ommatoiulus sabulosus and Cylindroiulus latestriatus are typical associated with sand dunes and sandy areas. The remaining species are probably most commonly recorded in areas with accumulation of litter, although Ophyiulus pilosus is considered to be mainly a soil-dwelling species.

3.7 Terrestrial Isopoda

	JUNE	JN/JL	JULY	TOTAL
Trichoniscus pusillus	0	2	0	2
Philoscia muscorum	0	2	0	2
Porcellio scaber	0	3	0	3
TOTAL	0	7	0	7

Although the number of specimens caught was low, this was the only site at which more than two species were recorded. Porcellio scaber is found widely on dry sandy soils. Philoscia muscorum is also common in grassland but seems to become localised in Scotland mainly to coastal areas and river valleys. The small soil dwelling species, Trichoniscus pusillus is susceptible to desiccation and is probably widespread in damp areas on some fixed dune areas. It was recorded at only five sites in the survey.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Nymphalidae

Aglais urticae

Satyridae

Coenonympha tullia

4.2 Coleoptera

The following weevils were recorded by Dr M.G. Morris unless otherwise stated:

Apionidae

Apion violaceum, 3 and 4.7.74, sweeping Rumex acetosa

A. carduorum, 3.7.74, sweeping Cirsium arvense.

A. aethiops, 3.7.74, sweeping Vicia cracca.

A. spencii, 3.7.74, sweeping Vicia cracca.

A. viciae, 3 and 4.7.74, sweeping Lathyrus pratensis.

Curculionidae

Otiorhynchus arcticus, 5.7.74, dead by roadside.

O. desertus, 3-5.7.74, on Salix repens.

O. ovatus, 3.7.74, under Lotus corniculatus.

O. singularis, 5.7.74, on Salix repens.

Barynotus squamosus, 1.7.74, moss/lichen (Coll. E. Duffey).

Grypus equiseti, 3 and 5.7.74, at roots of Equisetum spp..

Ceutorhynchus contractus, 3.7.74, on Cardamine spp. and Cakile maritima.

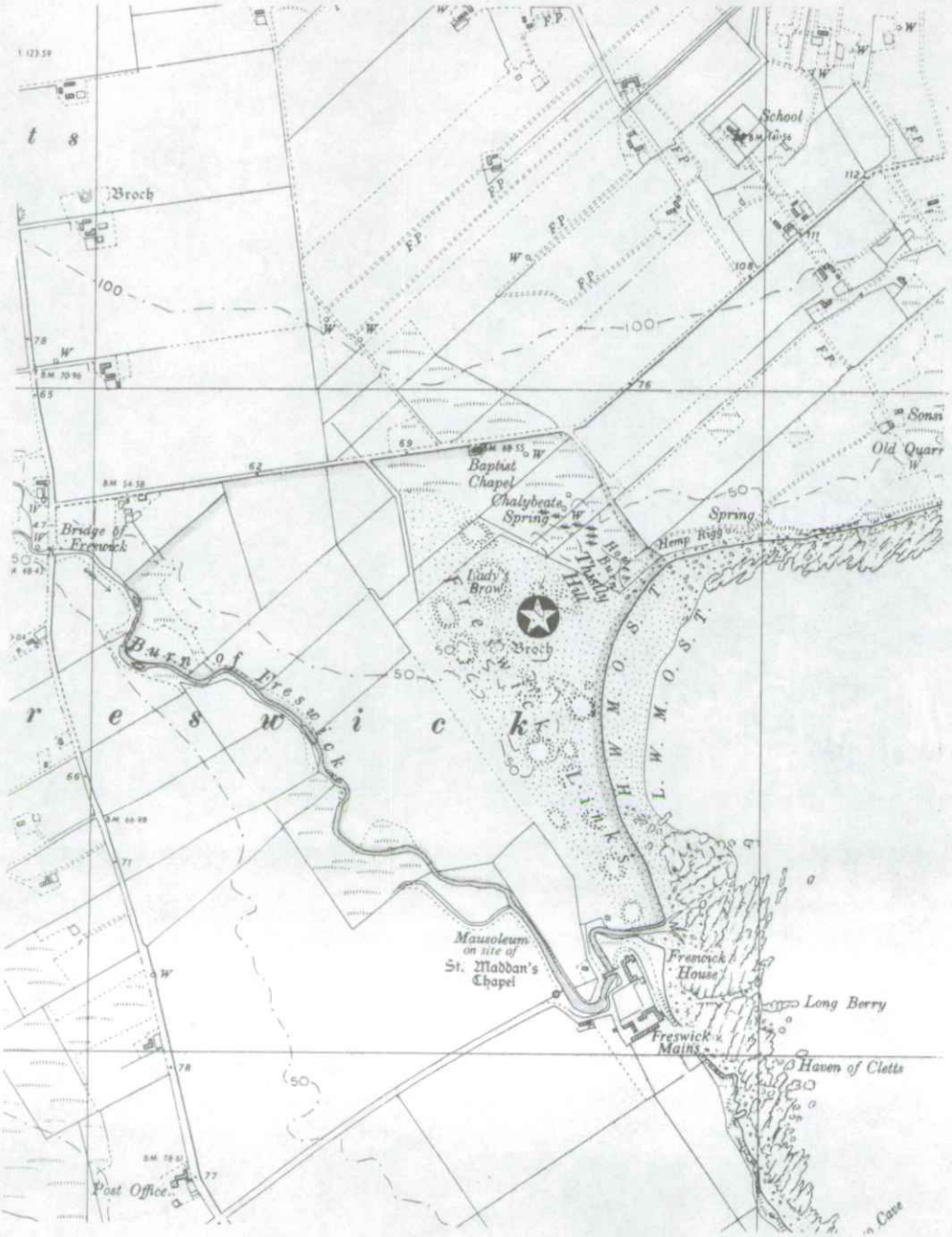
4.3 Pseudoscorpiones : Neobisiidae

The following species was determined by P.E. Jones:

Neobisium muscorum, 30.6. - 26.7.76 single specimen in pitfall trap 4B.

Site 63 Freswick

Site 63 Freswick



Light trap & pitfall traps

I.T.E. (N.E.R.C.) Bangor

SITE 63

FRESWICK

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

Freswick Links are an area of flattish dunes bounded on the north side by a very overgrown pasture. There are groups of stones among the older dunes which constitute the remains of a Norse settlement.

1.2 Vegetation

The vegetation surrounding the pitfall traps consisted of the following:

Pair 1: was an old dune with 30% Ammophila arenaria of poor growth, 65% short grass with Senecio jacobaea, Bellis perennis and Trifolium repens and 5% bare sand.

Pair 2: was on small eroded dunes; 60% A. arenaria, 25% litter, moss and herbs, and 15% bare sand.

Pair 3: was on old dunes with stones from the Norse settlement. The vegetation was a type of dune meadow with 15% A. arenaria, 80% short turf with B. perennis, S. jacobaea and Lotus corniculatus, and 5% bare sand.

Pair 4: was on the edge of a dune, on a slope with A. arenaria overhanging. 70% A. arenaria, 15% litter and grass and 15% bare sand. This area had a weedy nature, presumably affected by weed seeds coming in from the adjacent overgrown pasture.

1.3 Disturbance

The whole area was rather open and disturbed because of heavy trampling by cattle and sheep and rabbit grazing.

1.4 Distance from sea

The traps were placed about 100 metres inland from HWMOST.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The traps were sited in a hollow on the dune meadow, near to the fence that formed the boundary of the overgrown pasture. The pitfall traps were placed in a straight line transect running inland from the light trap.

2.2 Damage or malfunction

The light trap operated from 22 - 30.6.76 and 26.7. - 3.8.76 but was not functional on 3.8.76 when tested. The pitfall traps were all functional during the whole of each of the three periods, 22 - 30.6.76, 30.6. - 26.7.76 and 26.7. - 3.8.76. On 26.7.76 pitfall trap 1A contained a single Apodemus sylvaticus.

2.3 Colour slides available

Box 2, 13-18.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Hepialus humuli	1	0	1
Eupithecia nanata	1	0	1
Arctia caja	0	1	1
Euxoa tritici	0	93	93
Agrotis vestigialis	0	5	5
Noctua pronuba	0	8	8
Diarsia mendica	0	1	1
Xestia c-nigrum	0	1	1
Xestia sexstrigata	0	3	3
Hada nana	10	0	10
Cerapteryx graminis	0	5	5
Mythimna conigera	0	2	2
Mythimna impura	0	3	3
Apamea monoglypha	0	10	10
Apamea crenata	1	0	1
Mesoligia literosa	0	1	1
Mesapamea secalis	0	2	2
Diachrysia chrysitis	1	1	2
Autographa pulchrina	1	1	2
Abrostola triplasia	4	0	4
TOTAL	19	137	156

The catch at this site gave an average species list but the total catch was below average compared with other sites on the North Coast. Most of the species recorded are widespread and common. The most abundant species in the catch, Euxoa tritici (60%), was trapped often

commonly at many sites except those around the Moray Firth. Agrotis vestigialis is a common sand dune species which was trapped extensively and often commonly at many sites, especially on the North Coast.

Hepialus humuli is widely distributed and often common throughout the British Isles but was taken elsewhere in the survey only at Site 50N. It feeds on the roots of various low growing plants.

A few species are restricted to a limited range of larval food plants. Eupithecia nanata feeds on Calluna vulgaris. Abrostola triplasia feeds on Urtica dioica as does Diachrysia chrysitis which also feeds on a few other common species.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Nebria brevicollis	0	0	1	1
Notiophilus substriatus	0	1	0	1
Loricera pilicornis	4	5	2	11
Calathus fuscipes	0	6	0	6
Calathus melanocephalus	0	11	5	16
Calathus mollis	3	7	7	17
TOTAL	7	30	15	52

Although the three species of Calathus made up the major element of the catch of carabids at this site, Loricera pilicornis was more numerous than at any other North Coast site. This species, although common on the Hebridean machair, is usually regarded as a species of moist shaded ground close to water. One larva of Notiophilus substriatus was taken in the first trapping period and four Loricera pilicornis larvae were caught during the second period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Helophorus aquaticus	0	0	1	1
Megasternum obscurum	0	3	1	4
Leiodes dubia/obesa	2	12	1	15
Choleva glauca	0	2	0	2
Micropeplus porcatus	0	0	1	1
Micropeplus staphylinoides	0	0	1	1
Stenus brunnipes	2	3	0	5
Stenus clavicornis	0	0	1	1
Stenus crassus	1	0	0	1

	JUNE	JN/JL	JULY	TOTAL
Othius angustus	0	0	1	1
Gyrohypnus fracticornis	0	1	0	1
Xantholinus glabratus	0	6	1	7
Xantholinus linearis	2	2	1	5
Philonthus laminatus	1	0	0	1
Philonthus varius	1	1	0	2
Staphylinus aeneocephalus	0	0	1	1
Tachyporus chrysomelinus	10	6	1	17
Tachyporus hypnorum	3	4	1	8
Tachyporus pusillus	6	25	2	33
Tachinus signatus	1	0	0	1
Aloconota gregaria	2	3	1	6
Amischa cavifrons	1	2	5	8
Atheta elongatula	0	1	0	1
Atheta indubia	0	0	1	1
Atheta fungi	0	1	0	1
Atheta graminicola	1	0	0	1
Atheta atramentaria	0	8	4	12
Oxypoda haemorrhoa	1	0	0	1
Oxypoda umbrata	0	2	1	3
Serica brunnea	0	110	5	115
Hypnoides riparius	0	1	0	1
Cryptophagus dentatus	2	5	0	7
Micrambe vini	0	0	1	1
Atomaria atricapilla	0	1	0	1
Atomaria nitidula	18	33	5	56
Nephus redtenbacheri	1	0	0	1
Lathridius pseudominutus	0	2	0	2
Enicmus transversus	0	1	0	1
Corticaria punctulata	1	0	0	1
Corticaria umbilicata	0	0	1	1
Corticarina fuscula	9	17	2	28
Typhaea stercorea	0	2	0	2
Longitarsus jacobaeae	0	1	5	6
Longitarsus succineus	0	8	24	32
Crepidodera ferruginea	1	4	1	6
Apion carduorum	0	2	0	2
Otiorhynchus atroapterus	10	6	2	18
Philopedon plagiatus	0	0	1	1
TOTAL	76	275	73	424

Serica brunnea was by far the most abundant species in the catch, but other psammophilous or coastal species such as Otiorhynchus atroapterus, Leiodes dubia, and Philopedon plagiatus constituted a very small element of the fauna.

Atomaria nitidula and Corticarina fuscula are associated with decaying vegetable matter. The genus Tachyporus was well represented by both adults and larvae, and these predatory species are indicative of a tall herb layer with a fairly dense litter layer. The Lathridiidae, Typhaea stercorea, Cryptophagus dentatus, most of the Atheta spp. and many of the other Staphylinidae are associated with moulds such as those that occur in decaying vegetation. Megasternum obscurum occurs in such situations, but, together with Atheta atramentaria, the Xantholinus spp. and Philonthus spp., it also frequents dung. Helophorus aquaticus is a water beetle. Lathridius pseudominutus was not recorded at any other site during this survey, and although Tozer (1973) does not show it occurring further north than the Central Highlands in Scotland specimens were collected at Bettyhill and Site 57 in August 1972. However, when more collections have been critically examined it is expected that this species will be found to be more widely distributed.

Among the phytophagous species Apion carduorum feeds on Cirsium spp. and Carduus spp. on which adults of Crepidodera ferruginea are also found, although the larvae probably feed at the roots of various Gramineae. Longitarsus jacobaeae feeds on Senecio spp., L. succineus on various Compositae and Micrambe vini on Ulex spp. and Sarothamnus scoparius.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Drassodes cupreus	0	1	0	1
Xysticus cristatus	0	1	1	2
Pardosa palustris	18	15	0	33
Pardosa pullata	5	6	1	12
Pardosa nigriceps	3	1	0	4
Arctosa perita	1	1	1	3
Pachygnatha degeeri	1	0	0	1
Walckenaera vigilax	2	5	1	8
Dicymbium nigrum	0	1	0	1
Hypomma bituberculatum	1	0	0	1
Pocadicnemis pumila	0	1	0	1

	JUNE	JN/JL	JULY	TOTAL
Oedothorax retusus	10	11	1	22
Silometopus elegans	1	0	0	1
Tiso vagans	4	4	0	8
Savignya frontata	1	3	0	4
Erigone dentipalpis	4	5	3	12
Erigone atra	9	13	6	28
Erigone promiscua	14	18	7	39
Bathyphantes gracilis	0	1	0	1
Lepthyphantes tenuis	1	0	1	2
Lepthyphantes zimmermanni	1	0	0	1
Lepthyphantes ericaeus	0	1	0	1
TOTAL	76	88	22	186

The presence of Oedothorax retusus, a species often found in pioneer habitats is probably a reflection of the disturbance by stock and rabbits at this site. Erigone promiscua also occurs on open, rather disturbed ground such as burnt heathland in southern Britain.

Pardosa palustris was the most plentiful lycosid in the catch, although it was not as abundant as at some sites further south.

Arctosa perita is a sand dune and dry sandy heath species while Hypomma bituberculatum, although found typically in wetlands, is very often taken on sand dunes. Silometopus elegans is widespread in Britain but uncommon, being taken more often in the south than the north. It occurred only at this site during the survey. The widespread but infrequent erigonine, Walckenaera vigilax, is usually taken in wet, grassy places. The abundance of the three species of Erigone here showed similarities with the exposed and disturbed Hebridean sites. The remainder of the spiders are all common in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	2	1	12	15
Cochlicopa lubricella	1	0	0	1
Vitrina pellucida	1	15	18	34
TOTAL	4	16	30	50

This was a relatively small catch composed of species which are associated with fixed dune areas with some bare ground.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	0	2	0	2
Ommatoiulus sabulosus	3	4	0	7
TOTAL	3	6	0	9

Cylindroiulus latestriatus and Ommatoiulus sabulosus are common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

	JUNE	JN/JL	JULY	TOTAL
Porcellio scaber	0	3	0	3

Porcellio scaber is found widely on dry sandy soils.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Pieridae

Pieris napi

Lycaenidae

Polyommatus icarus

Nymphalidae

Aglais urticae

Satyridae

Maniola jurtina

Site 64 Sandwood

Site 64 Sandwood

Light trap & pitfall traps

SITE 64

SANDWOOD

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The sampled site was in an area of rather flat dunes to the west of the north-western end of Sandwood Loch.

1.2 Vegetation

The vegetation, other than Ammophila arenaria, was very short and included Bellis perennis, Trifolium spp., Carex arenaria, Viola spp., Galium verum, Erodium cicutarium, Euphrasia spp., Cerastium spp., Plantago spp., mosses, and a little Peltigera sp., but no other lichens. The structure of the vegetation surrounding the pitfall traps was as follows:

Pair 1: 30% A. arenaria, 10% bare sand, 60% open, very short vegetation.

Pair 2: 30% A. arenaria, 30% bare sand, 40% scattered, open vegetation.

Pair 3: 40% A. arenaria, 10% bare sand, 50% dwarf herbs, grass and moss.

Pair 4: 30% A. arenaria, 5% bare sand, 65% open vegetation.

1.3 Disturbance

The traps were sited about 30 metres from the main path to the beach and there was probably some disturbance from people on foot. The area was very heavily grazed by sheep and rabbits. Four wooden marker stakes were snapped off presumably by sheep during the three sampling periods.

1.4 Distance from sea

The traps were placed about 370 metres inland from HWMOST.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The light trap was placed 30 metres from the main footpath, in a shallow, wide hollow in the dunes. The pitfall traps were placed in

the next hollow on the seaward side and arranged in a large (20 metre) square. No attempt was made to conceal the traps as it was thought that the inaccessibility of the site would deter any potential vandals. The sampling site was about 2 miles from the nearest access point with a car.

2.2 Damage or malfunction

The light trap operated from 15 - 24.6.76 and 21 - 29.7.76, but was not functional on 29.7.76 when tested. With one exception, the pitfall traps were all functional during the whole of each of the three periods 15 - 24.6.76, 24.6. - 21.7.76 and 21 - 29.7.76. Pitfall trap 1B was not found on 21.7.76; the empty hole was found, but the container and its contents had disappeared.

2.3 Colour slides available

Box 2, 19-27.

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Cosmorhoe ocellata	2	0	2
Euxoa tritici	0	1	1
Euxoa cursoria	0	2	2
Agrotis vestigialis	0	11	11
Agrotis exclamationis	1	0	1
Noctua pronuba	1	3	4
Cerapteryx graminis	0	16	16
Blepharita adusta	5	0	5
Apamea monoglypha	0	3	3
Autographa bractea	0	2	2
TOTAL	9	38	47

This site produced the poorest species list recorded at any site on the North Coast. Only four species were caught during the first trapping period when the trap functioned satisfactorily, and seven species during the second when the trap ceased to operate by the end of the period.

Two sand dune species occurred. Euxoa cursoria was trapped at many

North Coast sites but elsewhere only at three sites on the East Coast. Agrotis vestigialis was trapped extensively and often commonly at many other sites, especially on the North Coast.

Only Cosmorhoe ocellata, which feeds on Galium spp., is restricted to a very limited number of larval food plants.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Nebria salina	1	0	0	1
Trechus obtusus	7	11	2	20
Pterostichus niger	1	0	0	1
Calathus fuscipes	39	479	65	583
Calathus melanocephalus	8	4	0	12
Amara aulica	0	1	0	1
Amara bifrons	3	3	4	10
Amara familiaris	1	0	0	1
TOTAL	60	498	71	629

The catch of carabids was dominated by Calathus fuscipes. This species was trapped in larger numbers only at the two Morrich More sites. Of the remaining species only Amara bifrons is a xerophilous species associated with sand and very sparse vegetation. Trechus obtusus is regarded by Lindroth (1974) as a species of open country, but in the east midlands of England, at least, it is commonly found among the litter layer in woodland.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Leiodes dubia/obesa	1	1	0	2
Catops nigricans	1	0	0	1
Stenus brunnipes	0	0	2	2
Stenus nanus	0	2	0	2
Gyrohypnus angustatus	0	7	0	7
Xantholinus laevigatus	12	16	1	29
Philonthus cognatus	4	0	0	4
Staphylinus aeneocephalus	1	0	0	1
Quedius semiobscurus	3	1	0	4
Quedius tristis	1	0	0	1
Tachyporus chrysomelinus	3	13	1	17
Tachyporus hypnorum	0	1	0	1

	JUNE	JN/JL	JULY	TOTAL
Falagria thoracica	4	22	7	33
Atheta amicula	3	0	0	3
Atheta fungi	3	0	0	3
Atheta aterrima	0	1	0	1
Geotrupes vernalis	3	12	2	17
Aphodius ater	1	0	0	1
Aphodius fimetarius	1	0	0	1
Serica brunnea	0	45	1	46
Byrrhus fasciatus	1	2	0	3
Athous haemorrhoidalis	0	2	0	2
Malthodes pumilus	1	0	0	1
Otiorhynchus atroapterus	0	8	1	9
Philopedon plagiatus	3	7	0	10
TOTAL	46	140	15	201

The catch at this site included an unusual assemblage of species. Serica brunnea was the most numerous species and other coastal/psammophile species Philopedon plagiatus, Otiorhynchus atroapterus and Leiodes dubia, were fairly well represented.

The second most abundant species, Falagaria thoracia, which is eurytopic, was recorded elsewhere during this survey only as a single specimen at Site 57. F. thoracica may have some association with ants although Donisthorpe (1927) does not include it among his lists of myrmecophiles and "tolerated or persecuted lodgers". This record greatly extends the known range of F. thoracica in Britain. In Fowler's time (1888) it was unknown from Scotland and Joy (1932) records it only from southwest Scotland.

Xantholinus laevigatus and Geotrupes vernalis occur in dung together with Gyrohypnus angustatus, the Aphodius spp., Philonthus cognatus and Atheta aterrima.

The Tachyporus spp. are active predators of invertebrates both in the litter layer and up on herbaceous vegetation. Malthodes pumilus is usually considered to be a specis of woodlands or woodland margins.

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Haplodrassus signifer	1	1	0	2
Xysticus cristatus	3	3	0	6
Pardosa palustris	47	28	0	75

	JUNE	JN/JL	JULY	TOTAL
Alopecosa pulverulenta	2	0	0	2
Trochosa terricola	0	6	4	10
Arctosa perita	0	1	0	1
Pachygnatha degeeri	7	9	0	16
Walckenaera antica	1	0	2	3
Dicymbium nigrum	1	1	0	2
Oedothorax retusus	24	25	1	50
Tiso vagans	12	7	2	21
Typhocrestus digitatus	1	0	0	1
Erigone dentipalpis	0	0	1	1
Erigone atra	0	1	0	1
Erigone promiscua	29	55	17	101
Erigone arctica	1	0	2	3
Agyneta cauta	5	0	0	5
Meioneta beata	20	20	2	42
TOTAL	154	157	31	342

This large and remote dune system in the extreme north-west of Scotland shows slight differences in spider fauna compared with the other North Coast sites although the catch is also an indication of the nature of the sampling area. The traps were in rather open, sandy, vegetation, mostly of herbs with comparatively little marram grass. Again this type of situation is reflected in the high numbers of Pardosa palustris a species typical of open grazing terrain taken in the traps. Another lycosid, Arctosa perita, is restricted to sand dunes and dry sandy places. The 11 linyphiid species included large numbers of Erigone promiscua, which is also associated with open vegetation, as is Oedothorax retusus. Three specimens of Erigone arctica were taken and, as the sampling site was a long distance from the sea, this occurrence is unusual. This species is restricted to beach and salt marsh drift lines in the south but occurs much further inland on sand dune systems in the north west of Scotland. The linyphiine, Meioneta beata, although generally not thought of as a sand dune species, occurred in large numbers. It is a grassland spider with a rather southern distribution. The remaining species are all common in grassland.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	0	2	1	3
Helicella itala	4	10	7	21
Cochlicopa acuta	1	4	4	9
Cepaea hortensis	0	0	2	2
TOTAL	5	16	14	35

The comparatively small catch was of species usually associated with semi-fixed dune areas with bare ground.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	3	4	2	9

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

No terrestrial Isopoda were recorded at this site.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Lycaenidae

Polyommatus icarus

Satyridae

Hipparchia semele

Maniola jurtina

Coenonympha tullia

Site 65 Sinclair's Bay

Site 65 Sinclairs Bay

Light trap & pitfall traps

SITE 65

SINCLAIR'S BAY

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The sampling area was in the area of rather flat dunes known as Keiss Links lying to the north of the mouth of the Water of Wester. The traps were placed near a broch in the area of antiquity marked as "Birkle Hills" on maps. The western edge of the dunes near the sampling site consisted of an area of slightly marshy turf.

1.2 Vegetation

Pitfall trap pairs 1 and 2 were in an area of marram transition zone verging on dune meadow on the landward side of the main dune system. The vegetation was 50% Ammophila arenaria and 50% mixed turf with moss and Carex arenaria.

Pitfall traps 3 and 4 were also in an area of 50% A. arenaria and 50% mixed turf with moss, but Lotus corniculatus was very common here.

1.3 Disturbance

No disturbance was noted but it was possible that the dunes were used for walking.

1.4 Distance from sea

The traps were placed about 130 metres inland from HWMOST.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

The traps were placed in a hollow in the top of some dunes, above a grass track. The pitfall traps were placed in a crescent to the north of the light trap.

2.2 Damage or malfunction

The light trap operated successfully from 22 - 30.6.76 and appeared to do so from 26.7. - 3.8.76. However when tested at the end of the second period it failed to switch on. The trap contained nine snails on 30.6.76. The pitfall traps were all functional during the first and last periods (22 - 30.6.76 and 26.7. - 3.8.76) but at the end of the middle period (30.6. - 26.7.76) traps

2A and 2B could not be found and are presumed to have been stolen.

2.3 Colour slides available

Box 2, 28-33

3. THE FAUNA

3.1 Lepidoptera

	JUNE	JULY	TOTAL
Hepialus fusconebulosa	1	0	1
Xanthorhoe munitata	0	4	4
Scotopteryx chenopodiata	0	13	13
Camptogramma bilineata	1	1	2
Cosmorhoe ocellata	3	0	3
Arctia caja	1	11	12
Euxoa tritici	0	136	136
Agrotis vestigialis	0	8	8
Ochropleura plecta	1	0	1
Noctua pronuba	0	48	48
Lycophotia porphyrea	4	1	5
Diarsia mendica	0	3	3
Xestia xanthographa	0	1	1
Hada nana	9	0	9
Cerapteryx graminis	1	68	69
Mythimna impura	0	11	11
Apamea monoglypha	0	111	111
Apamea crenata	2	0	2
Mesapamea secalis	0	5	5
Amphipoea lucens	0	1	1
Stilbia anomala	0	1	1
Diachrysia chrysitis	0	4	4
Plusia festucae	0	1	1
Autographa pulchrina	0	1	1
TOTAL	23	429	452

An average species list and a good total catch was taken here compared with other North Coast sites. Most of the species recorded are generally common and widespread and were trapped at many other sites. Two species accounted for 55% of the total catch. Euxoa tritici, which was the most abundant, was trapped often commonly at many sites except

those around the Moray Firth. Apamea monoglypha was also numerous and was the most widely taken species of the survey.

Agrotis vestigialis a common sand dune species was trapped extensively and often commonly at many other sites, especially on the North Coast.

Stilbia anomala was taken elsewhere only at Sites 50N and 56; it is a local species but sometimes not uncommon on heaths, or in rocky places by the sea (South 1961).

A few species are restricted to a limited range of larval food plants. Hepialus fusconebulosa feeds on the roots of Pteridium aquilinum and was taken widely at a number of sites. Cosmorhoe ocellata feeds on Galium spp., Lycophotia porphyrea on Calluna vulgaris and Erica spp.. Diachrysia chrysitis feeds on Urtica dioica and a few other common species.

3.2 Coleoptera : Carabidae

	JUNE	JN/JL	JULY	TOTAL
Leistus rufescens	1	0	0	1
Nebria brevicollis	0	1	0	1
Notiophilus aquaticus	1	0	1	2
Loricera pilicornis	1	0	0	1
Calathus fuscipes	4	156	43	203
Calathus melanocephalus	7	123	18	148
Calathus mollis	0	4	2	6
Amara communis	1	0	0	1
TOTAL	15	284	64	363

The catch of carabids at this site was overwhelmingly dominated by two species of Calathus - C. fuscipes and C. melanocephalus. Greater numbers of the latter species were trapped in mainland Scotland only at Sites 70 and 71, although it was generally more abundant on the Outer Hebrides. Two larvae of Notiophilus substriatus, a species not taken as an adult, were recorded during the first two trapping periods and a single larva of Amara sp. was caught in the middle period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

	JUNE	JN/JL	JULY	TOTAL
Megasternum obscurum	22	16	16	54
Leiodes dubia/obesa	5	10	2	17
Catops chrysomeloides	0	1	0	1

	JUNE	JN/JL	JULY	TOTAL
Thanatophilus rugosus	0	0	1	1
Micropeplus staphylinoides	1	8	9	18
Bledius longulus	1	2	0	3
Stenus impressus	0	1	2	3
Stenus nanus	1	0	0	1
Othius angustus	2	3	1	6
Xantholinus glabratus	0	7	8	15
Xantholinus linearis	1	1	1	3
Philonthus marginatus	0	1	1	2
Staphylinus aeneocephalus	1	1	0	2
Quedius molochinus	0	1	2	3
Quedius tristis	0	5	0	5
Mycetoporus splendidus	1	0	0	1
Tachyporus chrysomelinus	7	4	1	12
Tachinus signatus	0	0	1	1
Aloconota gregaria	0	1	0	1
Amischa cavifrons	0	1	0	1
Atheta elongatula	1	0	0	1
Atheta fungi	0	2	2	4
Oxypoda umbrata	1	0	0	1
Serica brunnea	0	51	8	59
Byrrhus fasciatus	12	18	2	32
Atomaria nitidula	0	1	0	1
Corticarina fuscula	0	1	0	1
Longitarsus jacobaeae	0	0	3	3
Longitarsus succineus	0	2	1	3
Apion dichroum	0	1	0	1
Otiorhynchus atroapterus	0	1	0	1
Philopedon plagiatus	20	6	1	27
TOTAL	76	146	62	284

The fauna recorded at this site falls into two major groups. The coastal and psammophile species were well represented by Serica brunnea, Philopedon plagiatus, Leiodes dubia with small numbers of Otiorhynchus atroapterus and Bledius longulus. Byrrhus fasciatus was taken in larger numbers than at any other site during this survey. Although widely distributed it is often found on lighter sandy soils. Many of the remaining species are usually associated with decaying

vegetable matter, dung etc., notably Megasternum obscurum, Micropeplus staphylinoides and Xantholinus glabratus. The last species has been recorded from decaying seaweed (Fowler, 1888).

Thanatophilus rugosus and Catops chrysomeloides may indicate the presence of carrion at the site, whilst Tachyporus chrysomelinus is a general predator in the herb layer, feeding on invertebrates such as aphids.

Phytophagous species were poorly represented with small numbers of Longitarsus jacobaeae which feeds on Senecio spp., L. succineus on a variety of Compositae and Apion dichroum on Trifolium spp..

3.4 Araneae

	JUNE	JN/JL	JULY	TOTAL
Drassodes cupreus	3	1	0	4
Haplodrassus signifer	1	1	0	2
Clubiona diversa	0	2	0	2
Agroeca proxima	0	1	3	4
Xystia cristatus	0	1	0	1
Pardosa palustris	2	2	0	4
Pardosa pullata	33	40	8	81
Pardosa nigriceps	1	3	1	5
Ceratinella brevipes	1	0	0	1
Walckenaera acuminata	1	5	1	7
Walckenaera antica	0	0	1	1
Walckenaera vigilax	4	0	0	4
Dicymbium nigrum	2	0	0	2
Pocadicnemis pumila	4	3	0	7
Oedothorax retusus	0	1	0	1
Tiso vagans	45	11	4	60
Tapinocyba praecox	1	0	0	1
Erigone atra	0	0	1	1
Agyneta decora	26	2	0	28
Meioneta beata	2	5	0	7
Lepthyphantes tenuis	0	1	0	1
Lepthyphantes mengei	0	0	3	3
TOTAL	126	79	22	227

Pardosa pullata, the most abundant species at this site, is a very common spider of turfy grassland and heathland with a slight preference

for damper situations. P. nigriceps was taken only in small numbers although the habitat was favourable for this species as it prefers longer vegetation. Agroeca proxima is usually found in dry grassland and heathland and may be common. Tiso vagans, is a widespread spider in grassland and is not generally thought of as a sand dune species although it occurred on some sites in very large numbers. Agymeta decora is widespread in grassy and mossy areas and has a rather northern distribution. Walckenaera vigilax is widely distributed in grassy places but few were recorded during the survey. The catch at this site contained no species confined to sand dunes, all the spiders taken being found in inland grassland areas.

3.5 Mollusca (Land snails)

	JUNE	JN/JL	JULY	TOTAL
Cochlicopa lubrica	49	5	6	60
Cochlicopa lubricella	0	79	63	142
Vitrina pellucida	0	3	6	9
Oxychilus alliarius	0	10	0	10
Cepaea hortensis	34	86	48	168
TOTAL	83	183	123	389

The assemblage of species taken was typically one associated with fixed dune areas with little bare ground, and little grazing. The number of specimens of Cepaea hortensis (168) was the highest recorded in the survey.

3.6 Diplopoda

	JUNE	JN/JL	JULY	TOTAL
Cylindroiulus latestriatus	31	16	15	62

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

	JUNE	JN/JL	JULY	TOTAL
Porcellio scaber	0	10	4	14

Porcellio scaber is found widely on dry sandy soils.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Pieridae

Pieris napi

Lycaenidae

Polyommatus icarus

Satyridae

Maniola jurtina

4.2 Coleoptera

The following species were recorded by Dr R.C. Welch on 3.8.72:

Carabidae

* Cychrus caraboides, among Ammophila arenaria in dunes.

Hydrophilidae

Cercyon littoralis, in seaweed on shore.

Ptilliidae

Ptenidium punctatum, under drift-wood on sand.

Staphylinidae

* Omalium caesum, at roots of Ammophila arenaria.

O. laeviusculum, in seaweed on shore.

Anotylus maritimus, in seaweed on shore.

* Stenus ludyi, at roots of vegetation on fixed dunes.

* S. picipes, at roots of vegetation on fixed dunes.

* Xantholinus laevigatus, at roots of vegetation on fixed dunes.

Cafius xantholoma, in seaweed on shore.

* Quedius maurorufus, at roots of Ammophila arenaria on fixed dunes.

Phytosus balticus, under drift-wood on sand.

Atheta immigrans, in seaweed on the shore.

A. vestita, in seaweed on the shore.

Aleochara grisea, in dead gulls and seaweed on the shore.

A. obscurella, in dead gulls and seaweed on the shore.

* = species not recorded by Welch, R.C. Entomologist's mon. Mag. 1973, 109 : 190.