An Assessment of the Invertebrate Fauna of Coastal Soft Cliffs between Flamborough and Scarborough 2013

David Boyce
Ecologist
December 2013

EXECUTIVE SUMMARY

This report details the findings of a terrestrial invertebrate survey carried out on coastal soft cliffs in Yorkshire between Flamborough Head and Scarborough. The work aimed to provide a sound body of evidence that would help inform the ongoing SSSI notification review of thestudy area. Detailed invertebrate surveys of four sites at Flamborough Head, Reighton Sands, Gristhorpe Sands and Cayton Bay were carried out in May and July 2013, using the standardised ground sampling, sweeping and spot searching methodologies devised by Natural England (NE) for condition assessment of invertebrate assemblages on English SSSIs.

In addition, a brief walk-over survey was undertaken more widely along the Flamborough to Scarborough cliffs. This aimed to provide a proxy assessment of the importance of all sections of the coast for invertebrates by estimation of the quality and quantity of the key invertebrate habitat features identified as a result of the invertebrate sampling programme.

The 2013 invertebrate survey recorded 26 key species that are of high conservation status and/or are stenotopic inhabitants of coastal soft cliff habitats. Of these, four have Red Data Book status, these being the craneflies *Idiocera bradleyi*, *Symplecta chosenensis*, *Dicranomyia goritiensis* and the picture-winged fly *Myopites inulaedyssentericae*. In addition, 19 nationally scarce invertebrates were recorded in 2013 comprising ten beetles, seven flies and two Aculeate wasps. Extending the analysis of the Flamborough to Scarborough coastal invertebrate assemblage to include both the results of this year's work and previous surveys of the area, resulted in a list of 37 key invertebrate species.

Using the 37 key invertebrates that have been recorded from the site recently, five key invertebrate habitats (KIH) were identified, these being defined as habitats that are required by at least one of the key species. The five KIH on the Flamborough to Scarbrough coast are: sparsely vegetated seepages; sparsely vegetated dry ground; vegetated seepages; species-rich dry grassland; and scrub and woodland. The proxy habitat survey divided the Flamborough to Scarborough coast into 23 sections. Of these, ten had a significant extent of four or five of the KIH, 11 had one to three, and only one section had no important invertebrate habitat features.

In conclusion, the Flamborough Head to Scarborough coast supports a rich invertebrate fauna that includes a large number of species with high conservation status. Of particular importance is the assemblage associated with coastal soft cliff habitat features, such as seepages and sparsely vegetated bare ground. The most important coastal soft cliff assemblages lie on theSpeeton Cliffs to Filey and Cayton Bay to Cornelian Bay sections, though more localised concentrations of key invertebrate habitat features are present elsewhere across much of the study area.

1. INTRODUCTION

One of the core duties of Natural England is to ensure protection and management of Sites of Special Scientific Interest (SSSIs), which are England's very best wildlife and geological sites. SSSIs are legally protected under the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way (CROW) Act 2000 and the Natural Environment and Rural Communities (NERC) Act 2006.

Natural England is carrying out a detailed notification review of England's SSSI sites to assess their coverage, interest features and boundaries in order to ensure that they remain responsive and resilient to changes in the natural environment and our understanding of it, as well as to highlight and build on the immense value of SSSIs to society.

1.1. Flamborough to Scarborough coast

The current study aimed to gather information on the terrestrial invertebrate assemblage of the Yorkshire coastline from the southern end of the Flamborough SSSI (TA194679) to the southern edge of Scarborough town (TA047872), this area being the subject of an ongoing SSSI notification review. The location of the study area is shown on Figure 1.1 below.

This section of the coast includes several sites designated for their biological and geological interest: Flamborough Head SSSI (also a Special Protection Area), Filey Brigg SSSI, Gristhorpe Bay and Red Cliff SSSI, and Cayton, Cornelian and South Bays SSSI. Of these sites, Cayton, Cornelian and South Bays SSSI has its invertebrate assemblage identified as a notified feature, which consists of species associated with coastal soft cliff habitats, such as seepages, bare and sparsely vegetated clay and sand and wet grassland. In addition to Cayton, Cornelian and South Bays SSSI, other sections of the coastline are also known to include areas of coastal soft cliff that support a rich invertebrate fauna, both within the existing SSSI sites and on the stretches of suitable habitat between them.

The SSSI notification review process needs to be based on sound evidence of the biological and geological features within the area under assessment. This study aims to provide such evidence for the invertebrate assemblage feature of coastal soft cliffs between Flamborough and Scarborough. The data collected will also provide a baseline for future monitoring surveys, which should allow trends in invertebrate diversity and habitat quality to be detected over time.

1.2. Objectives

The objectives of this contract were set out in the Project Specification as follows:

- To undertake a survey of the invertebrate assemblage primarily associated with seepages and associated wet grassland of the soft-rock cliff (SRC)resource present in Yorkshire coast (Flamborough to Scarborough), at specified locations.
- To describe and list the species and assemblages of interest at each site
- To analyse the data and make recommendations as to the quality of the invertebrate interest with regards to their possible qualification as a notified feature.
- To assess other specified proxy sites and extrapolate, based on scientific evidence and professional knowledge, the likely invertebrate assemblage value of these proxy sites.

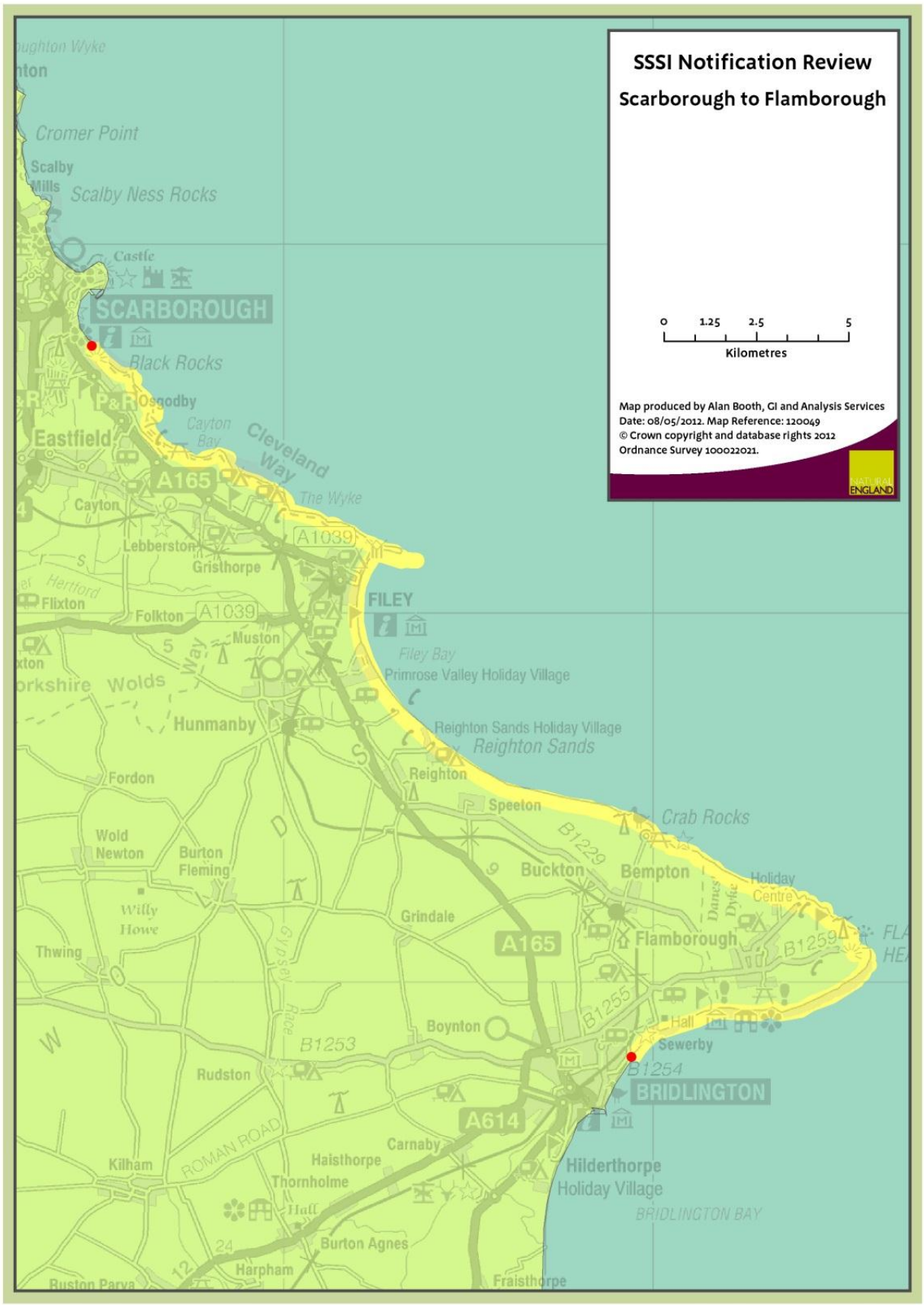


Figure A1.1.1. SSSI notification review Flamborough to Scarborough coast

2. METHODS

The following section of the report outlines the methodology employed in order to carry out the invertebrate survey of the Flamborough to Scarborough cliffs.

2.1. Preliminary assessment

Before the commencement of fieldwork, it was first necessary to gather together the relevant maps of the site, and to meet the NE Project Officer, Anne Armitstead, in order to walk over one of the chosen study sites (Flamborough Head) and finalise the sampling programme. During this day, maps of study sites were provided to the contractor, as well as other background information on the sites, particularly the detailed botanical surveys that have taken place on parts of the coast using the National Vegetation Classification (NVC). Prior to the commencement of the survey, the contractor had received and read copies of the two previous invertebrate surveys to have been carried out on the Flamborough to Scarborough coast. The first of these was the Buglife report, which investigated three sites: Speeton, Cayton Bay and Frank Cliff (Telfer, 2003). The second was commissioned in 2012 by Natural England (Sheppard, 2012). The design of the sampling programme aimed to cover the range of important invertebrate assemblages and habitat features present on this part of the Yorkshire coast.

2.2. Detailed invertebrate assessment

All fieldwork was carried out using the protocols that Natural England (NE) have developed in order to undertake condition assessments of invertebrate assemblages on English SSSIs. These survey techniques are laid out in NE Research Report (NERR) 005 (Drake et. al., 2007). It was envisaged that the F11 unshaded early successional mosaic, F21 grassland and scrub matrix and F222 mature heath and dry scrub mosaic defined by Drake et. al. (ibid.) would be the main assemblages to be assessed by this survey programme. Twelve days were spent on-site over the spring and summer of 2013. The two blocks of fieldwork, including the preliminary assessment, were undertaken between 9 to 13 May and 18 to 24 July 2013.

Four study sites were set up along the Yorkshire coast, with these being sampled once during each of the spring and summer visits. The four study sites were at Flamborough Head (FH), Reighton Sands (RS), Gristhorpe Sands (GS) and Cayton Bay (CB). At each study site, four sample stations were identified, these being established in areas that, based on the contractor's previous experience of coastal soft cliffs, appeared most likely to host a rich invertebrate fauna. In particular, they aimed to provide adequate sample coverage of the range of soft cliff habitat features that are present on this stretch of coast. A 30-minute ground search, 20-minute sweep net sample and 30-minute spot-search were collected in each sample station during both the spring and summer visits. Table 2.1.1 lists the 16 sample stations and gives a ten-figure grid reference that was taken from the approximate centre of each using a hand-held Global Positioning System (GPS) unit. The figure in parentheses after the national grid reference in the second column of the table refers to the degree of error for the grid reference given by the GPS unit.The location of the sample stations is also shown on Figures 3.3.1 to 3.3.10 in the following section of the report.

Table 2.1.1. Location of sample stations

Flamborough Head - FH1	TA2372872080 (5m)
Flamborough Head – FH2	TA2338372153 (3m)
Flamborough Head – FH3	TA2323772252 (5m)
Flamborough Head – FH4	TA2314872340 (5m)
Reighton Sands – RS1	TA1368476703 (3m)
Reighton Sands – RS2	TA1384476572 (4m)
Reighton Sands – RS3	TA1441776097 (5m)
Reighton Sands – RS4	TA1452275986 (3m)
Gristhorpe Sands – GS1	TA0887283623 (3m)
Gristhorpe Sands – GS2	TA0844583827 (4m)
Gristhorpe Sands – GS3	TA0839383947 (7m)
Gristhorpe Sands – GS4	TA0844983931 (3m)
Cayton Bay – CB1	TA0614585234 (5m)
Cayton Bay – CB2	TA0632085192 (5m)
Cayton Bay – CB3	TA0607885289 (4m)
Cayton Bay – CB4	TA0624984861 (4m)

All invertebrate specimens collected have been identified to species. The main groups to be sampled were those thought to be of greatest importance for the assessment of coastal soft cliff habitats. These taxa are identified in Table 1.3.1 below, along with an indication of the main sampling techniques employed to collect them. Voucher specimens of any important invertebrates recorded have been retained in the contractor's collection. As well as the groups identified in Table 1.3.1, any records of other easily-identified invertebrates were also made.

Table 1.3.1. Invertebrate taxa to be collected and main sampling techniques employed

Taxa	Ground search	Sweep	Spot search
Mollusca	✓		
Orthoptera		✓	✓
Heteropteran bugs	✓	✓	
Terrestrial beetles	✓	✓	
Diurnal butterflies and moths		✓	✓
Craneflies		✓	
Larger Brachyceran flies		✓	✓
Long-headed and dance flies		✓	
Hoverflies		✓	✓
Picture-winged flies		✓	✓

2.3. Proxy habitat survey

This contract also required that the contractor should carry out a proxy survey more widely along the Flamborough to Scarborough coast. The proxy survey was carried out during the second visit to the Flamborough to Scarborough coast, over approximately two and a half days, during periods of poor weather when conditions were generally considered unsuitable to carry out the detailed invertebrate surveys decribed above.

The proxy survey aimed to assess the wider extent of the key habitat features identified by the detailed survey programme as being of primary importance for the invertebrate assemblage. Time constraints and the difficulty of accessing some areas meant that it was not possible to achieve complete walk-over coverage. Where no direct access to a cliff section was possible, it was usually assessed visually with binoculars, either from the beach or the coast path that runs along the top of the cliff. In the time available it was not possible to walk the high cliffs between Speeton and the Flamborough study site (unit 21). However this stretch of coast, which includes Bempton Cliffs was looked at during the invertebrate assessment carried out in 2012 (Sheppard, 2012). It was described in that report as having high chalk cliffs with a narrow cap of stable grassland and scrub and no significant extent of clay slippages. As such, it was very unlikely to be of comparable interest with the more eroded cliffs elsewhere and was not the subject of survey or assessment in 2013.

From the results of both the detailed and proxy surveys, the Flamborough to Scarborough cliffs have been divided into 22 units, which are shown on Figures 3.3.1 to 3.3.10 below. The invertebrate importance of these has been assessed, with each being assigned to an invertebrate importance category of between '1' and '4'. Category 1 coastal units are those with the most important invertebrate assemblages and category 4 identifies are those of the lowest interest. The assignment of an importance category to a coastal unit was based on the amount and quality of the five key invertebrate habitat features (KIH) identified in sub-section 4.2 that were present. Figures 3.3.1 to 3.3.10 also show these importance categories for each coastal unit, plus the KIH features that led to this assessment. While carrying out the proxy survey, some additional casual invertebrate survey work was carried out, though time restrictions meant this was not nearly so detailed as that undertaken in the four study sites.

3. RESULTS

In this section of the report, the results of the 2013 invertebrate survey are presented. The first sub-section lays out the invertebrate species recorded from the four study sites using the methodologies described in the preceding section. Following this, sub-section 3.2 lists all of the key invertebrates recorded from the Flamborough to Scarborough coast in 2013. Lastly, section 3.3. sets out the results of the proxy habitat survey.

3.1. Site reports

For each study site, a brief summary of the results from the four sample stations is provided that includes the Results Assessment Table derived from the ISIS 2008 build. A full list of the invertebrate species recorded from the four sample stations set up at each study site, can be found in Appendix 1. Also here, more detail on the individual sample stations is given, including a short description of the habitat along with a photograph illustrating itse general appearance and important habitat features. A summary of all the invertebrates recorded during 2013 is given in Appendix 2.

3.1.1. Flamborough Head

The invertebrate fauna of Flamborough Head was moderately diverse, though it lacked most of the coastal soft cliff specialists recorded from other sections to the north. In particular, seepages were more localised and no key wet clay-sand or seepage specialists were noted here in 2013. However, some important invertebrates were recorded. Perhaps the most significant habitat for invertebrates at Flamborough Head was the extensive stands of relatively stable, short-sward species-rich grassland. This was particularly well developed at FH1 and FH3, though it was present across all four sample statations. The invertebrate fauna of these areas was quite diverse, and included the nationally scarce weevil *Trichosirocalus dawsoni*, which was found in numbers at FH3. On this part of the coast, the geology is of chalk cliffs overlain with clays. Though the clay cap was generally dry, there was still a substantial amount of erosion, and some invertebrates characteristic of bare ground habitats were recorded, including the spider-hunting wasp *Priocnemis confusor*, collected in the July spot search at FH1, and a nesting colony of the Crabronid wasp *Argogorytes fargeii*, which was found in a bare vertical clay bank at FH2. The Flamborough to Scarborough cliffs appear to be a national stronghold for this wasp. It provisions its nest burrows with froghoppers, and the juxtaposition of bare ground with botanically diverse grasslands that are rich in its hosts is probably a key component of its ecological requirements. The location of the Flamborough Head sample stations is shown in Figure 3.3.10. Also of note was the presence in FH4 of the specialist coastal soft cliff cranefly *Dicranomyia goritiensis*. This is a RDB3 species, which was only recorded here during the 2013 study.

Table 3.1.1. ISIS Results Assessment Table, Flamborough Head

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F113	exposed sea cliff	2		5	150
F002	rich flower resource	8		3	
W126	seepage	1		2	
F001	scrub edge	2		1	
F112	open short sward	2		1	150
F003	scrub-heath & moorland	1		0	
F111	bare sand & chalk	1		0	150

Visibility threshold (no. spp. used to calculate score)	0

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	38	112		50	
F1	unshaded early successional mosaic	17	150		22	
W2	mineral marsh & open water	7			9	
W3	permanent wet mire	7			9	
W1	flowing water	5			6	
F3	shaded field & ground layer	1			1	
A1	arboreal canopy	1			1	

Visibility threshold (total no. spp. used to calculate rarity score)	15

Technical statistics:

Number of species	138
Number of errors in species list	6

3.1.2. Reighton Sands

This study site encompassed some of the best areas of coastal soft cliff habitat along the Flamborough to Scarborough coast. Of particular note were the extensive seepages and the large areas of sparsely vegetated dry cliff habitat. Much of this section of the coast is being very actively eroded, and as a result, more densely vegetated grassland, wetland and scrub habitats were not generally so well represented, though there were still some quite extensive stands of herb-rich grassland that were of importance for invertebrates. Three RDB and six nationally scarce invertebrates were recorded at Reighton in 2013, with three of these (the RDB3 Tephritid fly *Myopites inulaedyssentericae*, the nationally scarce weevil *Grypus equiseti* and the nationally scarce digger wasp *Argogorytes fargeii*) being associated with areas of sparsely vegetated dry cliffs with much bare sand and clay. Sparsely vegetated seepages had good populations of the RDB1 cranefly *Symplecta chosenensis*, an obligate coastal soft cliff species, which appears to have its British headquarters on the Flamborough to Scarborough coast, plus the Georissid beetle *Georissus crenulatus* and the soldierfly *Oxycera pygmaea*, the latter two both being nationally scarce. Well-vegetated seepages also had an important invertebrate fauna, which included another rare (RDB2) coastal soft cliff specialist cranefly, *Idiocera bradleyi* and the nationally scarce snail-killing fly *Tetanocera punctifrons*. One further nationally scarce secies, the rove beetle *Platydracus latebricola*, was found in more mature species-rich grassland in 2013. The location of the Reighton Sands sample stations is shown on Figures 3.3.8 and 3.3.9.

Table 3.1.2. ISIS Results Assessment Table, Reighton Sands

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F002	rich flower resource	11		5	
W126	seepage	2		4	271
W122	riparian sand	1		2	271
F001	scrub edge	3		2	
F112	open short sward	3		2	150
F006	dung	1		1	
F111	bare sand & chalk	4		1	150
A212	bark & sapwood decay	1		0	
Visibility threshold (no. spp. used to calculate score)		0			

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	31	129		45	
F1	unshaded early successional mosaic	15	150		22	
W1	flowing water	12	271	fav	18	
W2	mineral marsh & open water	10			15	
W3	permanent wet mire	8			12	
F3	shaded field & ground layer	2			3	
A1	arboreal canopy	1			1	
A2	wood decay	1			1	0

Visibility threshold (total no. spp. used to calculate rarity score)	15

Technical statistics:

Number of species	148
Number of errors in species list	3

3.1.3. Gristhorpe Sands

This study site was the most actively eroded of all those investigated in 2013. The whole area was subject to very high levels of slippage that was resulting in large quantities of early-successional habitats, but relatively little that was more stable and mature. A feature of the site was the presence of many seepage systems, which remained wet throughout the spring and summer, despite the dry weather. Unsurpisingly, sparsely vegetated seepages were much the most noteworthy habitat feature for invertebrates, with these having large popuations of the RDB cranefly *Symplecta chosenensis*. Also recorded here in 2013 were the nationally scarce beetles *Georissus crenulatus* and *Heterocerus marginatus*, the nationally scarce snail-killing fly *Tetanocera punctifrons* as well as a number of other wet sand and seepage specialists, such as the ground beetles *Bembidion bualei* and *Chlaenius vestitus*. Less disturbed seepages with dense vegetation were of very limited occurrence at Gristhorpe, but one such area at GS3 had a population of the RDB2 cranefly *Idiocera bradleyi*. Dry, sparsely vegetated habitats and more stable species-rich dry grassland had one key species apiece, these being respectively the weevil *Grypus equiseti* and the rove beetle *Platydracus latebricola*. The location of the Gristhorpe Sands sample stations is shown on Figure 3.3.3.

Table 3.1.3. ISIS Results Assessment Table, Gristhorpe Sands

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W122	riparian sand	3		5	217
W126	seepage	2		4	217
F211	herb-rich dense sward	1		2	113
F002	rich flower resource	3		1	
F001	scrub edge	2		1	
F003	scrub-heath & moorland	3		1	
F112	open short sward	1		1	
F111	bare sand & chalk	1		0	

Visibility threshold (no. spp. used to calculate score)	0

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	31	113		45	
W1	flowing water	17	217	fav	25	
W2	mineral marsh & open water	13	116		19	
W3	permanent wet mire	10			15	
F1	unshaded early successional mosaic	8			12	
A1	arboreal canopy	1			1	

Visibility threshold (total no. spp. used to calculate rarity score)	15

Technical statistics:

Number of species	149
Number of errors in species list	3

3.1.4. Cayton Bay

As with previous surveys here, the2013 survey showed that the Cayton Bay area has a rich invertebrate fauna. Sparsely vegetated clay seepages on low cliffs just above the beach had an interesting fauna that included the ground beetle *Bembidion saxatile*, its close relative *B. stephensii*, the Georissid beetle *Georissus crenulatus* and the cranefly *Symplecta chosenensis*. More densely-vegetated seepages higher up the cliffs produced records of two soldier flies, *Oxycera morrisii* and *Stratiomys potamida*. Seepages under a wet woodland canopy had three further key species, the Scirtid beetle *Elodes elongata* and the craneflies *Molophilus corniger* and *Neolimnophila carteri*. The Aleocharine rove beetles *Gyrophaena manca* and *G. joyioides* were collected from brackets of the dryad's saddle fungus on a dead sycamore stump, and sheltered woodland edges in the same area had the rove beetle *Stenus fuscicornis*. The last key species recorded at Cayton Bay was the digger wasp *Argogorytes fargeii*, which was found flying over a dry, sparsely vegetated clay bank. All of the key species mentioned above except for *B. stephensii* (a local, stenotopic species of wet sand habitats) and the RDB1 *S. chosenensis* have nationally scarce status. The location of the Cayton Bay sample stations is shown on Figure 3.3.2.

Table 3.1.4. ISIS Results Assessment Table, Cayton Bay

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W126	seepage	5		9	205
W122	riparian sand	3		5	205
W113	fast flowing streams & waterfalls	1		5	205
F002	rich flower resource	7		3	
M211	sandy beaches	1		2	
A213	fungal fruiting bodies	2		2	
F001	scrub edge	3		2	
A211	heartwood decay	2		1	
W314	reedfen and pools	1		1	143
M311	saltmarsh and transitional brackish marsh	1		1	
A212	bark & sapwood decay	4		1	
F111	bare sand & chalk	1		0	
Visibility threshold (no. spp. used to calculate score)		0			

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W1	flowing water	21	205	fav	38	
F2	grassland & scrub matrix	16	128		29	
W2	mineral marsh & open water	15	122		27	
W3	permanent wet mire	12	143		21	
A2	wood decay	8			15	0
F1	unshaded early successional mosaic	6			10	
F3	shaded field & ground layer	4			8	
A1	arboreal canopy	1			2	
M2	sandy shore	1			1	
M3	saltmarsh, estuary & mud flat	1			1	

Visibility threshold (total no. spp. used to calculate rarity score)	15

Technical statistics:

Number of species	182
Number of errors in species list	2

3.2. Key invertebrates recorded from the Flamborough to Scarborough coast in 2013

In this sub-section of the report, the 26 key invertebrates recorded from the Flamborough to Scarborough coast in 2013 are listed, along with notes on their ecology, UK distribution and occurrence on the Yorkshire soft-rock cliffs this year. The definition of a key invertebrate species used in this report can be found in sub-section 4.1. Also here, the emboldened conservation status and habitat fidelity categories given after the species name are explained.

3.2.1. *Dyschirius aeneus*

A small black ground beetle with a weak metallic reflection. It is of very similar appearance to a number of its congeners from which it can only be recognised by close microscopic examination. It has a scattered distribution across southern and eastern England, with the Yorkshire coast marking its northern limit in Britain. It can be found at both inland and coastal sites where suitable habitat exists. Both adults and larvae burrow in damp, sparsely vegetated sand and mud where they prey on other small invertebrates. Though it lacks any formal conservation or habitat fidelity status, it is a stenotopic species, which was identified as an important species by Telfer (2006), and was only recorded once in 2013, from GS4.

3.2.2. *Bembidion bualei*

This small ground beetle, which was known till recently as *B. andreae* is one of the members of this large genus that have four pale yellowish marks on the otherwise dark wing cases. The pronotum and head are black with a distinct metallic green reflection. It is a very local species ofsparsely-vegetated damp sand or fine gravel, both on the coast and inland on riverbanks. It is more frequent towards the north and west, with the majority of sites being in northern England, Scotland and Wales. It is a predator that hunts for small invertebrates over the wet ground. Though it lacks any formal conservation or habitat fidelity status, it is a stenotopic species, which was identified as an important species by Telfer (2006). Like *D. aeneus* above, it was only recorded at Gristhorpe Sands in 2013, being collected in sample stations GS3 and GS4.

3.2.3. *Bembidion saxatile* **Nb./CSC2.**

B. saxatile is a small, dark ground beetle, with four pale spots on the wing cases. It can be quite easily distinguished from other superficially similar species in this large genus by the presence of a group of sharp punctures on the head just inside and behind the eye. It is usually found in areas of sparsely vegetated sand and mud, with many British records being from the edge of seepages on soft-rock cliffs. It is widely but very locally distributed across Britain, though becoming very scarce in northern Scotland. Most records are from coastal sites. Surprisingly, it was only collected from a single site, CB2, in 2013. It is strongly associated with coastal soft-cliff habitats in the UK (Howe, 2002).

3.2.4. *Bembidion stephensii* **CSC3.**

Wthin the large ground beetle genus *Bembidion*, *B. stephensii* is distinguished by its relatively large size, green metallic colouration, pale legs ans the lack of any wrinkles or punctures behind the eyes. It shares very similar habitat preferences to *B. saxatile*, though it is somewhat more widely distributed at inland sites such as the edges of gravel pits and riverbanks than that species. It is widely, but very locally distributed across England and Wales, becoming rare in Scotland. Though it lacks any formal conservation status, it is a stenotopic species, which was identified as an important species by Telfer (2006). Interestingly, like *B. saxatile*, it was only recorded from CB2 this year. *B. stephensii* is moderately associated with coastal soft-cliff habitats in the UK (Howe, 2002).

3.2.5. *Georissus crenulatus* **N.**

This small Georissid beetle can be easily recognised by dint of both its distinctive body shape and its habit of plastering itself in mud. It is an inhabitant of bare mud or sand at the edge of running water, and is primarily to be found on riverbanks and around seepages on coastal soft-rock cliffs. It has a scattered distribution across England and Wales, and there are also a few Scottish sites. On the Flamborough to Scarborough coast, it is a commonly encountered species at the edge of sparsely vegetated seepages, being recorded from Reighton, Gristhorpe and Cayton Bay in 2013.

3.2.6. *Gyrophaena joyioides* **N.**

G. joyioides is a small brown rove beetle in which parts of the abdomen and wing cases are obscurely lighter. It is closely similar to many of the other species in this large genus, and can only be distinguished with certainty from its congeners by examination of the very distinctive male genitalia. It is very locally distributed across the eastern half of England, with Yorkhire marking the northern limit of its British range. Like other members of the genus, *G. joyioides* is mycophagous, and is known to utilse a wide range of woodland fungi, including cap fungi in the genera *Amanita*, *Boletus* and *Russula*. It is also known to feed on the dead wood dryad's saddle *Polyporus squamosus* bracket fungus. Fruiting bodies of the latter were very abundant on dead and dying sycamore *Acer pseudoplatanus* and horse chestnut *Aesculus hippocastanum* in the Cayton Bay woodlands, and a single male was collected in the July ground sample at CB1 in brackets of this fungus growing on a dead sycamore stump.

3.2.7. *Gyrophaena manca* **N.**

Like *G. joyioides* above, this is a small and rather undistinguished brown rove beetle, which is nonetheless easily recognised by the remarkable form of the male genitalia. It is found at scattered sites across much of England and Wales, but appears to be absent from Scotland. Unlike *G. joyioides*, *G. manca* appears to be exclusively associated with fungi that grow on dead and dying timber. It has been found on a number of cap and bracket fungi in such situations, with dryad's saddle being one of its most favoured hosts. Very large numbers of adults were found at CB1 in the same brackets in which *G. joyioides* was collected. A further four *Gyrophaena* species: *G. affinis*, *G. bihamata*, *G. gentilis* and *G. fasciata* were also collected here.

3.2.8. *Stenus fuscicornis* **Nb.**

S. fuscicornis is a small black rove beetle with elongate tarsi that have a bilobed final segment and all appendages brown to pitchy. Its habitat requirements are very poorly known, but it seems to favour warm, sheltered locations such as woodland edges and scrubby quarries. In Britain it has been found at a scatter of sites, the vast majority of which are in eastern England, from Kent northwards to Yorkshire. Otherwise there are a few localities for it in western Britain, including just one Welsh site. It is not known to occur in Scotland. This study only recorded a single female, in a ground sample from CB3.

3.2.9. *Platydracus latebricola* **Nb.**

P. latebricola is a large and striking rove beetle, with red elytrae, and the rest of the body black with a slight green-metallic reflection. The abdomen also has bands and spots of conspicuous pale yellow pubescence at the base of the segments. Like *S. fuscicornis*, it is a very scarce beetle in western Britain, with most known sites being in eastern and central England, from Kent northwards to Lincolnshire. There are a very few sites in northern England, including Yorkshire and there are also a cluster of sites in the Scottish Highlands. *P. latebricola* has a strong association with ants, with the beetle frequently being found in and around their nests, where it is thought to predate the ants's brood. A single female was collected in the May ground search at RS4, by shaking grass tussocks

growing on the edge of a yellow meadow ant *Lasius flavus* nest mound. A further male was collected from a grass tussock during the July ground search at GS3.

3.2.10. *Elodes elongata* **N.**

The genus *Elodes* contains a number of very similar-looking, mid to small orange-brown beetles that are only reliably distinguished by careful microscopic examination of the male or female genitalia. There has been much past confusion in the identification of the species now recognised as *E. elongata*, so the picture of itsBritish distribution is imperfectly understood. However, *E. elongata* appears to be quite widely but locally distributed across England and Wales, though absent from Scotland. Adult *E. elongata* are usually found around woodland streams, and the larvae are known to be aquatic in small streams and seepages. A single male of this species was collected during the July spot search in CB2.

3.2.11. *Heterocerus marginatus* **N.**

Within this small family of beetles, *H. marginatus* can be recognised by a combination of its relatively large size, the ridge at the base of the pronotum and the lack of a basal pale marking on the otherwise dark brown and yellowish elytral wing pattern. Beetles of of this family are adapted to bury in wet sand and mud, and *H. marginatus* can be found locally in such situations beside freshwater throughout much of Britain except for the northern half of Scotland. *H. marginatus* can be found at the edge of a range of waterbodies, such as rivers, streams and ponds, wherever there are bare, muddy substrates. It seems to be quite local on the Flamborough to Scarborough coast, with the only site it was collected in 2013 being in the GS4 May ground sample from wet sand-clay flats at the base of the eroding cliffs.

3.2.12. *Grypus equiseti* **Nb.**

A mid-sized weevil with a very distinctive pattern of black and white to creamy-brown markings. It is found in a variety of open habitats, which include dry grassland, ruderal vegetation and wetlands. It feeds on a range of horsetails *Equisetum* spp., with field horsetail *E. arvense*, great horsetail *E. telmateia* and marsh horsetail *E. palustre* being recorded as hosts. It is qute widely, but locally distributed across Britain, but is much scarcer in Scotland. On the Flamborough to Scarborough coast, it was recorded this year from stands of field horsetail growing in sparsely vegetated ruderal vegetation on recent landslips at both Gristhorpe and Reighton Sands.

3.2.13. *Trichosirocalus dawsoni* **Nb.**

This is a very small Ceutorhynchine weevil in which the rostrum is predominantly red. It is a coastal species, found on open sea cliffs and upper saltmarshes around much of Britain, though it is absent from northern Scotland. Its foodplants are buck's-horn plantain *Plantago coronopus* and sea plantain *P. maritima*. Most sites are on maritime grassland on both hard- and soft-rock cliffs, wherever its foodplants are frequent. It was found in good numbers at FH3 during the current study.

3.2.14. *Molophilus corniger* **N.**

This species is one of a number of very similar small orange-yellow craneflies in this large genus. It is only reliably distinguished from its congeners by the form of the highly distinctive male genitalia. It is widely, but very locally distributed across much off the British Isles. The ecology of *M. corniger* is very poorly known, but adults are almost invariably collected in stands of high-quality wet woodland. It is presumed that the larvae occur in wet mud at the edge of seepages, with many of the sites it is known from being at least mildly calcareous. In 2013 it was only recorded from one site, CB1, where it was present in good numbers.

3.2.15. *Neolimnophila carteri* **N.**

N. carteri is a small and rather undistinguished brown cranefly. The top of the thorax is uniformly brown with grey dusting, and the male genitalia are distinctive. It is essentially a northern species that is quite widely, but very locally, distributed across northern England, Scotland and Wales, with just a handful of sites in southern England. It is found in high-quality wet woodland, where there are small streams and seepages, with the larvae thought to develop in wet mud at the edge of these. In 2013, a number of adults were swept in July from the wet woodland at CB1.

3.2.16. *Idiocera bradleyi* **RDB2./CSC2.**

I. bradleyi is a fairly small cranefly, which has the body marbled with dark brown and creamy markings. The wings have a characteristic pattern of quite well defined spots, and the male genitalia are extremely distinctive. It is a stenotopic inhabitant of soft-rock coastal cliffs, which is only known from a handful of British sites, most of these being on the coasts of Wales and north-east England. In Yorkshire, there are 1988 records from three sites in the 'Scarborough and Bridlington districts', and more recently, it has been recorded by Roy Crossley, just outside the study area, at Sewerby Cliffs near Bridlington. The current study swept adults from GS3 and RS4 during the July sampling session. It is strongly associated with coastal soft-cliff habitats in the UK (Howe, 2002).

3.2.17. *Symplecta chosenensis* **RDB1./CSC1.**

This is a small grey-brown cranefly, most easily distinguished from its congeners by the pattern of indistinct dots on the wings, and the form of the male genitalia. Until recently, it was known as *S. novaezemblae scotica*. It is a great rarity, currently known from just a handful of sites in Cumbria, Yorkshire, Norfolk and Wales. All the sites at which it is known are soft-rock cliffs, with the larvae believed to develop in or at the edge of small seepages. It appears to be quite widely distributed on this part of the Yorkshire coast, with 2013 records from a number of sample stations at Reighton Sands, Gristhorpe Sands and Cayton Bay. There are some previous records from this area, and the Flamborough to Scarborough coast is clearly an important British stronghold for *S. chosenensis*. It is restricted to coastal soft-cliff habitats in the UK (Howe, 2002).

3.2.18. *Paradelphomyia fuscula* **N.**

There are five British species in the genus *Paradelphomyia*, all of which are small yellow-brown craneflies with a darker band across the pleurae and fine hairs on the apical half of the wings. *P. fuscula* is only distinguished with certainty from its congeners by careful microscopic examination of the male terminalia. Although it is quite widely distributed throughout Britain, it is extremely local, with the vast majority of records coming from high-quality wet woodland where there are well-developed seepages, the larvae being thought to occur in wet mud in such areas. Given its predilection for wooded habitats, the record of a single male during casual recording from open, somewhat eroded seepages on the South Cliff at Filey Brigg was therefore surprising.

3.2.19. *Dicranomyia goritiensis* **RDB3./CSC2.**

D. goritiensis is a mid-sized brown cranefly, in which the wings have a unique pattern of black spots and the leading edge of the wing is distinctly yellow in colour. It is a very scarce species in Britain, with the larvae inhabiting shallow seepages and streamlets running over coastal rock exposures. It seems to favour streams and seepages that are relatively well-vegetated. A large proportion of its British sites are on soft-rock cliffs, though it can also be found on hard rock exposures, where there are suitable habitats. Most of its British sites are in south-west England and Wales. Elsewhere there are just a handful of sites in north-east England and Scotland. A single specimen was collected by sweeping at the point where a small stream runs over chalk cliffs onto the beach at FH4. It is strongly associated with coastal soft-cliff habitats in the UK (Howe, 2002).

3.2.20. *Oxycera morrisii* **N.**

O. morrisii is a small black soldierfly with some small pale yellow markings on the sides of the abdomen and at the apex of the scutellum. The wing vein r4+5 is forked near to the apex of the wing. It is quite widely but very locally distributed across England and Wales. The larvae are found in small seepages in a range of open habitats, with a number of its British sites being on coastal soft-rock cliffs. There have been previous records from the Flamborough to Scarborough coast and the 2013 records came from Cayton Bay, with two adults swept around seepages at CB3 in July.

3.2.21. *Oxycera pygmaea* **N.**

This soldierfly is rather similar to *O. morrisii*, but on average is smaller than that species, and has the wing vein r4+5 simple. It too is an inhabitant of seepages, being especially characteristic of those that are at least somewhat calcareous and sparsely vegetated. It is most often found in open situations, but can also be found in wooded seepages. It is widely distributed throughout Britain, but is very local everywehere. Seepages on coastal soft-rock cliffs are one of the most important habitat types for *O. pygmaea* in Britain. Adults were swept in the samples collected from RS2 and RS3. It was also found in numbers during casual sampling of a seepage on the South Cliff at Filey Brigg.

3.2.22. *Stratiomys potamida* **N.**

With its bold pattern of yellow abdominal bars and its large size, *S. potamida* is an unmistakeable insect. It has a localised distribution in southern England and Wales as far north as the Scottish borders, though it is absent from much of the south-west peninsula and western Wales. It is predominantly a southern species, with its distribution in northern England being much more localised. It is found in a range of relatively base-rich wetland habitats, where there are areas of shallow water in which the larvae are able to complete their development. Though it can occur in still water, such as pond and ditch edges or flooded fenland, seepages appear to be the most favoured larval habitat. A single adult was recorded at rest by the edge of a well-vegetated seepage at CB3 in July 2013.

3.2.23. *Myopites inulaedyssentericae* **RDB3.**

This is a small picture-winged fly, with a distinctive pattern of somewhat faint dark markings on the wing. The abdomen is predominantly orange in colour, with small black markings at the edge of the tergites. The known distribution of *M. inulaedyssentericae* is centred on the south coast of England and East Anglia, though it is also known from inland sites. Its occurrence on the Yorkshire coast appears to represent a major northward expansion of its known British range. It is found in various open habitats, though well-insolated localities where there the foodplant occurs in a matrix with bare ground, such as coastal soft-rock cliffs and ruderal vegetation on waste ground, appear to be particularly favoured. Larvae feed in galls in the flowerhead of common fleabane *Pulicaria dysenterica*. Despite the very wide occurrence of seemingly-suitable habitat on the Flamborough to Scarborough coast, this species was only found at Reighton Sands in 2013, with specimens swept at RS1 and RS3.

3.2.24. *Tetanocera punctifrons* **N.**

Within this genus of relatively large, orangey-brown snail-killing flies, *T. punctifrons* is quite easily distinguished by dint of its bare prosternum and the presence of a pre-apical bristle on the outer face of the mid femora. Confirmatory characters are provided by the presence of a brown parafacial spot and the form of the male genitalia. It is widely, but very locally, distributed across much of England and Wales, with a handful of additional sites in southern Scotland. Habitat associations are poorly understood, but it seems to occur in both open and wooded situations. It is probable that

like many of the other species in the genus, the larvar are aquatic or semi-aquatic predators of freshwater snails. In 2013, adults were found in the July sweep samples at RS4 and GS2.

3.2.25. *Priocnemis confusor* **Nb.**

P. confusor (until recently called *P. gracilis*) is a relatively small spider-hunting wasp, of generally black colouration, but with an extensive red band around the abdomen, as well as red markings on the legs. It is most easily distinguished from its very similar congeners by the form of the male sub-genital plate. It is an extremely local inhabitant of warm, open sites with a sandy or clay substrate, such as heathland, grassland and woodland rides. A significant proportion of its British populations are found on sparsely vegetated soft-rock coastal cliffs. It is most common in south-east England, with a scatter of records northwards as far as Yorkshire, the Flamborough to Scarborough coast marking the northern limit of its currently known British range. It is extremely rare in western Britain, though there are also a couple of sites on the south Welsh coast. A single male was collected at FH1 during the current study. It is moderately associated with coastal soft-cliff habitats in the UK (Howe, 2002).

3.2.26. *Argogorytes fargeii* **Na.**

A. fargeii is a arelatively large black- and yellow-banded digger wasp. It is quite easily distinguished from other similar species by a combination of its patterning, the form of the sub-marginal cells of the forewing and the strongly sloping anterior margin of the second abdominal sternum. It is a very scarce species in Britain, with thinly scattered sites across England as far north as Yorkshire. There are also a handful of colonies in south Wales. Some of the strongest colonies of this wasp are on coastal soft-rock cliff sites on the Isle of Wight and in Dorset. *A. fargeii* inhabits a range of open habitats where there are well-insolated banks of clay or sand in which it is able to excavate its nest burrow. The nest burrow is provisioned with paralysed froghoppers upon which the wasp's grub feeds. There is clearly a very strong population of *A. fargeii* on the Flamborough to Scarborough coast, with adults being recorded from a number of sample stations at Flamborough Head, Reighton Sands and Cayton Bay in 2013. *A. fargeii* is moderately associated with coastal soft-cliff habitats in the UK (Howe, 2002).

3.3. Proxy habitat survey

This sub-section of the report presents the findings of the proxy habitat survey that was carried out along the Flamborough to Scarborough coast in 2013. The proxy habitat survey involved a walk-over of as much of the coast as was possible in the two and a half days in July that were devoted to this element of the contract. In order to carry out the proxy survey, the Flamborough to Scarborough coast was divided into 22 coastal units (CU) that were usually demarcated by obvious geographical features (headlands, stream valleys, settlements etc.). The location of the coastal units is shown on Figures 3.3.1 to 3.3.10. An estimate has been made of the extent of the key invertebrate habitats (KIH) present in each of these coastal units. The identification of the KIH came out of the detailed invertebrate assessment work outlined in sub-section 3.1, being defined there as habitat features that are used by one or more of the key species identified in Table 4.1.1. A full description of the KIH and the key invertebrate species that are reliant on them is provided in sub-section 4.2 of this report. Five KIH are listed there, these being as follows:

4.2.1. Sparsely vegetated seepages;

4.2.2. Sparsely vegetated dry ground;

4.2.3. Vegetated seepages;

4.2.4. Species-rich dry grassland;

4.2.5. Scrub and woodland.

The importance categories used in the proxy survey have been determined by assessment of thenumber of KIH present as significant features (generally at least ten % of the total area of the coastal unit, though smaller areas of the two key seepage habitats might also qualify where they appeared to be of sufficiently high quality) within each coastal unit. The four invertebrate importance categories are defined as follows:

Category 1 = Presence of a significant extent of four or five of the KIH;

Category 2 = Presence of two or three of the KIH and if the former then invertebrate habitat quality higher;

Category 3 = Presence of a significant extent of one or two KIH and if the latter then invertebrate habitat quality lower;

Category 4 = No significant extent of KIH present.

By definition, all of the first three importance categories are likely to support populations of key species, and mayy therefore justify inclusion within SSSI boundaries. Only category 4 sites lack a significant extent of KIH, and cannot be justified for inclusion within SSSI boundaries on the grounds of their importance for invertebrates on the evidence of the proxy assessment.

The following sub-sections provide a brief description of the 22 coastal units that focuses on the presence of the KIH. After thenumber and name of eache coastal unit, the invertebrate importance category to which it has been allocated is given. Following this, those KIH that are present within the unit as significant elements of the total habitat mosaic are listed in parenthesis, these being the KIH that have contributed to the importance category assigned.

The importance categories and qualifying KIH features are also shown for each coastal unit on Figures 3.3.1 to 3.3.10.

3.3.1. CU1 – Wheatcroft Cliff. **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3, 4.2.4. and 4.2.5)

This coastal unit appears to have a complete range of the KIH. It covers much the same area as the 'Scarborough to White Nab medium interest site' of Sheppard (2012). Though it has not been the subject of detailed surveys, the habitat structure appears to be broadly similar to that of the two units immediately to the south of it (CU2 and CU3). These have been the subject of detailed invertebrate surveys in 2006 and 2013 respectively, and it is likely that the invertebrate communities here will be of similarly high quality.

3.3.2. CU2 – Frank Cliff. **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3, 4.2.4. and 4.2.5)

Telfer's (2012) 'Frank Cliff' and Sheppard's (loc.cit.) 'Cornelian Bay' survey sites are thought to lie within this coastal unit. It covers the same area as the 'Cornelian Bay high interest site' of Sheppard (ibid.). Both of the above surveys found this coastal unit to have an interesting invertebrate fauna. The proxy survey suggests it is likely to support similarly rich seepage and woodland invertebrate assemblages to those recorded in the CB study site (CU3), immediately to the south of here, in 2013.

3.3.3. CU3 – Osgodby Point to Tenant's Cliff. **Category 2 importance** (KIH 4.2.1, 4.2.3, and 4.2.5)

This unit includes all four of the sample stations that were set up in the 2013 Cayton Bay study site. As such, the assessment of habitat quality is based upon the detailed invertebrate survey carried out here. It covers the same area as the northern half of the 'Osgodby Point to Cayton North Bay medium interest site' of Sheppard (ibid.). The most striking feature of this unit is the presence of large stands of relatively mature woodland and scrub. Though the composition of the woodland is dominated by non-native sycamore (and also much horse chestnut), it nonetheless supports an interesting invertebrate assemblage, including key species that are associated with woodland seepages and dead wood.

3.3.4. CU4 – Tenant's Cliff to Cayton Bay pumping station. **Category 2 importance** (KIH 4.2.2, 4.2.4 and 4.2.5)

CU4 covers the same area as the southern half of the 'Osgodby Point to Cayton North Bay medium interest site' of Sheppard (ibid.). It has steep, dry cliffs with significant stands of dry grassland, some of which are heavily eroded, while others have a more closed, species-rich sward. Inland of the cliff face are extensive stands of scrub that are also considered to be potentially important for invertebrates.

3.3.5. CU5 – Cayton Sands (west). **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3, and 4.2.4)

Telfer's (op. cit.) 'Cayton Bay' survey site lies within this coastal unit. CU5 covers approximately the same area as the the 'Cayton Bay high interest site' of Sheppard (op. cit.). Perhaps of greatest interest here are the well-vegetated calcicolous seepages, which had a rich fauna that included some important species, when sampled by Telfer (op. cit.) in 2006. Also of considerable potential interest are the high-quality stands of species-rich dry grassland. There is also a significant resource of the sparsely vegetated seepage KIH and sparsely vegetated dry grassland KIH.

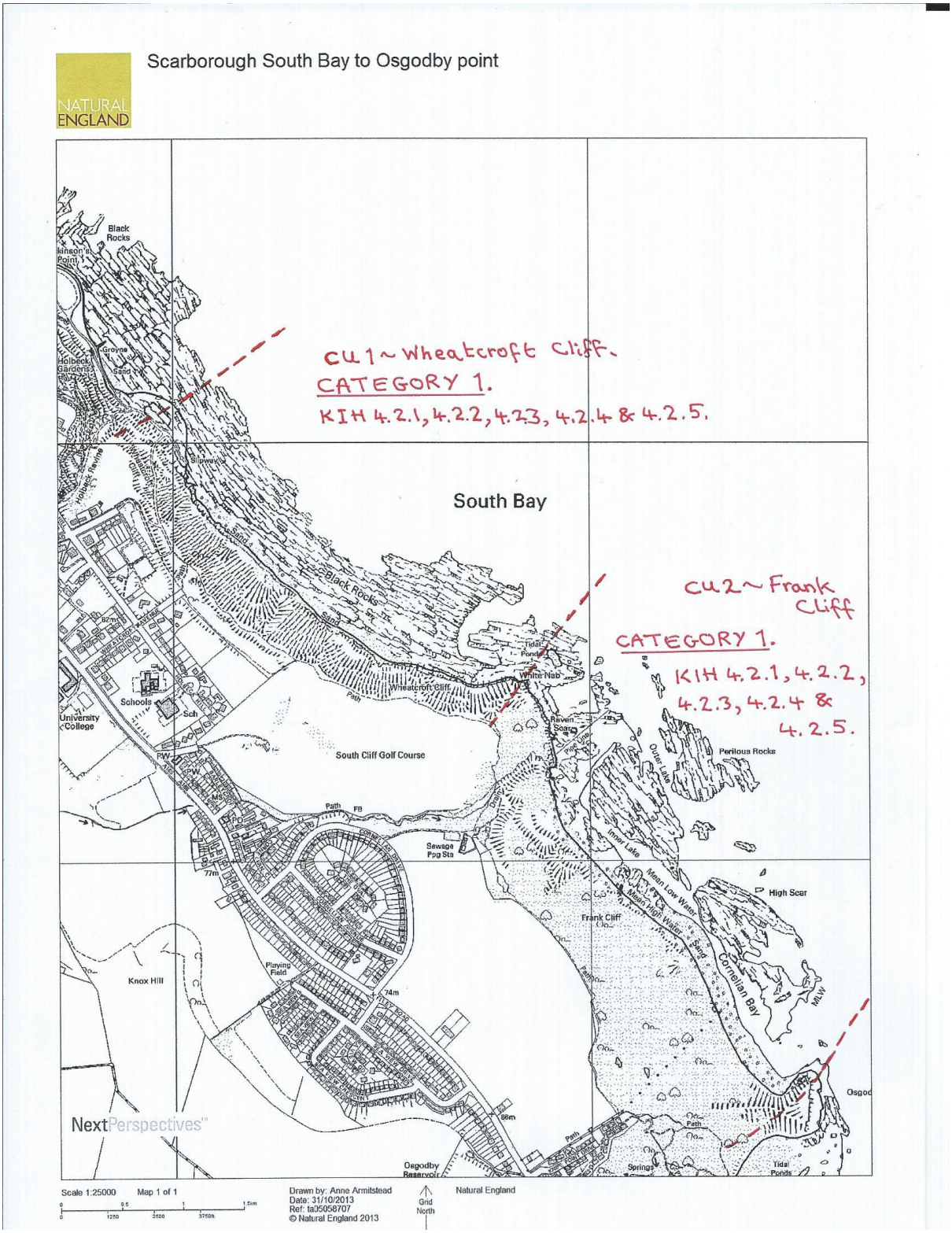


Figure 3.3.1. Invertebrate importance of Scarborough to Flamborough coast, Scarborough South Cliff to Osgodby Point

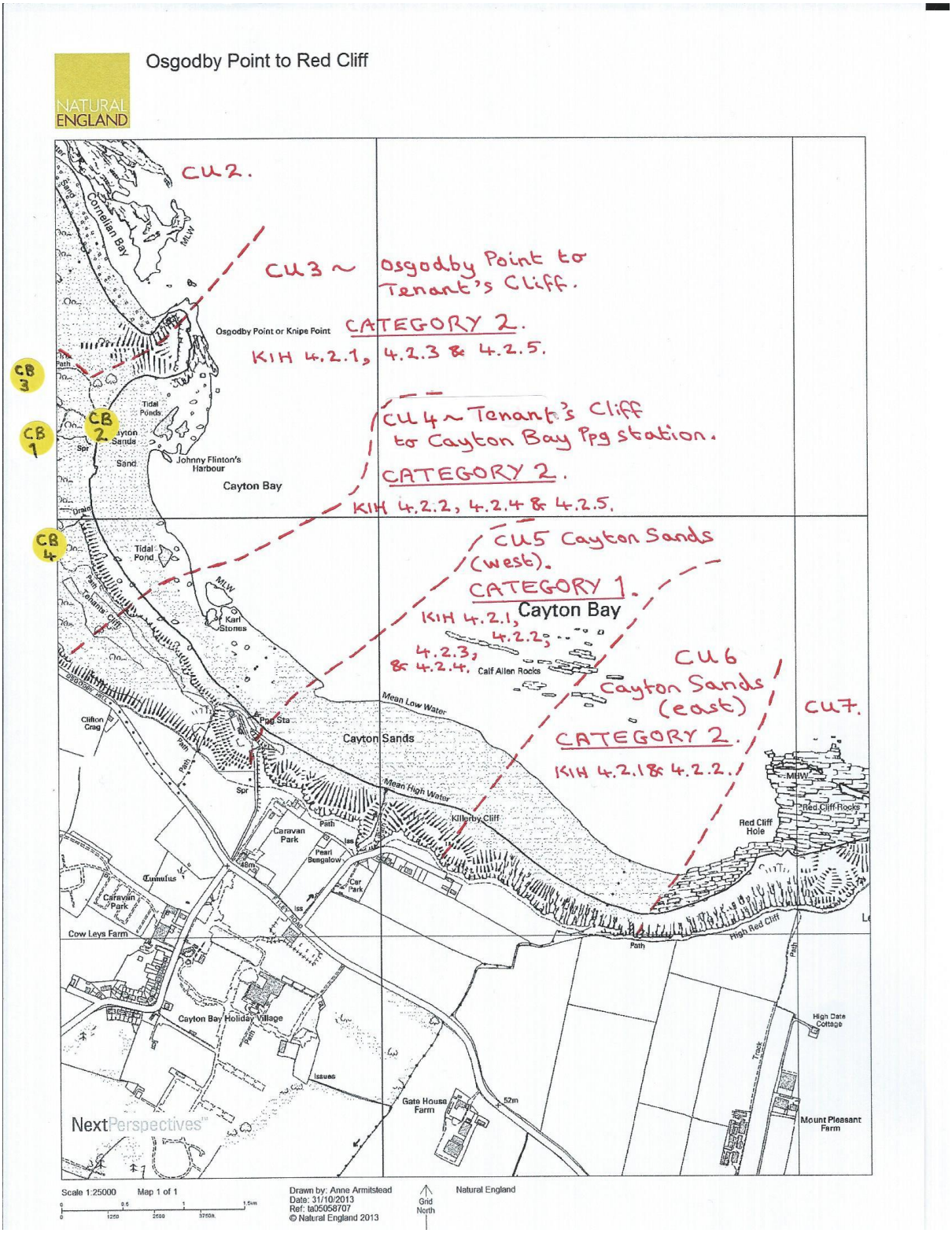


Figure 3.3.2. Invertebrate importance of Scarborough to Flamborough coast, Osgodby Point to Red Cliff Hole and location of Cayton Bay invertebrate sampling stations

3.3.6. CU6 – Cayton Sands (east). **Category 2 importance** (KIH 4.2.1 and 4.2.2.)

The cliffs here are more eroded, and lack some of the more mature habitat features found in CU5 to the west. Nonetheless, there are still significant areas of sparsely vegetated dry ground and seepages that are thought likely to have a comparable interest to that found in this habitat elsewhere on the Flamborough to Scarborough coast.

3.3.7. CU7 – Lebberston Cliff. **Category 3 importance** (KIH 4.2.1 and 4.2.4.)

In the time available, it was not possible to access this area, and it was only scanned from a distance with binoculars. The cliffs here were mostly rather high and bare, with lower representation of the more vegetated habitats that are of key importance for invertebrates. However, towards the eastern end of this unit, the cliffs became lower and more vegetated, and the quality of the habitat for invertebrates appeared to be higher. Within those parts of this unit that could be adequately assessed, there were significant areas of the sparsely vegetated seepage KIH and species-rich dry grassland KIH.

3.3.8. CU8 – Gristhorpe Sands. **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3 and 4.2.4)

This unit includes all four of the sample stations that were set up in the 2013 Gristhorpe Sands study site. As such, the assessment of habitat quality is based upon the detailed invertebrate survey carried out here. Of particularly high importance were the extensive network ofboth eroded and well-vegetated seepages. Therewas also a very large resource of the sparsely vegetated dry grassland KIH and a much smaller, though still significant area of the species-rich dry grassland KIH.

3.3.9. CU9 – Gristhorpe and Newbiggin Cliffs. **Category 3 importance** (KIH 4.2.2)

CU9 could only be viewed from a few places along the path that runs along the top of the cliff due to time constraints and its inaccessibility. It appeared to be mostly high, bare cliffs. There were some quite extensive areas referable to the sparsely vegetated dry ground KIH on screes along the lower cliff and some species-rich dry grassland (KIH 4.2.4) along the upper cliff margin, but otherwise, this area appeared to lack the diversity of invertebrate habitats found elsewhere on the Flamborough to Scarborough coast.

3.3.10. CU10 – Filey North Cliff. **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3 and 4.2.4)

To the west of Filey Brigg, there were moderately high clay cliffs that showed an excellent range of invertebrate habitat features. For the most part, the cliffs here were actively eroding, with much of the sparsely vegetated dry ground KIH, but there were also significant expanses of more stable species-rich grassland referable to KIH 4.2.4. Along the whole length of this slope, there were seepages, the majority of which were eroding (KIH 4.2.1), though there were also some that had higher vegetation cover (KIH 4.2.3).

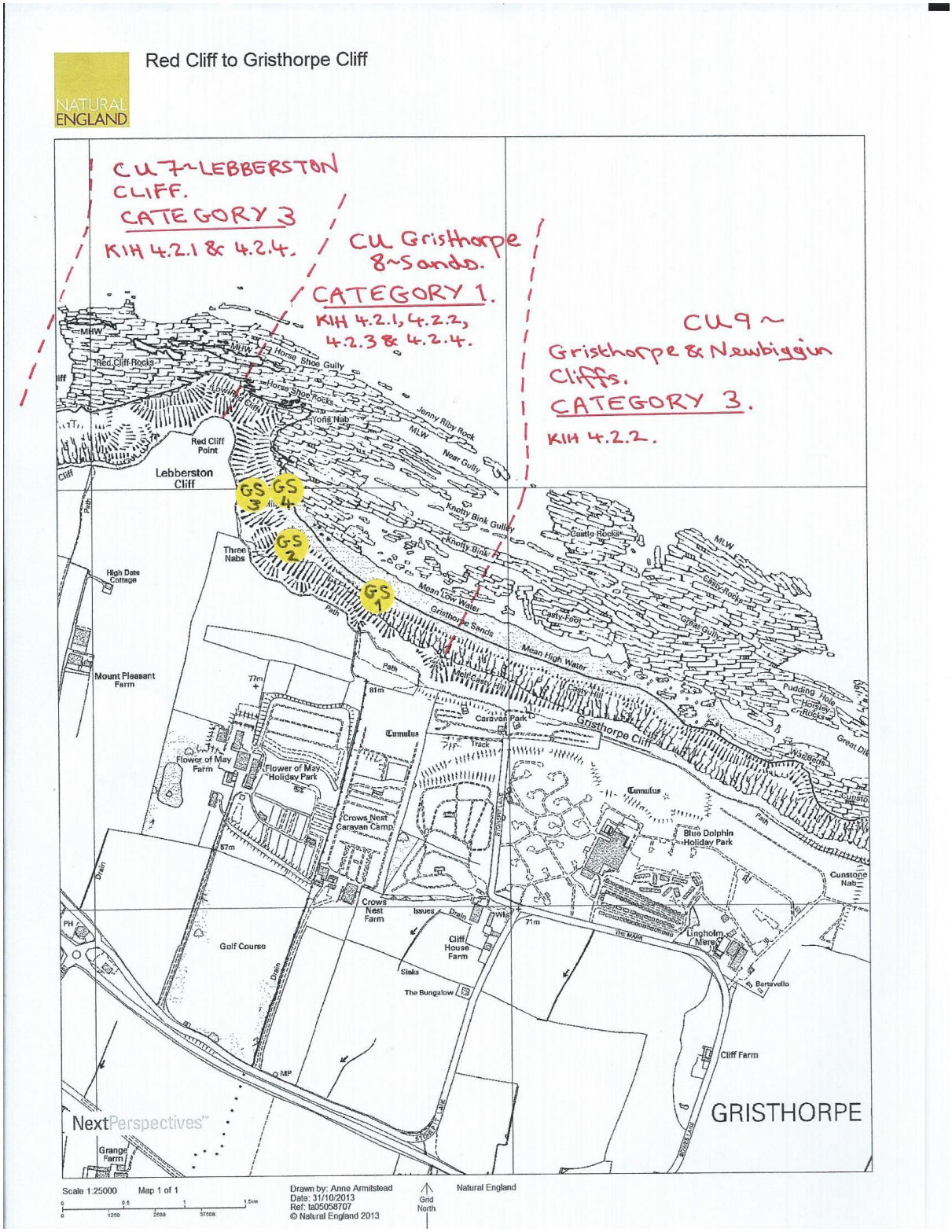
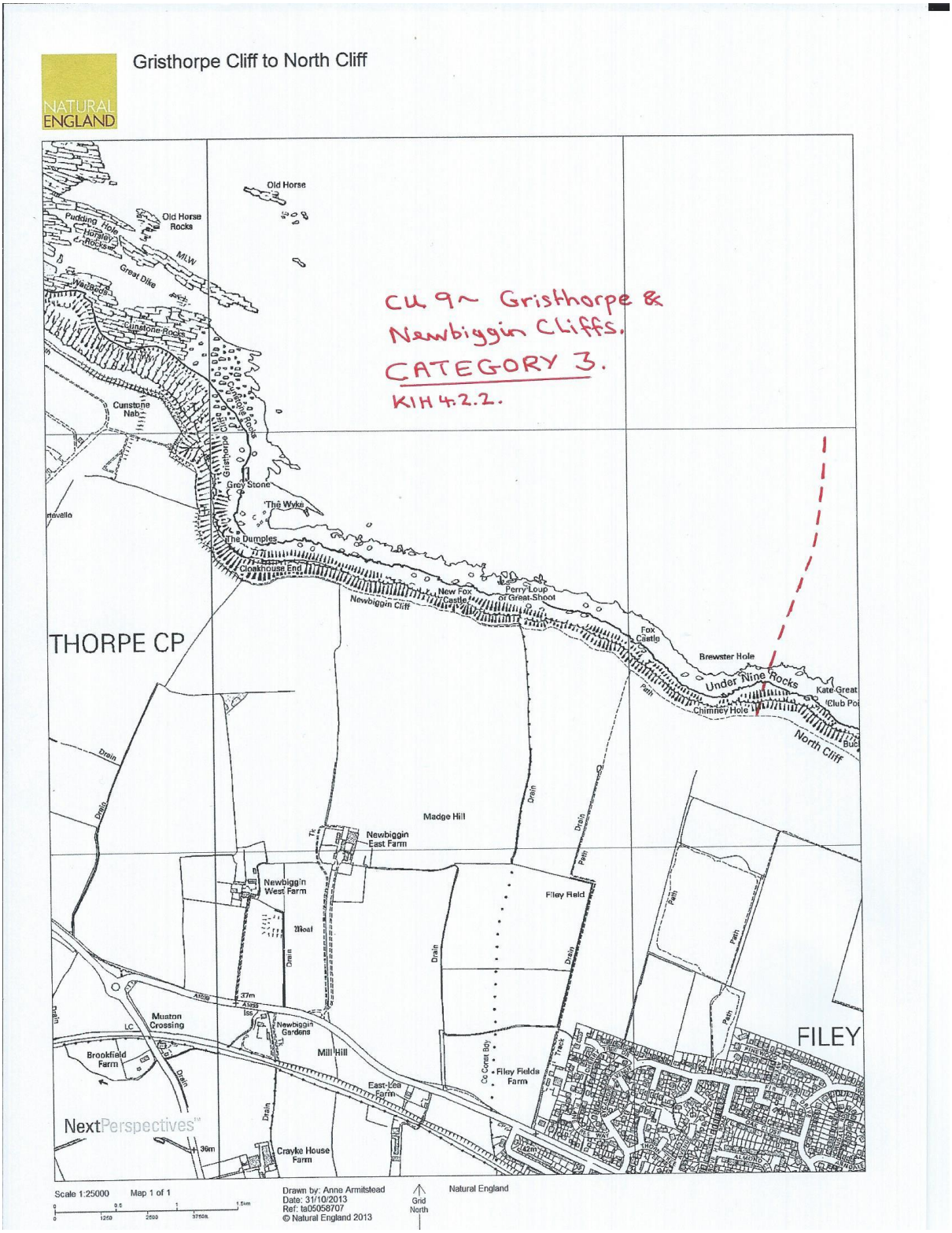


Figure 3.3.3. Invertebrate importance of Scarborough to Flamborough coast, Red Cliff Hole to Gristhorpe Cliff and location of Gristhorpe Sands invertebrate sampling stations



CU 9~ Gristhorpe & Newbiggin Cliffs.
CATEGORY 3.
KIH 4.2.2.

Figure 3.3.4. Invertebrate importance of Scarborough to Flamborough coast, Gristhorpe Cliff to North Cliff

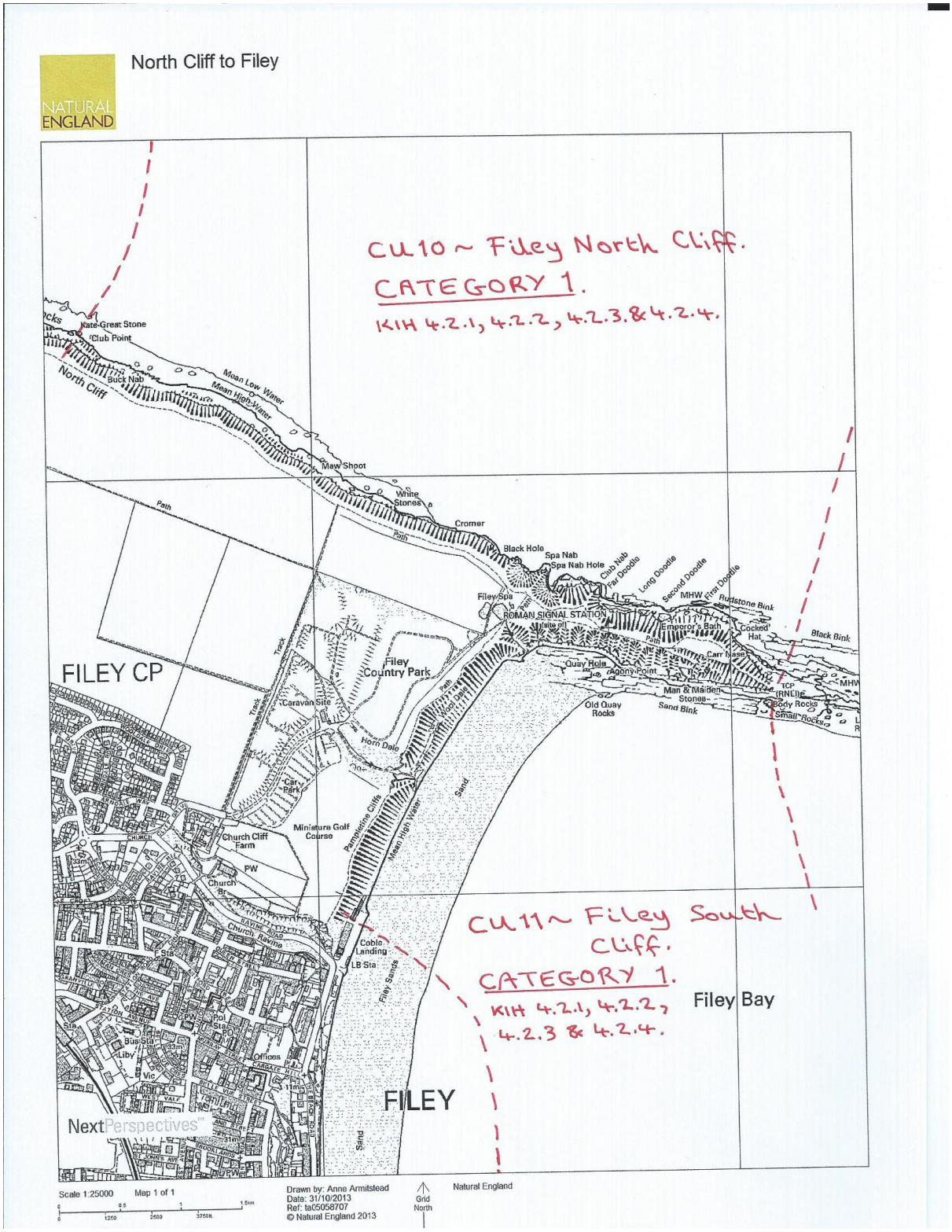


Figure 3.3.5. Invertebrate importance of Scarborough to Flamborough coast, North Cliff to Foley Brigg

3.3.11. CU11 – Filey South Cliff. **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3 and 4.2.4)

Though it was not the subject of detailed survey this year, the range of invertebrate habitat features on the southern side of Filey Brigg appeared to be of similarly high quality to those represented on the northern cliffs. Of particular note, were the areas of dry, open habitats, in which patches of eroded ground with sparse vegetation cover (KIH 4.2.2) were interspersed with stands of species-rich grassland (KIH 4.2.4). The steep, southerly aspect produces a particularly warm, dry microclimate that should be favourable for thermophilous invertebrates that are scarce elsewhere on this predominantly north- and east-facing coast.

3.3.12. CU12 – Filey to Mile Haven. **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3 and 4.2.4)

CU12 covered part of the 'Filey to Hunmanby Gap medium interest site' of Sheppard (op. cit.). The stretch of coast immediately to the south of Filey had relatively low and gently sloping clay cliffs. Though there was still a fair degree of erosion, the outstanding feature of this coastal unit was the large stands of species-rich grassland. The flora here was unlike that seen elsewhere on the cliffs, with an abundance of species such as devil's-bit scabious *Succisa pratensis*, saw-wort *Serratula tinctoria*, bloody cranesbill *Geranium sanguineum*, meadow cranesbill *Geranium pratense* betony *Stachys betonica* and greater burnet *Sanguisorba officinalis*. It is thought possible that this area could host a very interesting phytophagous invertebrate fauna given further survey. It comprises part of the length of coastline in Filey Bay, between Filey in the north and Speeton Cliffs in the south, which is thought to be one of the core areas of interest for invertebrates of open soft-rock cliff habitats on the Flamborough to Scarborough coast.

3.3.13. CU13 – Mile Haven to Flat Cliff. **Category 2 importance** (KIH 4.2.1, 4.2.2 and 4.2.4)

CU13 covers part of the 'Filey to Hunmanby Gap medium interest site' of Sheppard (ibid.). This unit had somewhat similar vegetation to that in the last described sub-section. However, erosion here was more active, and the grassland was noticeably less species-rich than in the previously described unit. Nonetheless, it still forms part of the outstanding stretch of soft-rock cliff invertebrate habitat in Filey Bay, with significant areas of sparsely vegetated wet and dry habitats (KIH 4.2.1 and 4.2.2 respectively), and good stands of more mature species-rich dry grassland (KIH 4.2.4).

3.3.14. CU14 – Flat Cliff. **Category 4 importance**

CU14 covers part of the 'Filey to Hunmanby Gap medium interest site' of Sheppard (ibid.). This was the one area of coastline between Filey and Speeton that was of rather low importance for invertebrates. This site lies at the point where the cliffs reach their lowest, and are backed by houses. There have been many attempts here to reduce the erosion of the low cliff face, and there was much planting of alien species and dumping of garden rubbish. Allied to the human disturbance of this area, the very low profile of the cliffs means they lack the range of habitat features present on the higher cliffs elsewhere on this stretch of the coast. It may be appropriate to include this section of the coast anyway, as it comprises part of one of the most important sections of the coast for invertebrates.

3.3.15. CU15 – Flat Cliff to Butcher Haven. **Category 3 importance** (KIH 4.2.3 and 4.2.5)

CU15 covers part of the 'Filey to Hunmanby Gap medium interest site' of Sheppard (ibid.). The cliff was a little higher here than at Flat Cliff to the north. This was a gently sloping area, with little erosion, and much scrub and bracken. However, the area marked as a pond on the OS 1:25,000 had mature wetland vegetation (KIH 4.2.3) with much great horsetail *Equisetum telmateia* and great willowherb *Epilobium hirsutum*.

3.3.16. CU16 – Butcher Haven to Hunmanby Gap. **Category 2 importance** (KIH 4.2.1, 4.2.2, 4.2.3 and 4.2.5)

CU16 covers part of the 'Filey to Hunmanby Gap medium interest site' of Sheppard (ibid.). The cliffs at CU16 were somewhat higher and steeper than those to both the east and west. Erosion of this coastal unit was extremely active, and much of the cliff was either bare or had no more than sparse vegetation cover. Despite the presence of a significant extent of only the two more eroded invertebrate habitat featues here (KIH 4.2.1 and 4.2.2), the quality of these was generally high, and seepages systems were present at high density. For these reasons, it was anticipated that this coastal unit would have many of the important species recorded by the detailed invertebrate survey of similar habitats at Reighton Sands, and category 2 importance was considered justifiable.

3.3.17. CU17 – Hunmanby Gap to Reighton Sands. **Category 2 importance** (KIH 4.2.1, 4.2.24.2.3 and 4.2.5)

CU17 covers part of the 'Speeton Cliffs high interest site' of Sheppard (ibid.). CU 17 had high-quality soft-rock cliff habitats similar to those occurring elsewhere in Filey Bay, with large areas of species-rich dry grassland (KIH 4.2.4), sparsely vegetated dry ground (KIH 4.2.2) and sparsely vegetated seepages (KIH 4.2.1) that were very likely to have a fauna of comparable interest to that recorded in the Reighton Sands sample stations immediately to the south of this unit (RS1 and RS2).

3.3.18. CU18 – Reighton Sands to Reighton Gap. **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3, 4.2.4 and 4.2.5)

CU18 covers part of the 'Speeton Cliffs high interest site' of Sheppard (ibid.). This unit included sample stations RS1 and RS2 of the 2013 Reighton Sands study site. This and the two coastal units immediately to the south (CU19 and CU20) between them had high-quality examples of all the important open soft-rock cliff invertebrate habitats present on the Flamborough to Scarborough coast.

3.3.19. CU19 – Reighton Sands to Middle Cliff. **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3 and 4.2.4)

CU19 covers part of the 'Speeton Cliffs high interest site' of Sheppard (ibid.). This unit included sample stations RS3 and RS4 of the 2013 Reighton Sands study site. This and the two coastal units to either side (CU18 and CU20) between them had high-quality examples of all the important open soft-rock cliff invertebrate habitats present on the Flamborough to Scarborough coast.

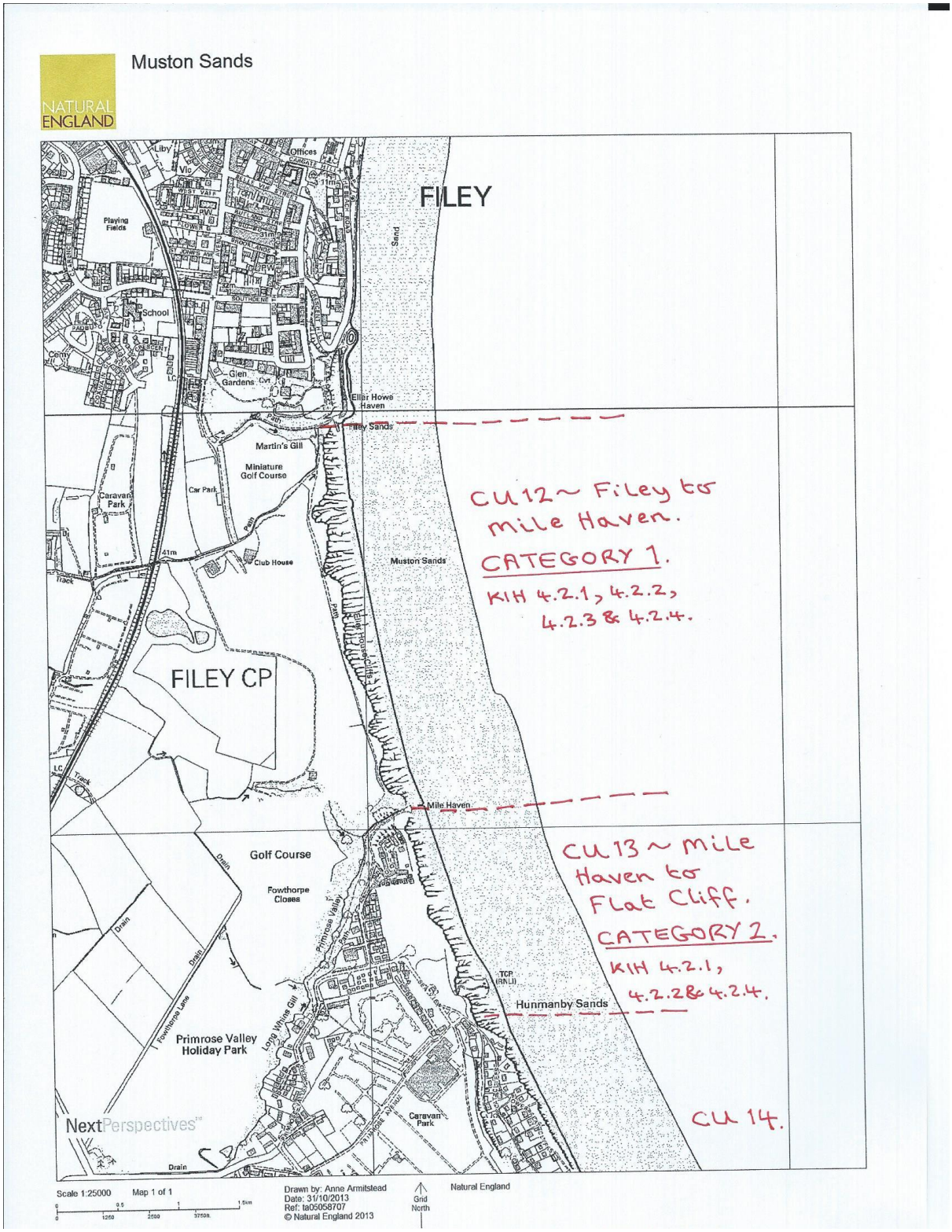


Figure 3.3.6. Invertebrate importance of Scarborough to Flamborough coast, Filey to Flat Cliff

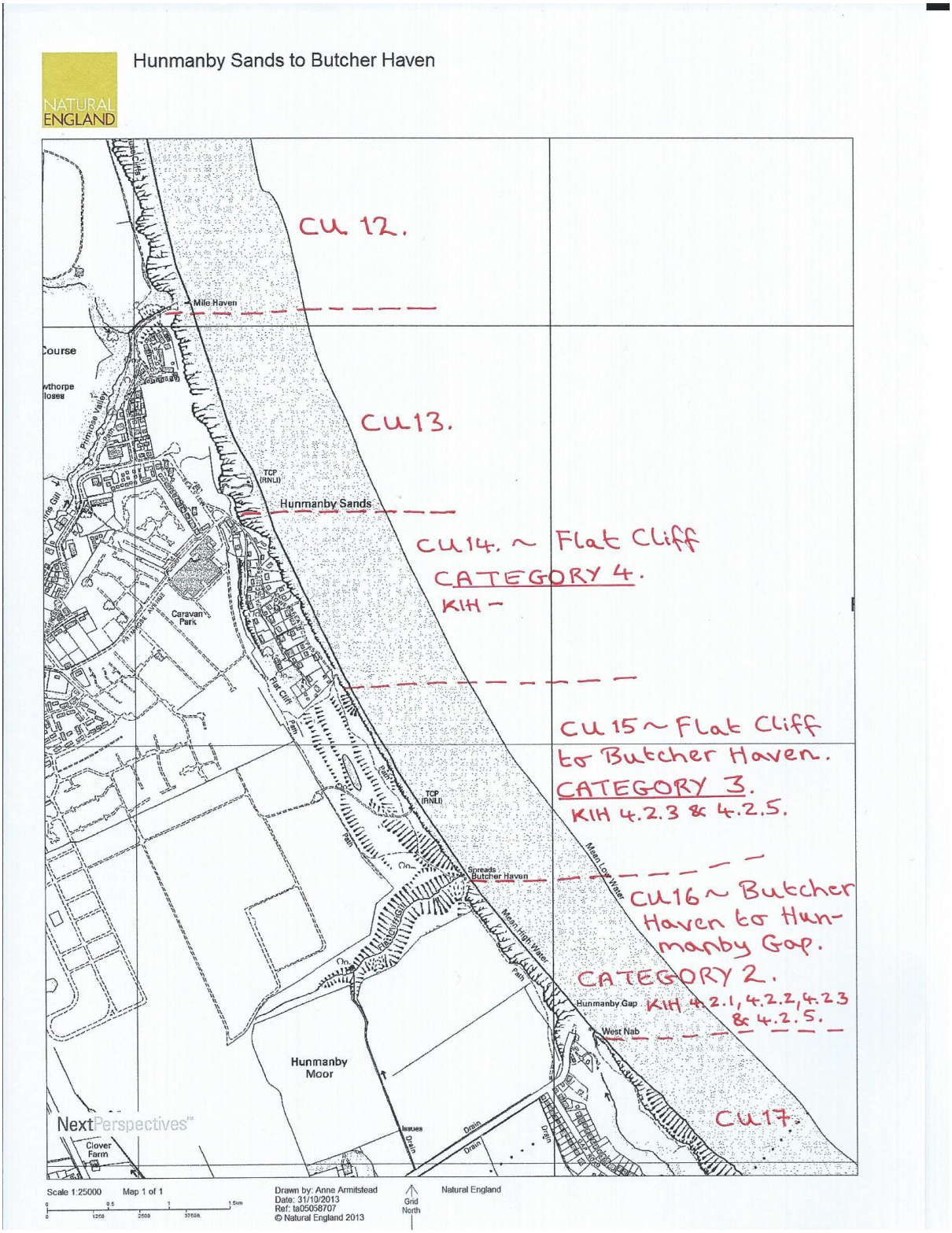


Figure 3.3.7. Invertebrate importance of Scarborough to Flamborough coast, Flat Cliff to Hunmanby Gap

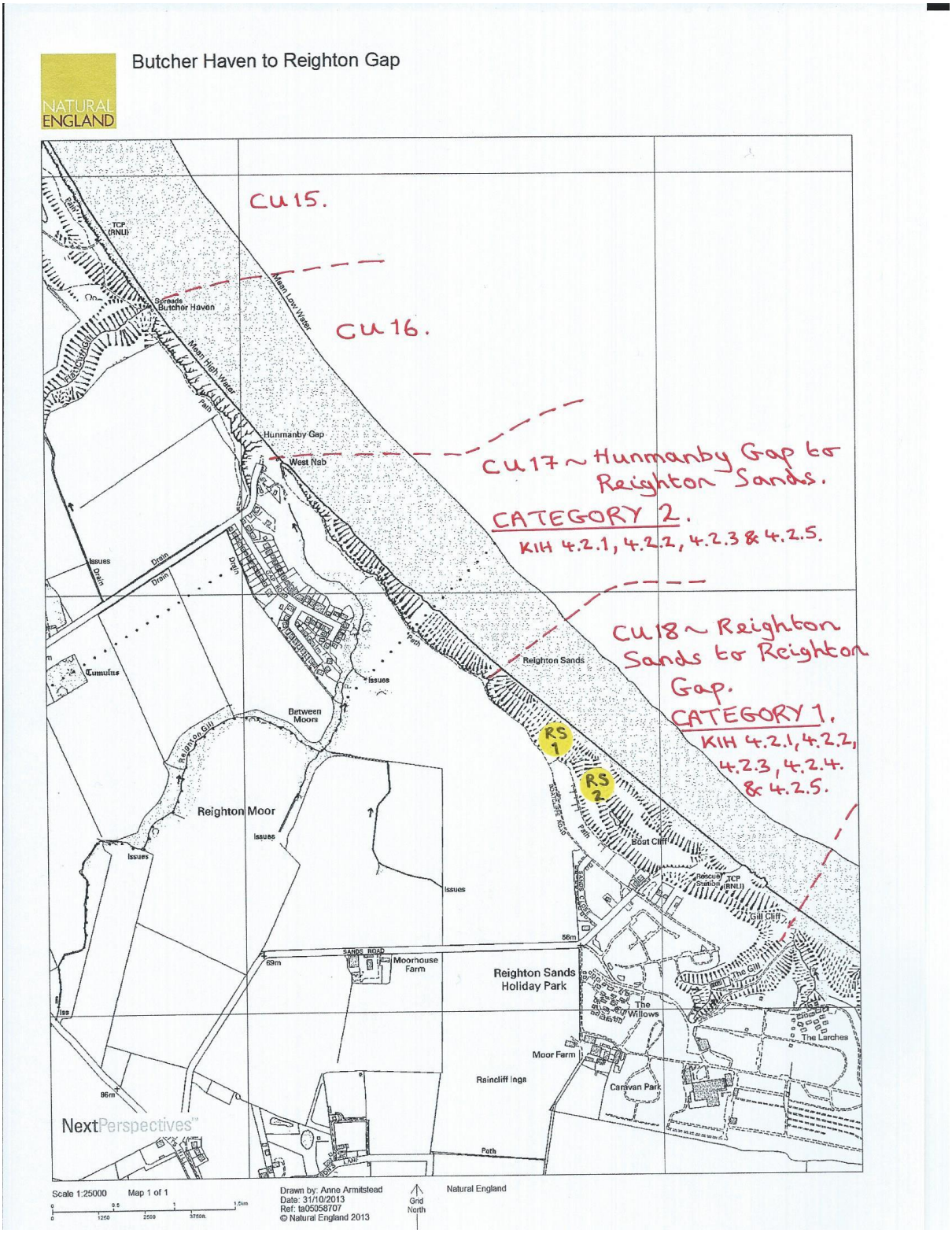


Figure 3.3.8. Invertebrate importance of Scarborough to Flamborough coast, Hunmanby Gap to Reighton Gap and location of Reighton Sands invertebrate sampling stations RS1 and RS2

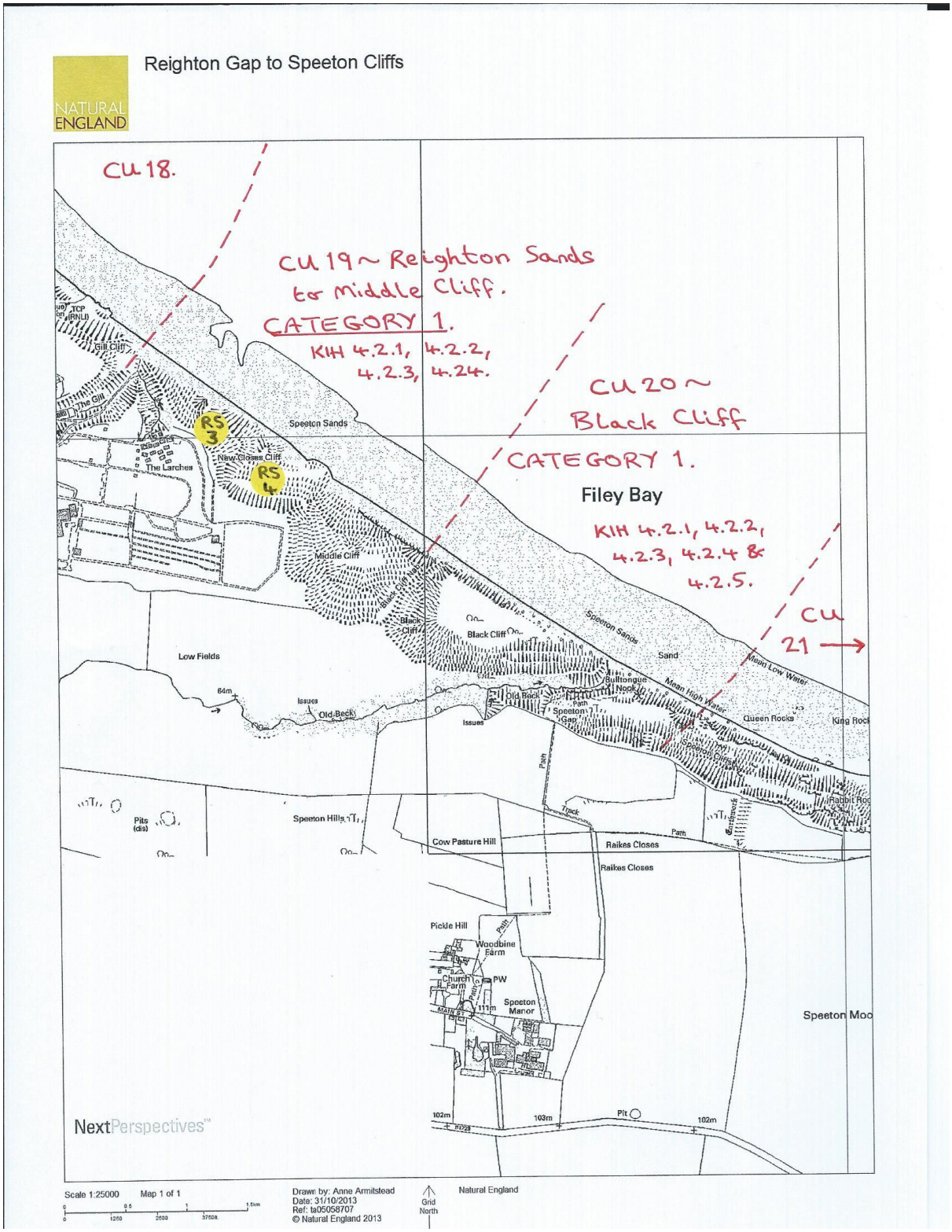


Figure 3.3.9. Invertebrate importance of Scarborough to Flamborough coast, Reighton Gap to Speeton Cliffs and location of Reighton Sands invertebrate sampling stations RS3 and RS4

3.3.20. CU20 – Black Cliff. **Category 1 importance** (KIH 4.2.1, 4.2.2, 4.2.3, 4.2.4 and 4.2.5)

CU20 covers part of the 'Speeton Cliffs high interest site' of Sheppard (ibid.). Though it was not part of the detailed invertebrate sampling programme carried out this year, unit 20 appeared to be of similar quality to the other Reighton Sands coastal units (CU18 and CU19). Slopes here were relatively gentle, and though there was still good representation of eroded habitat features (KIH 4.2.1 and 4.2.2), there were also significant areas of the more stable, vegetated seepage (KIH 4.2.3), species-rich dry grassland (KIH 4.2.4) and scrub (KIH 4.2.5) features.

3.3.21. Unit 21 – Speeton and Bempton Cliffs. **Category 3 importance** (KIH 4.2.4.)

In the time available it was not possible to walk the long stretch of high cliffs between Speeton and the Flamborough study site (unit 21). However this stretch of coast, which includes Bempton Cliffs was looked at during the invertebrate assessment carried out in 2012 (Sheppard, 2012). It was described in that report as having high chalk cliffs with a narrow cap of stable grassland and scrub and no significant extent of clay slippages.

Reference to that report, and examination with binoculars from the southern end and from Bempton cliffs suggested that important erosion habitats were likely to be very poorly represented here. However, therewass a significant extent of more stable neutral-calcareous grassland along the upper cliff edge that were likely to be similar to the neutral-calcareous grassland swards sampled in FH1 and FH3, these being referable to KIH4.2.4.

3.3.22. Unit 22 – Thornwick Bay and North Landing. **Category 2 importance** (KIH 4.2.2, 4.2.3 and 4.2.4.)

This unit included all four of the sample stations that were set up in the Flamborough Head study site. As such, the assessment of habitat quality was based upon the detailed invertebrate survey carried out here.

Of particular importance here was the presence of good stands of species-rich dry grassland of a calcareous character that was different to that occurring elsewhere on the Flamborough to Scarborough coast. There were also significant stands of the sparsely vegetated dry ground and vegetated seepage KIH. The latter was mainly associated with the small, well-vegetated streams that run down Holmes Gut and the small valleys to each side of Thornwick Nab (sample stations FH2 and FH4).

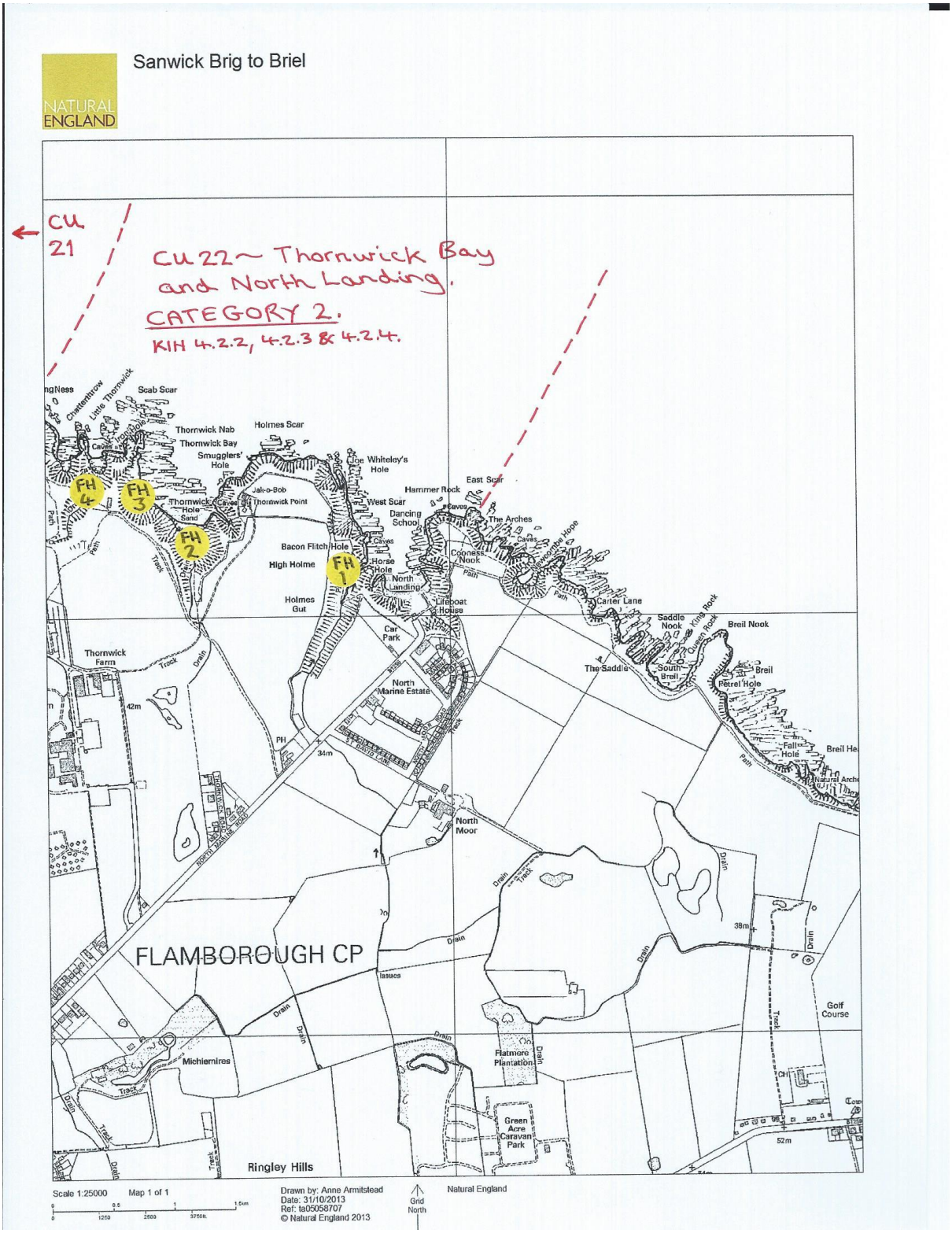


Figure 3.3.10. Invertebrate importance of Scarborough to Flamborough coast, Reighton Gap to Speeton Cliffs and location of Reighton Sands invertebrate sampling stations RS3 and RS4

4. DISCUSSION

4.1. Key invertebrates of the Flamborough to Scarborough cliffs

This section provides an assessment of the invertebrate fauna of the Flamborough to Scarborough cliffs. A list of 37 key invertebrate species has been identified, which are listed in Table 4.1.1. Key species are defined as being: 1) of Red Data Book (RDB), Nationally Scarce or England Biodiversity List status; and/or 2)species listed by Howe (2002) as being strongly associated with soft cliff habitats in Britain; and/or 3) species identified in the earlier Buglife report (Telfer, 2006) as being of importance, a few of the latter being without one of the conservation or habitat indicator statuses listed above, but which are nonetheless stenotopic inhabitants of soft-rock cliffs in Britain. The list of species in Table 4.1.1 includes all those recorded as a result of the fieldwork carried out in 2013. However, other earlier records of important invertebrates from this stretch of the coast have also been added to the table where known. Most of the earlier records come from the 2006 Buglife survey (ibid.), but some relatively recent records from the National Biodiversity Network Gateway have also been added. Note that the list of earlier records is by no means exhaustive, and more could doubtless be added.

The scarce and threatened status categories in column two are taken from the national reviews of beetles (Hyman ed., 1992 and 1994; Foster, 2010), flies (Falk, 1991a) and Aculeate Hymenoptera (Falk, 1991b) commissioned by the Joint Nature Conservation Committee (JNCC). The national status categories relevant to this report are as follows:

RDB1. – Red Data Book Category 1 – Endangered. Taxa in danger of extinction and whose survival is unlikely if causal factors continue operating.
RDB2. – Red Data Book Category 2 – Vulnerable. Taxa which are known from 15 or fewer 10 km squares of the National Grid and which are decreasing and will become endangered in the near future if the causal factors continue operating.
RDB3. – Red Data Book Category 3 - Rare. Taxa with small populations that are not at present Endangered or Vulnerable, but are at risk.
Na – Nationally Scarce Category A. Taxa thought to occur in 30 to 16 10 km squares of the National Grid.
Nb – Nationally Scarce Category B. Taxa thought to occur in between 30 and 100 10 km squares of the National Grid.
N – Nationally Scarce. Taxa which are estimated to occur within the range of 16 to 100 10km squares, but which do not qualify for inclusion within the IUCN threatened or near threatened categories, and where division into Na or Nb status has not been attempted (usually due to limited availability of information on British distribution).
EBL – England Biodiversity List species. The England Biodiversity List has been developed to meet the requirements of Section 41 of the Natural Environment and Rural Communities Act (2006). This legislation requires the Secretary of State to publish a list of species of flora and fauna and habitats considered to be of principal importance for the purpose of conserving biodiversity. These were formerly known as BAP Priority species.

Also included in the status column are the coastal soft cliff associates identified by Howe (2002). He identified three grades of fidelity to this habitat in Britain. None of the Grade 1 species, included in this report have been found on the Flamborough to Scarborough cliffs. However, the cranefly *Symplecta chosenensis*, which does occur on these cliffs, has been identified as a Grade 1 species subsequently (Howe, 2003). A number of Grade 2 and Grade 3 species also occur here, and the categories are defined as follows:

CSC1 – Coastal Soft Cliff Grade 1 species. Invertebrates that are restricted to coastal soft cliffs in the UK.
CSC2 – Coastal Soft Cliff Grade 2 species. Invertebrates that are strongly associated with coastal soft cliffs in the UK, but which can also be found occasionally in other places that share some of the same habitat features.

CSC3 – Coastal Soft Cliff Grade 3 species. Invertebrates that are moderately associated with coastal soft cliffs in the UK, but which occur quite widely in other places that share some of the same habitat features.

Table 4.1.1. Key invertebrates recorded from the Flamborough to Scarborough cliffs

Species	Status	2013 sites	Other records
Nebria livida	Na., CSC2		1985 CaB, GS; 1952 Filey Bay; no date Filey
Dyschirius aeneus		GS	2006 FC
*Bembidion bualei**		GS	2012 CoB, 2006 FC, SP
Bembidion monticola	Nb.		2012 CoB
Bembidion saxatile	Nb., CSC2.	CaB	2006 CaB
Bembidion stephensii	CSC3.	CaB	2012 CoB, 2006 CaB, FC, SP
Georissus crenulatus	N.	CaB, GS, RS	2006 FC, SP
Chaetarthria seminulum	N.		2006 CaB
Gyrophaena joyioides	N.	CB	
Gyrophaena manca	N.	CB	
Stenus fuscicornis	Nb.	CaB	
Platydracus latebricola	Nb.	GS, RS	
Elodes elongata	N.	CB	
Heterocerus marginatus	N.	GS	
Eubria palustris	RDB3, CSC3.		2006 CaB
Adonia variegata	Nb.		2006, SP
Scaphidema metallicum	Nb.		2006, SP
Longitarsus parvulus	Na.		2006, SP
Grypus equiseti	Nb.	GS, RS	2006, SP
Trichosirocalus dawsoni	Nb.	FH	
Gonomyia conoviensis	N., CSC3.		2001 Reighton cliffs
Idiocera bradleyi	RDB2, CSC2.	GS, RS	1988 Scarborough district
Molophilus corniger	N.	CB	
Neolimnophila carteri	N	CB	
Symplecta chosenensis†	RDB1, CSC1.	GS, RS	2003 Reighton cliffs; 2002 Speeton cliffs
Paradelphomyia fuscula	N.	FB	
Dicranomyia goritiensis	RDB3, CSC2.	FH	
Oxycera morrisii	N.	CaB	
Oxycera pygmaea	N.	FB, RS	
Stratiomys potamida	N.	CaB	
Xanthandrus comtus	N.		2006, FC
Myopites inulaedyssentericae	RDB3.	RS	
Tetanocera punctifrons	N.	GS, RS	
Priocnemis confusor	Nb., CSC3.	FH	
Priocnemis schiodtei	Nb.		2006, SP
Argogorytes fargeii	Na., CSC3.	CaB, FB, FH, RS,	
Nysson trimaculatus	Nb.		2006 CaB
Notes:			
* Recorded as *B. andreae* in the 2006 and 2012 reports † Formerly known as *S. novaezemblae scotica*	For explanation of status categories see preceding page	CaB=Cayton Bay FB = Filey Brigg FH=Flamborough Head GS=Gristhorpe Sands RS=Reighton Sands	CoB = Cornelian Bay FC = Frank Cliff SP = Speeton

As can be seen from the above table, the invertebrate fauna of the Flamborough to Scarborough cliffs is of national importance, with relatively recent records of 37 key species, including five that are of Red Data Book status and a further 29 that are nationally scarce. The 2013 invertebrate survey has recorded four Red Data Book species, and 19 that are nationally scarce.

4.2. Key invertebrate habitat features of the Flamborough to Scarborough cliffs

From the detailed recording work carried out at the four study sites, five key invertebrate habitat features (KIH) have been identified that are of primary importance for the key invertebrate species identified in Table 3.5.1. Each of these habitat features is discussed in more detail in the following sub-sections. The key species listed in parenthesis after the title are those thought to be particularly associated with that habitat feature.

The most important sections of the Flamborough to Scarborough coast for invertebrates of open, soft cliff habitats are thought to be the area of Filey Bay stretching from Filey in the north to Speeton Cliffs in the south (coastal units12, 13 and 15 to 20) and Cayton and Cornelian Bays(CU1 to 5). However, the sections of coast at Gristhorpe Sands (CU8), Filey Brigg (CU10 and 11) and Thornwick Bay/North Landing (CU22) also appear to have very interesting invertebrate assemblages.

4.2.1. Open sparsely vegetated seepages

(*Dyschirius aeneus*, *Bembidion bualei*, *B. saxatile*, *B. stephensii*, *Georissus crenulatus*, *Heterocerus marginatus*, *Gonomyia conoviensis*, *Symplecta chosenensis*, *Oxycera pygmaea*, *Tetanocera punctifrons*)

The most significant element of the soft-rock invertebrate fauna at this site is certainly that found in association with streams and seepages running down the cliff face. Both sparsely vegetated seepages and those with denser vegetation have their own distinctive fauna. The former are characterised by a low, open growth of scattered vegetation amongst which coltsfoot *Tussilago farfara*, horsetails *Equisetum* spp., small sedges *Carex* spp. fleabane *Pulicaria dysenterica* and scattered rush *Juncus spp.* tussocks are characteristic features. Between the clumps of vegetation there are very extensive expanses of wet sand and/or clay. These are early successional features that are best seen in areas where there have been relatively recent erosion events. The high degree of instability along the Flamborough to Scarboroughcoast ensures that these are of widespread occurrence currently. The most extensive high-quality examples in the four study areas were at Gristhorpe (unit 8) and Reighton Sands (unit 18). Elsewhere along the coast, the proxy assessment suggested other particularly good areas of this habitat feature were present on the stretch of coast between Speeton as far north as Butcher Haven (CU 16-20, this stretch of coast including the Reighton Sands study site). Very good examples were also present in the Gristhorpe Sands study site (CU8).

The Flamborough to Scarborough cliffs have an outstanding assemblage of craneflies, which includes the RDB1 Limoniid *Symplecta chosenensis*, this species being especially characteristic of sparsely vegetated seepages here. Though it is very rarely encountered in Britain, it appears to be quite frequent on the Yorkshire coast, where it is encountered around sparsely vegetated seepages running over saturated sand or clay. In 2013 it was found in abundance at both the Reighton and Gristhorpe Sands study sites, with small er numbers also recorded at Cayton Bay.

4.2.2. Sparsely vegetated dry ground

(*Grypus equiseti*, *Myopites inulaedyssentericae*, *Priocnemis confusor*, *Priocnemis schiodtei*, *Argogorytes fargeii*, *Nysson trimaculatus*)

As is the case with the sparsely vegetated seepages described previously, this is an early successional habitat feature that is maintained by continuing active disturbance of the cliffs. Given the high levels of erosion occurring currently, this is a well-distributed habitat feature found throughout, though best expressed on the very actively eroding cliffs between Speeton and Filey Brigg, and in the Gristhorpe Sands area (CU8).

Vegetation is characterised by low and open mixtures of the dry grassland species described in the following sub-section, along with a suite of species that are particularly characteristic of somewhat disturbed sites. Particularly characterstic amongst the latter are kidney vetch *Anthyllis vulneraria*, wild carrot *Daucus carota* and field horsetail *Equisetum arvense*. Between the vegetation there are extensive areas of bare clay and/or sand.

This KIH is particularly important for Aculeate Hymenoptera, and four key species in this group have been assigned to this habitat feature. These species are the spider wasps *Priocnemis confusor* and *P. schiodtei* and the digger wasps *Argogorytes fargeii* and *Nysson trimaculatus*. Many Aculeatesrequire dry mosaic habitats such as this, which satisfy their requirements both for bare ground in which they (or the species they kleptoparasitise in the case of *N. trimaculatus*) construct their burrows, and flower-rich open vegetation in which to feed on nectar and hunt the invertebrates with which they or their hosts provision the nest. In addition to these key species, the Flamborough to Scarborough cliffs support a diverse assemblage of other local Aculeate Hymenoptera which share these requirements, and for which this habitat feature is also likely to be of key importance.

Another very noteworthy species found in association with this KIH was the RDB3 picture-winged fly *Myopites inulaedyssenterica*. It appeared to require stands of common fleabane growing in disturbed situations where there was an abundance of bare ground. It was only found at the Reighton Sands study site.

4.2.3. Open vegetated seepages

(*Chaetarthria seminulum*, *Eubria palustris*, *Idiocera bradleyi*, *Paradelphomyia fuscula*, *Dicranomyia goritiensis*, *Oxycera morrisii*, *Stratiomys potamida*,)

In some places, most often where the cliff slopes are less steep, there may be a sufficient period of stability for seepages running down the cliff slope to develop dense cover of wetland vegetation. Typically, this includes tall fen plant species such as common reed *Phragmites australis*, greater reedmace *Typha latifolia*, great horsetail *Equisetum telmateia*, rushes, great willowherb *Epilobium hirsutum* meadowsweet *Filipendula ulmaria* and hemp agrimony *Eupatorium cannabinum*. Where vegetation cover is not too tall and dense, there may also be abundant brown mosses in the ground layer and a rich field layer of sedges and lower-growing herbs such as grass-of-Parnassus *Parnassia palustris*, common fleabane and water mint *Mentha aquatica*. This KIH also includes small well-vegetated streams running down the cliff slopes, such as those within the FH2 and FH4 sample stations.

The generally very high levels of erosion on the Flamborough to Scarborough cliffs result in this being one of the most infrequently encountered habitat features. Good examples with species-rich vegetation were most frequent at the northern end of the site, particularly in parts of Cayton and Cornelian Bays (units2, 3 and 5). The small, well-vegetated streams running down the cliffs in the area of the FH study site (coastal unit 22) provided the second main area in which this KIH was recorded. Elsewhere, though found along much of the coastline, such habitats were for the most part very small and fragmented and of somewhat lower quality.

The seven key species listed are all characteristic of relatively open vegetated seepages with a short sward of brown mosses, sedges and low-growing herbs such as grass-of Parnassus. It is vital that their breeding sites are not shaded out by tall vegetation. Of particular importance is the presence here of the two Red Data Book craneflies *Idiocera bradleyi* and *Dicranomyia goritiensis*. The former was found in small patches of mature wetland at Gristhorpe and Reighton Sands, while the latter was only found by a small stream at Thornwick Nab (FH4).

Ironically in the Cayton-Cornelian area, lack of erosion may be a threat to this habitat feature and its associated invertebrate fauna. Many of the seepages here have become shaded with scrub and woodland, which is inimical to their survival. Even where there are no trees and shrubs, lack of erosion is resulting in relatively short species-rich swards being replaced with rank, more species-poor vegetation dominated by tall herbs such as great willowherb.

4.2.4. Species-rich dry grassland

(*Platydracus latebricola*, *Adonia variegata*, *Longitarsus parvulus*, *Trichosirocalus dawsoni*)

Where there is not too much erosion of the cliffs, a more mature, closed-sward dry grassland may be able to develop. In many places along the coast there are stands of species-rich neutral to calcareous dry grassland in which characteristic species include common bird's-foot trefoil *Lotus corniculatus*, red clover *Trifolium pratense*, lady's bedstraw *Galium verum*, primrose *Primula vulgaris*, restharrow *Ononis repens*, salad burnet *Poterium sanguisorba*, common spotted orchid *Dactylorhiza fuchsia*, fragrant orchid *Gymnadenia conopsea*, pyramidal orchid *Anacamptis pyramidalis* and common knapweed *Centaurea nigra.*

Species-rich dry grassland can be found in many places along the Flamborough to Scarborough cliffs. Good examples are present on the relatively stable cliffs around the Flamborough sample station (unit 22), on both sides of Filey Brigg (units 10 and 11) and in the central part of Cayton Bay (units 4 and 5). Though not one of the sites designated for detailed survey this year, the grassland community on the low cliffs between Filey and Mile Haven (unit 12) looked to be of potentially high invertebrate interest. The flora here was distinctly different to that seen elsewhere on the cliffs, with an abundance of species such as devil's-bit scabious *Succisa pratensis* and saw-wort *Serratula tinctoria*, bloody cranesbill *Geranium sanguineum*, meadow cranesbill *Geranium pratense* betony *Stachys betonica* and greater burnet *Sanguisorba officinalis*. It is thought possible that this area could host a very interesting phytophagous invertebrate fauna given further survey.

The species-rich dry grasslands of the Flamborough to Scarborough coast are used by a diverse community of phytophagous innvertebrates, including three key species, the rove beetle *Platydracus latebricola*, the flea beetle *Longitarsus parvulus* and the weevil *Trichosirocalus dawsoni*. It should also be noted that where stable dry grasslands such as this lie adjacent to bare ground, they may also be of great importance as feeding and hunting sites for the Aculeate Hymenoptera discussed in sub-section 3.2.2.

4.2.5 Scrub and woodland

(*Gyrophaena manca*, *Gyrophaena joyioides*, *Stenus fuscicornis*, *Elodes elongata* *Scaphidema metallicum*, *Molophilus corniger*, *Neolimnophila carteri*, *Xanthandrus comtus*)

The eight key species associated with this KIH are all nationally scarce. These species are the rove beetles *Gyrophaena manca*, *G. joyioides* and *Stenus fuscicornis*, the Scirtid beetle *Elodes elongata*, darkling beetle *Scaphidema metallicum* and the craneflies *Molophilus corniger* and *Neolimnophila carteri* and the hoverfly *Xanthandrus comtus. G .manca*, *G. joyioides* and *S. metallicum* have all been found in association with dead wood (saproxylic) habitats on the Flamborough to Scarborough coast. The two former being found in woodland bracket fungi at Cayton Bay, while the latter is usually

found under bark of dead wood. *X. comtus* and *S. fuscicornis* t seem to favour wood- and scrub edges where the microclimate is warm and sheltered. *M. corniger*, *N. carteri* and *E. elongata* have aquatic or semi-aquatic larvae and are found in association with woodland seepages.

All of these species except *S. metallicum* have only been found in association with the extensive scrub and woodland habitats of the Cayton-Cornelian area. This section of the study area is the only place on the Flamborough to Scarborough coast where there are relatively mature woodlands, which are dominated by sycamore *Acer pseudoplatanus*, with much horse chestnut *Aesculus hippocastani* and ash F*raxinus excelsior*. Around the numerous pools and seepages present within these woods are stands of wet woodland with much grey willow *Salix cinerea* and alder *Alnus glutinosa*. Despite the secondary nature of the woodland here, and the domination of the canopy by non-native sycamore and horse chestnut, the woods of the Cayton-Cornelian area clearly host an interesting invertebrate fauna, with the main features of interest appearing to be seepages, woodland edges and saproxylic habitats.

On the more disturbed clay-sand cliffs elsewhere along the Flamborough to Scarborough coast, this habitat feature is largely restricted to patches of scrub growing in those areas where there was relatively high stability, with European gorse *Ulex europaeus*, hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa* being the main species present. Though no scrub-specialist key species were found in such areas during 2013, they nonetheless comprise an important element of the total habitat mosaic, especially in providing nectaring sites and shelter for warmth-loving species such as the Aculeate Hymenoptera.

APPENDIX 1: SAMPLE STATIONS

Further details on each of the 16 sample stations are provided below. Following the sample station code, a ten-figure GPS-derived grid reference is given, which marks its approximate centre. The figure in parenthesis after the sample station codeshows the degree of error in metres built into this grid reference. Following this, there is a short description of the sample station and a photograph illustrating its general appearance. Lastly, a full checklist of all 2013 invertebrate records from each sample station is given. The presence of any of the key species identified in Table 4.1.1 is identified here by the table row being emboldened.

A1.1. Flamborough Head

A1.1.1. FH1 TA2372872080 (5m)

Holme's Gut. A small, steep-sided valley, with the sample station being located on the east-facing slopes. Vegetationwass dominated by dry, neutral-calcareous grassland, with this being short and species-rich towards the seaward (northern) end of the sample station, where maritime influence helps to maintain open conditions. At the southern end of the station, the grassland was rank and there were patches of European gorse *Ulex europaeus* scrub. There was one small flushed area of ground with rushes *Juncus* sp., marsh marigold *Caltha palustris* and fleabane.

Figure A1.1.1. Sample station FH1. Species-rich neutral-calcareous dry grassland

Table A1.1.1. Checklist of invertebrates recorded from FH1 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Agriolimacidae		*Deroceras laeve*		FH1	9	5	2013	GS
Mollusca	Clausiliidae		*Clausilia bidentata*		FH1	9	5	2013	GS
Mollusca	Helicidae		*Cernuella virgata*		FH1	18	7	2013	SS
Mollusca	Helicidae		*Monacha cantiana*		FH1	9	5	2013	SS
Mollusca	Helicidae		*Trichia hispida*		FH1	9	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		FH1	9	5	2013	SS
Mollusca	Helicidae		*Helix aspersa*	Garden snail	FH1	9	5	2013	SS
Orthoptera	Acrididae		*Chorthippus brunneus*	Field grasshopper	FH1	18	7	2013	SS
Coleoptera	Carabidae		*Agonum dorsale*		FH1	9	5	2013	SW
Coleoptera	Carabidae		*Philorhizus melanocephalus*		FH1	9	5	2013	GS
Coleoptera	Carabidae		*Philorhizus melanocephalus*		FH1	9	5	2013	SW
Coleoptera	Carabidae		*Demetrias atricapillus*		FH1	9	5	2013	SW
Coleoptera	Staphylinidae		*Sepedophilus nigripennis*		FH1	9	5	2013	GS
Coleoptera	Staphylinidae		*Philorinum sordidum*		FH1	9	5	2013	SW
Coleoptera	Staphylinidae		*Tachyporus hypnorum*		FH1	9	5	2013	GS
Coleoptera	Staphylinidae		*Tachyporus obtusus*		FH1	9	5	2013	SW
Coleoptera	Staphylinidae		*Stenus flavipes*		FH1	9	5	2013	SW
Coleoptera	Cantharidae		*Rhagonycha fulva*		FH1	18	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		FH1	18	7	2013	SW
Coleoptera	Cryptophagidae		*Micrambe ulicis*		FH1	9	5	2013	GS
Coleoptera	Coccinellidae		*Rhyzobius litura*		FH1	9	5	2013	GS
Coleoptera	Coccinellidae		*Coccinella 7-punctata*	7-spot ladybird	FH1	18	7	2013	SW
Coleoptera	Coccinellidae		*Subcoccinella 24-punctata*	24-spot ladybird	FH1	18	7	2013	SW
Coleoptera	Chrysomelidae		*Neocrepidodera transversa*		FH1	18	7	2013	SW
Coleoptera	Apionidae		*Eutrichapion ervi*		FH1	18	7	2013	SW
Coleoptera	Curculionidae		*Phyllobius roboretanus*		FH1	18	7	2013	SW
Coleoptera	Curculionidae		*Andrion regensteinense*		FH1	9	5	2013	SW
Coleoptera	Curculionidae		*Orobitis cyaneus*		FH1	9	5	2013	GS
Lepidoptera	Zygaenidae		*Zygaena filipendulae*	6-spot burnet	FH1	18	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena filipendulae*	6-spot burnet	FH1	18	7	2013	SW
Lepidoptera	Pyralidae		*Pleuroptya ruralis*	Mother of pearl	FH1	18	7	2013	SS
Lepidoptera	Pterophoridae		*Marasmarcha lunaedactyla*		FH1	18	7	2013	SS

Lepidoptera	Hesperiidae		*Ochlodes venata*	Large skipper	FH1	18	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	FH1	18	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	FH1	18	7	2013	SW
Lepidoptera	Lycaenidae		*Lysandra icarus*	Common blue	FH1	18	7	2013	SS
Lepidoptera	Nymphalidae		*Aglais urticae*	Small tortoiseshell	FH1	18	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	FH1	18	7	2013	SS
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	FH1	18	7	2013	SS
Lepidoptera	Lasiocampidae		*Euthrix potatoria*	Drinker, larva	FH1	9	5	2013	SS
Lepidoptera	Lasiocampidae		*Euthrix potatoria*	Drinker, adult	FH1	18	7	2013	SW
Lepidoptera	Geometridae		*Odezia atrata*	Chimney sweeper	FH1	18	7	2013	SS
Lepidoptera	Lymantriidae		*Orgyia antiqua*	Vapourer, larva	FH1	18	7	2013	SS
Lepidoptera	Noctuidae		*Autographa gamma*	Silver Y	FH1	18	7	2013	SS
Diptera	Stratiomyidae		*Chloromyia formosa*		FH1	18	7	2013	SS
Diptera	Stratiomyidae		*Chloromyia formosa*		FH1	18	7	2013	SW
Diptera	Empididae		*Empis livida*		FH1	18	7	2013	SS
Diptera	Dolichopodidae		*Chrysotus gramineus*		FH1	18	7	2013	SW
Diptera	Dolichopodidae		*Hercostomus germanus*		FH1	18	7	2013	SW
Diptera	Dolichopodidae		*Hercostomus nigripennis*		FH1	18	7	2013	SW
Diptera	Dolichopodidae		*Sciapus contristans*		FH1	18	7	2013	SW
Diptera	Syrphidae		*Syritta pipiens*		FH1	18	7	2013	SS
Diptera	Syrphidae		*Syritta pipiens*		FH1	18	7	2013	SW
Diptera	Syrphidae		*Volucella bombylans*		FH1	18	7	2013	SS
Diptera	Tephritidae		*Urophora jaceana*		FH1	18	7	2013	SW
Diptera	Tachinidae		*Eriothrix rufomaculata*		FH1	18	7	2013	SS
Hymenoptera	Formicidae		*Formica lemani*		FH1	9	5	2013	SS
Hymenoptera	Formicidae		*Formica lemani*		FH1	9	5	2013	SW
Hymenoptera	Formicidae		*Myrmica rubra*		FH1	9	5	2013	GS
Hymenoptera	**Pompilidae**	**Nb.**	***Priocnemis confusor***		**FH1**	**18**	**7**	**2013**	**SS**
Hymenoptera	Vespidae		*Ancistrocerus oviventris*		FH1	18	7	2013	SW
Hymenoptera	Crabronidae		*Crossocerus elongatulus*		FH1	18	7	2013	SW
Hymenoptera	**Crabronidae**	**Na.**	***Argogorytes fargeii***		**FH1**	**18**	**7**	**2013**	**SW**
Hymenoptera	Apidae		*Anthidium manicatum*		FH1	18	7	2013	SW
Hymenoptera	Apidae		*Anthophora plumipes*		FH1	9	5	2013	SS
Hymenoptera	Apidae		*Bombus lucorum*	White-tailed bumblebee	FH1	9	5	2013	SS
Hymenoptera	Apidae		*Bombus lucorum*	White-tailed bumblebee	FH1	9	5	2013	SW

Hymenoptera	Apidae	*Bombus terrestris*	Buff-tailed bumblebee	FH1	9	5	2013	SS
Hymenoptera	Apidae	*Bombus terrestris*	Buff-tailed bumblebee	FH1	9	5	2013	SW
Hymenoptera	Apidae	*Bombus hortorum*	Garden bumblebee	FH1	9	5	2013	SS
Hymenoptera	Apidae	*Bombus lapidarius*	Red-tailed bumblebee	FH1	9	5	2013	SS
Hymenoptera	Apidae	*Bombus lapidarius*	Red-tailed bumblebee	FH1	18	7	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	FH1	9	5	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	FH1	18	7	2013	SS
Isopoda	Trichoniscidae	*Trichoniscus pusillus*		FH1	9	5	2013	GS
Isopoda	Philosciidae	*Philoscia muscorum*		FH1	9	5	2013	GS
Isopoda	Porcellionidiae	*Porcellio scaber*		FH1	9	5	2013	GS
Araneae	Dysderidae	*Harpactea hombergi*		FH1	9	5	2013	GS
Araneae	Tetragnathidae	*Meta mengei*		FH1	9	5	2013	GS
Araneae	Araneidae	*Araneus quadratus*		FH1	18	7	2013	SS
Araneae	Gnaphosidae	*Micaria pulicaria*		FH1	9	5	2013	GS

A1.1.2. FH2 TA2338372153

Thornwick Bay (east). A moderately steep coastal valley on either side of a small stream. The sample station lay in an area of clay perched on low chalk cliffs (see Figure A1.1.2). The orientation of the stream was from north to south giving predominantly east- and west-facing aspects. For the most part, the vegetation was dominated by rather species-poor rank grassland, but there were areas of eroded ground with bare clay and sparse vegetation. Along the stream corridor and the small seepages that run into it there were very localised wetland plant communities, including some stands of quite species-rich brown moss and short sedge vegetation.

Figure A1.1.2. Sample station FH2. Rank neutral grassland on clay with some erosion features over chalk

Table A1.1.2. Checklist of invertebrates recorded from FH2 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Lymnaeidae		*Lymnaea truncatula*		FH2	9	5	2013	GS
Mollusca	Succineidae		*Oxyloma pfeifferi*		FH2	9	5	2013	GS
Mollusca	Arionidae		*Arion ater*		FH2	9	5	2013	GS
Mollusca	Arionidae		*Arion subfuscus*		FH2	9	5	2013	GS
Mollusca	Milacidae		*Milax gagates*		FH2	9	5	2013	GS
Mollusca	Agriolimacidae		*Deroceras panormitanum*		FH2	9	5	2013	GS
Mollusca	Agriolimacidae		*Deroceras reticulatum*		FH2	9	5	2013	GS
Mollusca	Clausiliidae		*Clausilia bidentata*		FH2	9	5	2013	GS
Mollusca	Helicidae		*Monacha cantiana*		FH2	9	5	2013	GS
Mollusca	Helicidae		*Monacha cantiana*		FH2	10	5	2013	SS
Mollusca	Helicidae		*Trichia hispida*		FH2	9	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		FH2	9	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		FH2	18	7	2013	SS
Mollusca	Helicidae		*Helix aspersa*	Garden snail	FH2	9	5	2013	GS
Mollusca	Helicidae		*Helix aspersa*	Garden snail	FH2	18	7	2013	SS
Diplopoda	Polyxenidae		*Polxenus lagurus*		FH2	10	5	2013	SS
Orthoptera	Acrididae		*Omocestus viridulus*	Common green grasshopper	FH2	18	7	2013	SS
Orthoptera	Acrididae		*Chorthippus brunneus*	Field grasshopper	FH2	18	7	2013	SS
Hemiptera	Veliidae		*Velia caprai*		FH2	9	5	2013	GS
Hemiptera	Veliidae		*Velia caprai*		FH2	10	5	2013	SS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	FH2	9	5	2013	SS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	FH2	18	7	2013	SS
Coleoptera	Carabidae		*Loricera pilicornis*		FH2	9	5	2013	GS
Coleoptera	Carabidae		*Paranchus albipes*		FH2	9	5	2013	GS
Coleoptera	Carabidae		*Paranchus albipes*		FH2	10	5	2013	SS
Coleoptera	Cantharidae		*Philorhizus melanocephalus*		FH2	9	5	2013	GS
Coleoptera	Staphylinidae		*Tachyporus hypnorum*		FH2	9	5	2013	GS
Coleoptera	Staphylinidae		*Carpelimus zealandicus*		FH2	18	7	2013	SW
Coleoptera	Cantharidae		*Rhagonycha fulva*		FH2	18	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		FH2	18	7	2013	SW
Coleoptera	Coccinellidae		*Rhyzobius litura*		FH2	9	5	2013	GS
Coleoptera	Coccinellidae		*Coccinella 7-punctata*	7-spot ladybird	FH2	18	7	2013	SS
Coleoptera	Chrysomelidae		*Phaedon tumidulus*		FH2	18	7	2013	SS

Coleoptera	Chrysomelidae		*Neocrepidodera transversa*		FH2	18	7	2013	SS
Coleoptera	Chrysomelidae		*Neocrepidodera transversa*		FH2	18	7	2013	SW
Coleoptera	Curculionidae		*Mecinus pascuorum*		FH2	18	7	2013	SW
Lepidoptera	Hepialidae	**EBL.**	*Hepialus humuli*	Ghost moth	FH2	18	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	FH2	18	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	FH2	18	7	2013	SW
Lepidoptera	Hesperiidae		*Ochlodes venata*	Large skipper	FH2	18	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	FH2	18	7	2013	SS
Lepidoptera	Pieridae		*Pieris brassicae*	Large white	FH2	18	7	2013	SS
Lepidoptera	Lycaenidae		*Lysandra icarus*	Common blue	FH2	18	7	2013	SS
Lepidoptera	Nymphalidae		*Aglais urticae*	Small tortoiseshell	FH2	18	7	2013	SS
Lepidoptera	Nymphalidae		*Inachis io*	Peacock	FH2	18	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	FH2	18	7	2013	SS
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	FH2	18	7	2013	SS
Diptera	Rhagionidae		*Chrysopilus cristatus*		FH2	18	7	2013	SW
Diptera	Rhagionidae		*Rhagio scolopacea*		FH2	18	7	2013	SS
Diptera	Stratiomyidae		*Chloromyia formosa*		FH2	18	7	2013	SS
Diptera	Stratiomyidae		*Chloromyia formosa*		FH2	18	7	2013	SW
Diptera	Empididae		*Empis livida*		FH2	18	7	2013	SS
Diptera	Dolichopodidae		*Dolichopus plumipes*		FH2	18	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus trivialis*		FH2	18	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus ungulatus*		FH2	18	7	2013	SW
Diptera	Dolichopodidae		*Poecilobothrus nobilitatus*		FH2	18	7	2013	SW
Diptera	Dolichopodidae		*Tachytrechus notatus*		FH2	18	7	2013	SW
Diptera	Syrphidae		*Baccha elongata*		FH2	18	7	2013	SS
Diptera	Syrphidae		*Cheilosia illustrata*		FH2	18	7	2013	SS
Diptera	Syrphidae		*Lejogaster metallina*		FH2	18	7	2013	SW
Diptera	Syrphidae		*Melanostoma scalare*		FH2	18	7	2013	SS
Diptera	Syrphidae		*Melanostoma scalare*		FH2	18	7	2013	SW
Diptera	Syrphidae		*Syrphus ribesii*		FH2	18	7	2013	SW
Diptera	Sciomyzidae		*Coremacera marginata*		FH2	18	7	2013	SW
Diptera	Sciomyzidae		*Pherbina coryleti*		FH2	18	7	2013	SW
Hymenoptera	Formicidae		*Formica lemani*		FH2	18	7	2013	SS
Hymenoptera	Formicidae		*Myrmica rubra*		FH2	9	5	2013	GS
Hymenoptera	Formicidae		*Myrmica rubra*		FH2	10	5	2013	SS

Hymenoptera	Formicidae		*Myrmica rubra*		FH2	18	7	2013	SS
Hymenoptera	**Crabronidae**	**Na.**	***Argogorytes fargeii***		**FH2**	**18**	**7**	**2013**	**SS**
Hymenoptera	**Crabronidae**	**Na.**	***Argogorytes fargeii***		**FH2**	**18**	**7**	**2013**	**SW**
Hymenoptera	Apidae		*Lasioglossum villosulum*		FH2	18	7	2013	SW
Hymenoptera	Apidae		*Bombus lapidarius*	Red-tailed bumblebee	FH2	10	5	2013	SS
Hymenoptera	Apidae		*Bombus lapidarius*	Red-tailed bumblebee	FH2	18	7	2013	SS
Hymenoptera	Apidae		*Bombus pascuorum*	Common carder bumblebee	FH2	10	5	2013	SS
Hymenoptera	Apidae		*Bombus pascuorum*	Common carder bumblebee	FH2	18	7	2013	SS
Isopoda	Oniscidae		*Oniscus asellus*		FH2	9	5	2013	GS
Isopoda	Oniscidae		*Oniscus asellus*		FH2	10	5	2013	SS
Isopoda	Armadillidiidae		*Armadillidium vulgare*		FH2	9	5	2013	GS
Isopoda	Armadillidiidae		*Armadillidium vulgare*		FH2	10	5	2013	SS

A1.1.3. FH3 TA2323772252

Thornwick Bay (west). An area of moderately steep grassland lying on north- to north-east-facing slopes. Much of this site had species-rich neutral-calcareous grassland swards of short to moderate height. There were some patches of bare, eroded clay but in general much of this sample station appeared to be quite stable. The flora here was quite rich and included a range of relatively calcicolous species such as pyramidal orchid, salad burnet and restharrow. There were a few damp seepages, but at the time of this survey, much of the area was rather dry, and there was no standing water present.

Figure A1.1.3. Sample station FH3. Species-rich dry grassland with patchy bare clay

Table A1.1.3. Checklist of invertebrates recorded from FH3 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Cochlicopidae		*Cochlicopa lubricella*		FH3	9	5	2013	GS
Mollusca	Arionidae		*Arion ater*		FH3	10	5	2013	SS
Mollusca	Clausiliidae		*Clausilia bidentata*		FH3	9	5	2013	GS
Mollusca	Clausiliidae		*Clausilia bidentata*		FH3	10	5	2013	SS
Mollusca	Helicidae		*Trichia hispida*		FH3	9	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		FH3	9	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		FH3	10	5	2013	SS
Mollusca	Helicidae		*Cepaea nemoralis*		FH3	18	7	2013	SS
Mollusca	Helicidae		*Helix aspersa*	Garden snail	FH3	9	5	2013	GS
Orthoptera	Acrididae		*Omocestus viridulus*	Common green grasshopper	FH3	18	7	2013	SS
Coleoptera	Carabidae		*Bembidion deletum*		FH3	9	5	2013	GS
Coleoptera	Carabidae		*Philorhizus melanocephalus*		FH3	9	5	2013	GS
Coleoptera	Silphidae		*Silpha atrata*		FH3	9	5	2013	GS
Coleoptera	Staphylinidae		*Sepedophilus nigripennis*		FH3	9	5	2013	GS
Coleoptera	Staphylinidae		*Mocyta fungi* agg.		FH3	9	5	2013	GS
Coleoptera	Elateridae		*Aplotarsus incanus*		FH3	10	5	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		FH3	18	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		FH3	18	7	2013	SW
Coleoptera	Coccinellidae		*Rhyzobius litura*		FH3	9	5	2013	GS
Coleoptera	Chrysomelidae		*Phaedon tumidulus*		FH3	18	7	2013	SS
Coleoptera	Apionidae		*Eutrichapion ervi*		FH3	18	7	2013	SW
Coleoptera	Apionidae		*Holotrichapion ononis*		FH3	18	7	2013	SS
Coleoptera	Apionidae		*Ischnopterapion loti*		FH3	18	7	2013	SW
Coleoptera	Apionidae		*Protapion assimile*		FH3	18	7	2013	SW
Coleoptera	Curculionidae		*Mecinus pascuorum*		FH3	18	7	2013	SW
Coleoptera	Curculionidae		*Microplontus rugulosus*		FH3	18	7	2013	SS
Coleoptera	**Curculionidae**	**Nb.**	***Trichosirocalus dawsoni***		**FH3**	**9**	**5**	**2013**	**GS**
Coleoptera	**Curculionidae**	**Nb.**	***Trichosirocalus dawsoni***		**FH3**	**18**	**7**	**2013**	**GS**
Coleoptera	**Curculionidae**	**Nb.**	***Trichosirocalus dawsoni***		**FH3**	**18**	**7**	**2013**	**SS**
Coleoptera	Curculionidae		*Hypera nigrirostris*		FH3	10	5	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	FH3	18	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	FH3	18	7	2013	SW
Lepidoptera	Hesperiidae		*Ochlodes venata*	Large skipper	FH3	18	7	2013	SS

Lepidoptera	Hesperiidae	*Thymelicus sylvestris*	Small skipper	FH3	18	7	2013	SS
Lepidoptera	Hesperiidae	*Thymelicus sylvestris*	Small skipper	FH3	18	7	2013	SW
Lepidoptera	Lycaenidae	*Lysandra icarus*	Common blue	FH3	18	7	2013	SS
Lepidoptera	Nymphalidae	*Maniola jurtina*	Meadow brown	FH3	18	7	2013	SS
Lepidoptera	Nymphalidae	*Aphantopus hyperantus*	Ringlet	FH3	18	7	2013	SS
Lepidoptera	Noctuidae	*Mesoligia literosa*	Rosy minor	FH3	18	7	2013	SS
Diptera	Syrphidae	*Helophilus pendulus*		FH3	18	7	2013	SS
Diptera	Syrphidae	*Platycheirus manicatus*		FH3	18	7	2013	SW
Diptera	Syrphidae	*Scaeva pyrastri*		FH3	18	7	2013	SS
Diptera	Conopidae	*Sicus ferrugineus*		FH3	18	7	2013	SS
Diptera	Ulidiidae	*Herina frondescentiae*		FH3	18	7	2013	SW
Diptera	Ulidiidae	*Herina germinationis*		FH3	18	7	2013	SW
Diptera	Sciomyzidae	*Coremacera marginata*		FH3	18	7	2013	SS
Diptera	Sciomyzidae	*Coremacera marginata*		FH3	18	7	2013	SW
Diptera	Sciomyzidae	*Limnia unguicornis*		FH3	18	7	2013	SW
Diptera	Sciomyzidae	*Tetanocera ferruginea*		FH3	18	7	2013	SW
Diptera	Sciomyzidae	*Trypetoptera punctulata*		FH3	18	7	2013	SW
Hymenoptera	Formicidae	*Myrmica rubra*		FH3	9	5	2013	GS
Hymenoptera	Apidae	*Anthophora plumipes*		FH3	10	5	2013	SS
Hymenoptera	Apidae	*Bombus lucorum*	White-tailed bumblebee	FH3	10	5	2013	SS
Hymenoptera	Apidae	*Bombus lucorum*	White-tailed bumblebee	FH3	18	7	2013	SS
Hymenoptera	Apidae	*Bombus terrestris*	Buff-tailed bumblebee	FH3	18	7	2013	SS
Hymenoptera	Apidae	*Bombus lapidarius*	Red-tailed bumblebee	FH3	18	7	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	FH3	18	7	2013	SS
Isopoda	Trichoniscidae	*Trichoniscus pusillus*		FH3	9	5	2013	GS
Isopoda	Philosciidae	*Philoscia muscorum*		FH3	9	5	2013	GS
Isopoda	Armadillidiidae	*Armadillidium vulgare*		FH3	9	5	2013	GS
Araneae	Theridiidae	*Enoplognatha ovata*		FH3	18	7	2013	SW
Araneae	Tetragnathidae	*Meta mengei*		FH3	10	5	2013	SS
Araneae	Araneidae	*Araneus quadratus*		FH3	18	7	2013	SS
Araneae	Araneidae	*Araneus quadratus*		FH3	18	7	2013	SW
Araneae	Araneidae	*Larinioides cornutus*		FH3	10	5	2013	SS
Araneae	Araneidae	*Larinioides cornutus*		FH3	18	7	2013	SW

A1.1.4. FH4 TA2314872340

Gully west of Thornwick Nab. This sample station encompassed both the east- and west-facing slopes around the small stream running through this gully. Towards the northern (seaward) edge of the sample station, the ground was much eroded, with considerable expanses of bare clay, and only patchy maritime grassland vegetation. On the landward side, the ground became increasingly stable, with closed-sward grassland as well as a small damp area of common reed with much marsh marigold. Other than this latter area, and the narrow stream corridor, the sample station was mostly rather dry during the spring and summer of 2013.

Figure A1.1.4. Sample station FH4. Eroded clay cliffs with patchy vegetation

Table A1.1.4. Checklist of invertebrates recorded from FH4 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Lymnaeidae		*Lymnaea truncatula*		FH4	9	5	2013	GS
Mollusca	Clausiliidae		*Clausilia bidentata*		FH4	9	5	2013	GS
Mollusca	Helicidae		*Cernuella virgata*		FH4	10	5	2013	SS
Mollusca	Helicidae		*Trichia hispida*		FH4	9	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		FH4	9	5	2013	GS
Mollusca	Helicidae		*Helix aspersa*	Garden snail	FH4	19	7	2013	GS
Odonata	Acrididae		*Omocestus viridulus*	Common green grasshopper	FH4	19	7	2013	SS
Orthoptera	Acrididae		*Chorthippus brunneus*	Field grasshopper	FH4	19	7	2013	SS
Orthoptera	Acrididae		*Chorthippus brunneus*	Field grasshopper	FH4	19	7	2013	SW
Coleoptera	Carabidae		*Loricera pilicornis*		FH4	9	5	2013	GS
Coleoptera	Carabidae		*Paranchus albipes*		FH4	9	5	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		FH4	9	5	2013	GS
Coleoptera	Carabidae		*Philorhizus melanocephalus*		FH4	9	5	2013	GS
Coleoptera	Staphylinidae		*Sepedophilus nigripennis*		FH4	9	5	2013	GS
Coleoptera	Staphylinidae		*Tachyporus hypnorum*		FH4	9	5	2013	GS
Coleoptera	Staphylinidae		*Oxypoda elongatula*		FH4	9	5	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		FH4	19	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		FH4	19	7	2013	SW
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	FH4	19	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	FH4	19	7	2013	SW
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	FH4	19	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	FH4	19	7	2013	SW
Lepidoptera	Lycaenidae		*Lysandra icarus*	Common blue	FH4	19	7	2013	SS
Lepidoptera	Nymphalidae		*Aglais urticae*	Small tortoiseshell	FH4	19	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	FH4	19	7	2013	SS
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	FH4	19	7	2013	SS
Diptera	Tipulidae		*Nephrotoma flavescens*		FH4	19	7	2013	SW
Diptera	Limoniidae		*Symplecta stictica*		FH4	19	7	2013	SW
Diptera	**Limoniidae**	**RDB3.**	***Dicranomyia goritiensis***		**FH4**	**19**	**7**	**2013**	**SW**
Diptera	Keroplatidae		*Orfelia nemoralis*		FH4	19	7	2013	SW
Diptera	Empididae		*Empis livida*		FH4	19	7	2013	SS
Diptera	Dolichopodidae		*Dolichopus brevipennis*		FH4	19	7	2013	SW

Diptera	Dolichopodidae	*Dolichopus plumipes*		FH4	19	7	2013	SW
Diptera	Dolichopodidae	*Dolichopus ungulatus*		FH4	19	7	2013	SW
Diptera	Dolichopodidae	*Poecilobothrus nobilitatus*		FH4	19	7	2013	SW
Diptera	Syrphidae	*Eupeodes corollae*		FH4	19	7	2013	SW
Diptera	Syrphidae	*Merodon equestris*		FH4	19	7	2013	SS
Diptera	Syrphidae	*Scaeva pyrastri*		FH4	19	7	2013	SS
Hymenoptera	Formicidae	*Formica lemani*		FH4	10	5	2013	SS
Hymenoptera	Formicidae	*Myrmica rubra*		FH4	10	5	2013	SS
Hymenoptera	Apidae	*Anthophora plumipes*		FH4	10	5	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	FH4	10	5	2013	SW
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	FH4	19	7	2013	SS
Isopoda	Oniscidae	*Oniscus asellus*		FH4	9	5	2013	GS
Isopoda	Philosciidae	*Philoscia muscorum*		FH4	9	5	2013	GS
Isopoda	Armadillidiidae	*Armadillidium vulgare*		FH4	10	5	2013	SS

A1.1.5. RS1 TA1368476703

Reighton Sands. The sample station was located in the actively eroding clay-sand cliffs lying above Reighton Sands, immediately to the west of Boat Cliff. This section of the cliff was for the most part rather dry, though there were some small seepages running down the lower cliff slopes onto the beach. Much of the area had rather ruderal open-structured vegetation in which species such as field horsetail, kidney vetch and coltsfoot were frequent. However, there were some more stable areas with either scrub or species-rich neutral-calcareous grassland. There was also one small damp 'low' with greater reedmace.

Figure A1.1.5. Sample station RS1. Mix of eroded ruderal, stable grassland and scrub vegetation

Table A1.1.5. Checklist of invertebrates recorded from RS1 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Lymnaeidae		*Lymnaea truncatula*		RS1	10	5	2013	GS
Mollusca	Zonitidae		*Aegopinella pura*		RS1	10	5	2013	GS
Mollusca	Helicidae		*Trichia hispida*		RS1	10	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		RS1	19	7	2013	GS
Orthoptera	Tetrigidae		*Tetrix subulata*	Slender groundhopper	RS1	10	5	2013	GS
Orthoptera	Tetrigidae		*Tetrix subulata*	Slender groundhopper	RS1	19	7	2013	SS
Odonata	Acrididae		*Omocestus viridulus*	Common green grasshopper	RS1	19	7	2013	SS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	RS1	19	7	2013	SS
Coleoptera	Carabidae		*Loricera pilicornis*		RS1	10	5	2013	GS
Coleoptera	Carabidae		*Clivina fossor*		RS1	10	5	2013	GS
Coleoptera	Carabidae		*Pterostichus nigrita*		RS1	10	5	2013	GS
Coleoptera	Hydrophilidae		*Anacaena globulus*		RS1	10	5	2013	GS
Coleoptera	Staphylinidae		*Mocyta fungi* agg.		RS1	10	5	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		RS1	19	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		RS1	19	7	2013	SW
Coleoptera	Cryptophagidae		*Micrambe ulicis*		RS1	19	7	2013	SS
Coleoptera	Coccinellidae		*Propylea 14-punctata*	14-spot ladybird	RS1	19	7	2013	SS
Coleoptera	Coccinellidae		*Subcoccinella 24-punctata*	24-spot ladybird	RS1	19	7	2013	SS
Coleoptera	Chrysomelidae		*Galeruca tanaceti*		RS1	19	7	2013	GS
Coleoptera	Chrysomelidae		*Neocrepidodera transversa*		RS1	19	7	2013	SW
Coleoptera	Apionidae		*Ischnopterapion loti*		RS1	19	7	2013	GS
Coleoptera	Apionidae		*Protapion assimile*		RS1	19	7	2013	GS
Coleoptera	Apionidae		*Protapion trifolii*		RS1	19	7	2013	GS
Coleoptera	Curculiondae		*Mecinus pascuorum*		RS1	19	7	2013	GS
Coleoptera	Curculiondae		*Trichosirocalus troglodytes*		RS1	19	7	2013	GS
Coleoptera	Curculiondae		*Hypera nigrirostris*		RS1	19	7	2013	GS
Coleoptera	Curculiondae		*Hypera venusta*		RS1	19	7	2013	GS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	RS1	19	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	RS1	19	7	2013	SW
Lepidoptera	Hesperiidae		*Ochlodes venata*	Large skipper	RS1	19	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	RS1	19	7	2013	SS
Lepidoptera	Nymphalidae		*Melanargia galathea*	Marbled white	RS1	19	7	2013	SS

Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	RS1	19	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	RS1	19	7	2013	SW
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	RS1	19	7	2013	SS
Lepidoptera	Nymphalidae	**EBL.**	*Coenonympha pamphilus*	Small heath	RS1	19	7	2013	SS
Lepidoptera	Arctiidae	**EBL.**	*Tyria jacobaeae*	Cinnabar moth	RS1	19	7	2013	SS
Diptera	Tipulidae		*Nephrotoma flavescens*		RS1	19	7	2013	SW
Diptera	Tipulidae		*Tipula oleracea*		RS1	19	7	2013	SS
Diptera	Rhagionidae		*Chrysopilus cristatus*		RS1	19	7	2013	SS
Diptera	Asilidae		*Leptogaster cylindrica*		RS1	19	7	2013	SS
Diptera	Empididae		*Empis livida*		RS1	19	7	2013	SS
Diptera	Dolichopodidae		*Dolichopus wahlbergi*		RS1	19	7	2013	SW
Diptera	Syrphidae		*Episyrphus balteatus*		RS1	19	7	2013	SS
Diptera	Syrphidae		*Eumerus strigatus*		RS1	19	7	2013	SW
Diptera	Syrphidae		*Helophilus pendulus*		RS1	19	7	2013	SS
Diptera	Syrphidae		*Syrphus vitripennis*		RS1	19	7	2013	SW
Diptera	Syrphidae		*Volucella bombylans*		RS1	19	7	2013	SS
Diptera	Ulidiidae		*Herina germinationis*		RS1	19	7	2013	SW
Diptera	**Tephritidae**	**RDB3.**	***Myopites inulaedyssentericae***		**RS1**	**19**	**7**	**2013**	**SW**
Diptera	Tephritidae		*Urophora jaceana*		RS1	19	7	2013	SW
Diptera	Tephritidae		*Chaetorellia jaceae*		RS1	19	7	2013	SW
Diptera	Sciomyzidae		*Pherbellia cinerella*		RS1	19	7	2013	SW
Diptera	Sciomyzidae		*Limnia unguicornis*		RS1	19	7	2013	SW
Diptera	Sciomyzidae		*Trypetoptera punctulata*		RS1	19	7	2013	SW
Diptera	Tachinidae		*Actia lamia*		RS1	19	7	2013	SW
Hymenoptera	Formicidae		*Formica lemani*		RS1	19	7	2013	SS
Hymenoptera	Formicidae		*Myrmica rubra*		RS1	10	5	2013	GS
Hymenoptera	Formicidae		*Myrmica rubra*		RS1	19	7	2013	SS
Hymenoptera	Formicidae		*Myrmica scabrinodis*		RS1	10	5	2013	GS
Hymenoptera	Pompilidae		*Anoplius nigerrimus*		RS1	19	7	2013	SS
Hymenoptera	Crabronidae		*Crossocerus tarsatus*		RS1	19	7	2013	SS
Hymenoptera	**Crabronidae**	**Na.**	***Argogorytes fargeii***		**RS1**	**19**	**7**	**2013**	**SS**
Hymenoptera	Apidae		*Bombus lucorum*	White-tailed bumblebee	RS1	19	7	2013	SS
Hymenoptera	Apidae		*Bombus hortorum*	Garden bumblebee	RS1	19	7	2013	SS
Hymenoptera	Apidae		*Bombus lapidarius*	Red-tailed bumblebee	RS1	19	7	2013	SS
Hymenoptera	Apidae		*Bombus pascuorum*	Common carder bumblebee	RS1	19	7	2013	SS

Isopoda	Armadillidiidae	*Armadillidium vulgare*	RS1	10	5	2013	GS
Isopoda	Armadillidiidae	*Armadillidium vulgare*	RS1	19	7	2013	SS
Araneae	Araneidae	*Larinioides cornutus*	RS1	19	7	2013	SS

A1.1.6. RS2 TA1384476572

North-western end of Boat Cliff. This was a structurally diverse area, with a network of seepages interspersed with patches of species-rich neutral-calcareous grassland and European gorse scrub. The considerable amount of water movement was resulting in a high degree of erosion, and there were considerable areas of bare or sparsely vegetated sand and clay.

Figure A1.1.6. Sample station RS2. Wet seepages in a mosaic with dry ruderal grassland and scrub

Table A1.1.6. Checklist of invertebrates recorded from RS2 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Enidae		*Ena obscura*		RS2	10	5	2013	GS
Mollusca	Helicidae		*Candidula intersecta*		RS2	10	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		RS2	10	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		RS2	19	7	2013	SS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	RS2	10	5	2013	GS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	RS2	19	7	2013	SS
Coleoptera	Carabidae		*Loricera pilicornis*		RS2	10	5	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		RS2	10	5	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		RS2	19	7	2013	SS
Coleoptera	Staphylinidae		*Acrotona pygmaea*		RS2	10	5	2013	GS
Coleoptera	Staphylinidae		*Atheta aquatica*		RS2	10	5	2013	GS
Coleoptera	Staphylinidae		*Datomicra celata*		RS2	10	5	2013	GS
Coleoptera	Staphylinidae		*Microdota amicula*		RS2	10	5	2013	GS
Coleoptera	Staphylinidae		*Philhygra palustris*		RS2	10	5	2013	GS
Coleoptera	Staphylinidae		*Oxypoda brevicornis*		RS2	10	5	2013	GS
Coleoptera	Staphylinidae		*Bledius gallicus*		RS2	10	5	2013	GS
Coleoptera	Staphylinidae		*Carpelimus zealandicus*		RS2	19	7	2013	SS
Coleoptera	Staphylinidae		*Stenus guttula*		RS2	10	5	2013	GS
Coleoptera	Staphylinidae		*Gabrius breviventer*		RS2	10	5	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		RS2	19	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		RS2	19	7	2013	SW
Coleoptera	Chrysomelidae		*Neocrepidodera transversa*		RS2	19	7	2013	SW
Coleoptera	Chrysomelidae		*Derocrepis rufipes*		RS2	19	7	2013	SW
Coleoptera	Curculionidae		*Hypera venusta*		RS2	19	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	RS2	19	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	RS2	19	7	2013	SW
Lepidoptera	Hesperiidae		*Ochlodes venata*	Large skipper	RS2	19	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	RS2	19	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	RS2	19	7	2013	SW
Lepidoptera	Pieridae		*Pieris brassicae*	Large white	RS2	19	7	2013	SS
Lepidoptera	Nymphalidae		*Melanargia galathea*	Marbled white	RS2	19	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	RS2	19	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	RS2	19	7	2013	SW

Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	RS2	19	7	2013	SS
Lepidoptera	Nymphalidae	**EBL.**	*Coenonympha pamphilus*	Small heath	RS2	19	7	2013	SS
Diptera	Tipulidae		*Nephrotoma flavescens*		RS2	19	7	2013	SW
Diptera	Tipulidae		*Tipula lateralis*		RS2	19	7	2013	SW
Diptera	Limoniidae		*Molophilus bifidus*		RS2	19	7	2013	SW
Diptera	**Limoniidae**	**RDB1.**	***Symplecta chosenensis***		**RS2**	**19**	**7**	**2013**	**SW**
Diptera	**Stratiomyidae**	**N.**	***Oxycera pygmaea***		**RS2**	**19**	**7**	**2013**	**SW**
Diptera	Dolichopodidae		*Argyra argyria*		RS2	19	7	2013	SW
Diptera	Dolichopodidae		*Tachytrechus notatus*		RS2	19	7	2013	SW
Diptera	Dolichopodidae		*Campsicnemus curvipes*		RS2	19	7	2013	SW
Diptera	Dolichopodidae		*Syntormon pallipes*		RS2	19	7	2013	SW
Diptera	Micropezidae		*Micropeza corrigiolata*		RS2	19	7	2013	SW
Diptera	Ulidiidae		*Herina germinationis*		RS2	19	7	2013	SW
Diptera	Tephritidae		*Urophora jaceana*		RS2	19	7	2013	SW
Diptera	Tephritidae		*Chaetorellia jaceae*		RS2	19	7	2013	SW
Diptera	Sciomyzidae		*Pherbellia cinerella*		RS2	19	7	2013	SW
Hymenoptera	Formicidae		*Myrmica rubra*		RS2	10	5	2013	GS
Hymenoptera	Formicidae		*Myrmica rubra*		RS2	19	7	2013	SS
Hymenoptera	Formicidae		*Myrmica scabrinodis*		RS2	19	7	2013	SS
Hymenoptera	Pompilidae		*Anoplius nigerrimus*		RS2	19	7	2013	SS
Hymenoptera	Pompilidae		*Anoplius infuscatus*		RS2	19	7	2013	SS
Hymenoptera	Vespidae		*Gymnomerus laevipes*		RS2	19	7	2013	SS
Hymenoptera	Crabronidae		*Tachysphex pompiliformis*		RS2	19	7	2013	SS
Hymenoptera	Crabronidae		*Crossocerus elongatulus*		RS2	19	7	2013	SS
Hymenoptera	Crabronidae		*Crossocerus tarsatus*		RS2	19	7	2013	SS
Hymenoptera	Crabronidae		*Mellinus arvensis*		RS2	19	7	2013	SS
Hymenoptera	**Crabronidae**	**Na.**	***Argogorytes fargeii***		**RS2**	**19**	**7**	**2013**	**SS**
Hymenoptera	Apidae		*Andrena bicolor*		RS2	19	7	2013	SS
Hymenoptera	Apidae		*Lasioglossum punctatissimum*		RS2	19	7	2013	SS
Hymenoptera	Apidae		*Lasioglossum cupromicans*		RS2	19	7	2013	SS
Hymenoptera	Apidae		*Megachile versicolor*		RS2	19	7	2013	SS
Hymenoptera	Apidae		*Bombus terrestris*	Buff-tailed bumblebee	RS2	19	7	2013	SS
Hymenoptera	Apidae		*Bombus hortorum*	Garden bumblebee	RS2	19	7	2013	SS
Hymenoptera	Apidae		*Bombus lapidarius*	Red-tailed bumblebee	RS2	19	7	2013	SS
Hymenoptera	Apidae		*Bombus pratorum*	Early bumblebee	RS2	19	7	2013	SS

Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	RS2	19	7	2013	SS
Isopoda	Trichoniscidae	*Trichoniscus pusillus*		RS2	10	5	2013	GS
Isopoda	Oniscidae	*Oniscus asellus*		RS2	10	5	2013	GS
Isopoda	Oniscidae	*Oniscus asellus*		RS2	19	7	2013	SS
Isopoda	Porcellionidae	*Porcellio scaber*		RS2	10	5	2013	GS
Isopoda	Armadillidiidae	*Armadillidium vulgare*		RS2	10	5	2013	GS
Araneae	Tetragnathidae	*Meta mengei*		RS2	10	5	2013	GS

A1.1.7. RS3 TA1441776097

West end of Speeton Sands. A very good range of habitat features were present here, including eroding sand-clay cliffs with sparse ruderal vegetation, species-rich grassland, brown moss seepages, sparsely vegetated seepages and European gorse scrub. The seepages here were some of the wettest encountered during the 2013 survey and despite the dry weather this year, they had surface water running throughout the spring and summer survey period.

Figure A1.1.7. Sample station RS3. Actively eroding cliffs with mixed stable and ruderal communities

Table A1.1.7. Checklist of invertebrates recorded from RS3 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Lymnaeidae		*Lymnaea truncatula*		RS3	11	5	2013	GS
Mollusca	Arionidae		*Arion ater*		RS3	11	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		RS3	19	7	2013	SS
Mollusca	Helicidae		*Helix aspersa*	Garden snail	RS3	11	5	2013	GS
Orthoptera	Tetrigidae		*Tetrix undulata*	Common groundhopper	RS3	11	5	2013	GS
Orthoptera	Acrididae		*Omocestus viridulus*	Common green grasshopper	RS3	19	7	2013	SS
Orthoptera	Acrididae		*Chorthippus brunneus*	Field grasshopper	RS3	19	7	2013	SS
Coleoptera	Dytiscidae		*Hydroporus tessellatus*		RS3	11	5	2013	GS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	RS3	11	5	2013	GS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	RS3	19	7	2013	SS
Coleoptera	Carabidae		*Loricera pilicornis*		RS3	11	5	2013	GS
Coleoptera	Carabidae		*Bembidion deletum*		RS3	11	5	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		RS3	11	5	2013	GS
Coleoptera	Carabidae		*Bembidion articulatum*		RS3	11	5	2013	GS
Coleoptera	Carabidae		*Bembidion lunulatum*		RS3	11	5	2013	GS
Coleoptera	Carabidae		*Pterostichus madidus*		RS3	11	5	2013	GS
Coleoptera	Hydrophilidae		*Anacaena globulus*		RS3	11	5	2013	GS
Coleoptera	Silphidae		*Silpha atrata*		RS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Lesteva longoelytrata*		RS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Bledius gallicus*		RS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Stenus guttula*		RS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Stenus pusillus*		RS3	11	5	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		RS3	19	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		RS3	19	7	2013	SW
Coleoptera	Chrysomelidae		*Phaedon tumidulus*		RS3	19	7	2013	SS
Coleoptera	Chrysomelidae		*Neocrepidodera transversa*		RS3	19	7	2013	SW
Coleoptera	Chrysomelidae		*Derocrepis rufipes*		RS3	19	7	2013	SW
Coleoptera	Apionidae		*Oxystoma subulatum*		RS3	19	7	2013	SW
Coleoptera	Apionidae		*Protapion assimile*		RS3	19	7	2013	SW
Coleoptera	**Erirhinidae**	**Nb.**	***Grypus equiseti***		**RS3**	**11**	**5**	**2013**	**GS**
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	RS3	19	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	RS3	19	7	2013	SW
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	RS3	19	7	2013	SS

Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	RS3	19	7	2013	SW
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	RS3	19	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	RS3	19	7	2013	SW
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	RS3	19	7	2013	SS
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	RS3	19	7	2013	SW
Lepidoptera	Nymphalidae	**EBL.**	*Coenonympha pamphilus*	Small heath	RS3	19	7	2013	SS
Diptera	Tipulidae		*Nephrotoma flavescens*		RS3	19	7	2013	SW
Diptera	Tipulidae		*Tipula oleracea*		RS3	19	7	2013	SW
Diptera	Limoniidae		*Erioconopa trivialis*		RS3	19	7	2013	SW
Diptera	**Limoniidae**	**RDB1.**	***Symplecta chosenensis***		**RS3**	**11**	**5**	**2013**	**GS**
Diptera	Limoniidae		*Dicranomyia modesta*		RS3	19	7	2013	SW
Diptera	Rhagionidae		*Chrysopilus cristatus*		RS3	19	7	2013	SS
Diptera	**Stratiomyidae**	**N.**	***Oxycera pygmaea***		**RS3**	**19**	**7**	**2013**	**SW**
Diptera	Dolichopodidae		*Argyra argyria*		RS3	19	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus ungulatus*		RS3	19	7	2013	SW
Diptera	Dolichopodidae		*Poecilobothrus nobilitatus*		RS3	19	7	2013	SW
Diptera	Ulidiidae		*Herina germinationis*		RS3	19	7	2013	SW
Diptera	**Tephritidae**	**RDB3.**	***Myopites inulaedyssentericae***		**RS3**	**19**	**7**	**2013**	**SW**
Diptera	Muscidae		*Coenosia tigrina*		RS3	19	7	2013	SW
Hymenoptera	Formicidae		*Myrmica rubra*		RS3	11	5	2013	GS
Hymenoptera	Formicidae		*Myrmica rubra*		RS3	19	7	2013	SS
Hymenoptera	Apidae		*Bombus lapidarius*	Red-tailed bumblebee	RS3	19	7	2013	SS
Hymenoptera	Apidae		*Bombus pratorum*	Early bumblebee	RS3	19	7	2013	SS
Hymenoptera	Apidae		*Bombus pascuorum*	Common carder bumblebee	RS3	19	7	2013	SS
Isopoda	Oniscidae		*Oniscus asellus*		RS3	11	5	2013	GS
Isopoda	Armadillidiidae		*Armadillidium vulgare*		RS3	11	5	2013	GS
Araneae	Lycosidae		*Arctosa leopardus*		RS3	11	5	2013	GS

A1.1.8. RS4 TA1452275986

Central section of of Speeton Sands. A relatively stable area, though still with appreciable areas of bare clay-sand and sparse ruderal vegetation. Compared to the other sample stations at this study site, RS4 had unusually large amounts of more stable neutral-calcareous grassland habitats, which had a diverse flora. Also, there was a damp 'low' with mixed rush and greater reedmace fen. Throughout this area, there were patches of hawthorn and European gorse scrub.

Figure A1.1.8. Sample station RS4. A relatively stable area with species-rich grassland, scrub and fen

Table A1.1.8. Checklist of invertebrates recorded from RS4 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Zonitidae		*Aegopinella pura*		RS4	11	5	2013	GS
Mollusca	Helicidae		*Candidula intersecta*		RS4	11	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		RS4	11	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		RS4	20	7	2013	GS
Mollusca	Helicidae		*Helix aspersa*	Garden snail	RS4	11	5	2013	GS
Orthoptera	Tetrigidae		*Tetrix undulata*	Common groundhopper	RS4	11	5	2013	GS
Orthoptera	Acrididae		*Omocestus viridulus*	Common green grasshopper	RS4	20	7	2013	SS
Orthoptera	Acrididae		*Chorthippus brunneus*	Field grasshopper	RS4	20	7	2013	SS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	RS4	11	5	2013	GS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	RS4	20	7	2013	GS
Coleoptera	Carabidae		*Loricera pilicornis*		RS4	11	5	2013	GS
Coleoptera	Carabidae		*Pterostichus madidus*		RS4	20	7	2013	GS
Coleoptera	**Georissidae**	**N.**	***Georissus crenulatus***		**RS4**	**11**	**5**	**2013**	**GS**
Coleoptera	Hydrophilidae		*Anacaena globulus*		RS4	11	5	2013	GS
Coleoptera	Staphylinidae		*Drusilla canaliculata*		RS4	11	5	2013	GS
Coleoptera	Staphylinidae		*Bledius gallicus*		RS4	11	5	2013	GS
Coleoptera	**Staphylinidae**	**Nb.**	***Platydracus latebricola***		**RS4**	**11**	**5**	**2013**	**SS**
Coleoptera	Elateridae		*Adrastus pallens*		RS4	20	7	2013	SW
Coleoptera	Cantharidae		*Rhagonycha fulva*		RS4	20	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		RS4	20	7	2013	SW
Coleoptera	Apionidae		*Protapion apricans*		RS4	20	7	2013	GS
Coleoptera	Apionidae		*Protapion assimile*		RS4	20	7	2013	GS
Coleoptera	Apionidae		*Protapion trifolii*		RS4	20	7	2013	GS
Coleoptera	**Erirhinidae**	**Nb.**	***Grypus equiseti***		**RS4**	**20**	**7**	**2013**	**SW**
Coleoptera	Curculionidae		*Hypera nigrirostris*		RS4	20	7	2013	GS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	RS4	20	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	RS4	20	7	2013	SW
Lepidoptera	Hesperiidae		*Ochlodes venata*	Large skipper	RS4	20	7	2013	SW
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	RS4	20	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	RS4	20	7	2013	SW
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	RS4	20	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	RS4	20	7	2013	SW
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	RS4	20	7	2013	SS

Lepidoptera	Nymphalidae	**EBL.**	*Coenonympha pamphilus*	Small heath	RS4	20	7	2013	SS
Lepidoptera	Lasiocampidae		*Euthrix potatoria*	Drinker, larva	RS4	11	5	2013	SS
Lepidoptera	Arctiidae	**EBL.**	*Tyria jacobaeae*	Cinnabar moth	RS4	20	7	2013	SW
Diptera	Tipulidae		*Nephrotoma flavescens*		RS4	20	7	2013	SW
Diptera	Tipulidae		*Tipula lateralis*		RS4	20	7	2013	SW
Diptera	**Limoniidae**	**RDB2.**	***Idiocera bradleyi***		**RS4**	**20**	**7**	**2013**	**SW**
Diptera	Limoniidae		*Molophilus obscurus*		RS4	20	7	2013	SW
Diptera	Limoniidae		*Symplecta stictica*		RS4	20	7	2013	SW
Diptera	**Limoniidae**	**RDB1.**	***Symplecta chosenensis***		**RS4**	**20**	**7**	**2013**	**SW**
Diptera	Rhagionidae		*Chrysopilus cristatus*		RS4	20	7	2013	SW
Diptera	Rhagionidae		*Rhagio scolopaceus*		RS4	20	7	2013	SS
Diptera	Stratiomyidae		*Oxycera trilineata*		RS4	20	7	2013	SW
Diptera	Empididae		*Empis livida*		RS4	20	7	2013	SS
Diptera	Dolichopodidae		*Argyra argyria*		RS4	20	7	2013	SW
Diptera	Dolichopodidae		*Sympycnus desoutteri*		RS4	20	7	2013	SW
Diptera	Dolichopodidae		*Syntormon monile*		RS4	20	7	2013	SW
Diptera	Syrphidae		*Eristalis tenax*		RS4	20	7	2013	SS
Diptera	Syrphidae		*Melanogaster hirtella*		RS4	20	7	2013	SW
Diptera	Syrphidae		*Platycheirus manicatus*		RS4	11	5	2013	SW
Diptera	Syrphidae		*Rhingia campestris*		RS4	11	5	2013	SS
Diptera	Ulidiidae		*Herina germinationis*		RS4	20	7	2013	SW
Diptera	Tephritidae		*Urophora jaceana*		RS4	20	7	2013	SW
Diptera	Tephritidae		*Chaetorellia jaceae*		RS4	20	7	2013	SW
Diptera	Sciomyzidae		*Pherbellia cinerella*		RS4	20	7	2013	SW
Diptera	Sciomyzidae		*Limnia unguicornis*		RS4	20	7	2013	SW
Diptera	**Sciomyzidae**	**N.**	***Tetanocera punctifrons***		**RS4**	**20**	**7**	**2013**	**SW**
Diptera	Tachinidae		*Siphona geniculata*		RS4	20	7	2013	SS
Hymenoptera	Formicidae		*Formica lemani*		RS4	11	5	2013	GS
Hymenoptera	Formicidae		*Lasius flavus*		RS4	11	5	2013	GS
Hymenoptera	Formicidae		*Lasius flavus*		RS4	20	7	2013	SS
Hymenoptera	Formicidae		*Myrmica rubra*		RS4	11	5	2013	GS
Hymenoptera	Formicidae		*Myrmica rubra*		RS4	20	7	2013	SS
Hymenoptera	Formicidae		*Myrmica scabrinodis*		RS4	11	5	2013	GS
Hymenoptera	Pompilidae		*Priocnemis exaltata*		RS4	20	7	2013	SS
Hymenoptera	**Crabronidae**	**Na.**	***Argogorytes fargeii***		**RS4**	**20**	**7**	**2013**	**SS**

Hymenoptera	Apidae	*Andrena bicolor*		RS4	11	5	2013	SW
Hymenoptera	Apidae	*Andrena bicolor*		RS4	20	7	2013	SS
Hymenoptera	Apidae	*Andrena haemorrhoa*		RS4	11	5	2013	SS
Hymenoptera	Apidae	*Andrena haemorrhoa*		RS4	11	5	2013	SW
Hymenoptera	Apidae	*Bombus lapidarius*	Red-tailed bumblebee	RS4	20	7	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	RS4	11	5	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	RS4	20	7	2013	SS
Isopoda	Trichoniscidae	*Androniscus dentiger*		RS4	11	5	2013	GS
Isopoda	Trichoniscidae	*Trichoniscus pusillus*		RS4	11	5	2013	GS
Isopoda	Oniscidae	*Oniscus asellus*		RS4	11	5	2013	GS
Isopoda	Philosciidae	*Philoscia muscorum*		RS4	11	5	2013	GS
Isopoda	Armadillidiidae	*Armadillidium vulgare*		RS4	11	5	2013	GS
Araneae	Araneidae	*Larinioides cornutus*		RS4	20	7	2013	SS

A1.1.9. GS1 TA0887283623

Gristhorpe Sands, eastern end below the caravan park, lower cliff. The cliffs here were mostly comprised of greyer clays than are present elsewhere at this study site. The sample station lay on a low 'toe' above the beach. Above it, there were very high and heavily eroded clay cliffs. There were a number of small seepages with sparse vegetation, including a few clumps of soft rush *Juncus effusus* and the drier grassland was for the most part similarly disturbed. More stable areas of grassland were only present as small localised patches, though where they occured, they could be quite species-rich. These more stable areas also had a few patches of European gorse scrub.

Figure A1.1.9. Sample station GS1. Heavily eroded ruderal grassland with small seepages

Table A1.1.9. Checklist of invertebrates recorded from GS1 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Lymnaeidae		*Lymnaea truncatula*		GS1	12	5	2013	GS
Mollusca	Discidae		*Discus rotundatus*		GS1	12	5	2013	GS
Mollusca	Arionidae		*Arion ater*		GS1	12	5	2013	GS
Mollusca	Helicidae		*Trichia striolata*		GS1	22	7	2013	GS
Orthoptera	Tetrigidae		*Tetrix undulata*	Common groundhopper	GS1	22	7	2013	SS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	GS1	22	7	2013	SS
Coleoptera	Carabidae		*Loricera pilicornis*		GS1	12	5	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		GS1	12	5	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		GS1	22	7	2013	SS
Coleoptera	Carabidae		*Pterostichus nigrita*		GS1	12	5	2013	GS
Coleoptera	Carabidae		*Paranchus albipes*		GS1	12	5	2013	GS
Coleoptera	Carabidae		*Chlaenius vestitus*		GS1	12	5	2013	GS
Coleoptera	Carabidae		*Paradromius linearis*		GS1	12	5	2013	GS
Coleoptera	**Georissidae**	**N.**	***Georissus crenulatus***		**GS1**	**12**	**5**	**2013**	**GS**
Coleoptera	Hydraenidae		*Ochthebius dilatatus*		GS1	12	5	2013	GS
Coleoptera	Staphylinidae		*Lesteva longoelytrata*		GS1	12	5	2013	GS
Coleoptera	Staphylinidae		*Aloconota gregaria*		GS1	12	5	2013	GS
Coleoptera	Staphylinidae		*Philhygra elongatula*		GS1	12	5	2013	GS
Coleoptera	Staphylinidae		*Bledius gallicus*		GS1	12	5	2013	GS
Coleoptera	Staphylinidae		*Carpelimus elongatulus*		GS1	12	5	2013	GS
Coleoptera	Staphylinidae		*Carpelimus rivularis*		GS1	12	5	2013	GS
Coleoptera	Staphylinidae		*Stenus fulvicornis*		GS1	12	5	2013	GS
Coleoptera	Staphylinidae		*Stenus guttula*		GS1	12	5	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		GS1	22	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		GS1	22	7	2013	SW
Coleoptera	Coccinellidae		*Rhyzobius litura*		GS1	12	5	2013	GS
Coleoptera	Chrysomelidae		*Derocrepis rufipes*		GS1	22	7	2013	GS
Coleoptera	Apionidae		*Protapion trifolii*		GS1	22	7	2013	GS
Coleoptera	**Erirhinidae**	**Nb.**	***Grypus equiseti***		**GS1**	**12**	**5**	**2013**	**GS**
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	GS1	22	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	GS1	22	7	2013	SW
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	GS1	22	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	GS1	22	7	2013	SW

Lepidoptera	Pieridae		*Pieris napi*	Green-veined white	GS1	12	5	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	GS1	22	7	2013	SS
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	GS1	22	7	2013	SS
Lepidoptera	Nymphalidae	**EBL.**	*Coenonympha pamphilus*	Small heath	GS1	22	7	2013	SS
Diptera	Tipulidae		*Tipula oleracea*		GS1	12	5	2013	SW
Diptera	Tipulidae		*Tipula lateralis*		GS1	22	7	2013	SW
Diptera	**Limoniidae**	**RDB1.**	***Symplecta chosenensis***		**GS1**	**12**	**5**	**2013**	**GS**
Diptera	**Limoniidae**	**RDB1.**	***Symplecta chosenensis***		**GS1**	**22**	**7**	**2013**	**SW**
Diptera	Hybotidae		*Tachydromia aemula*		GS1	22	7	2013	SW
Diptera	Dolichopodidae		*Argyra argyria*		GS1	22	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus ungulatus*		GS1	22	7	2013	SW
Diptera	Dolichopodidae		*Rhaphium caliginosum*		GS1	22	7	2013	SW
Diptera	Dolichopodidae		*Syntormon pallipes*		GS1	22	7	2013	SW
Diptera	Dolichopodidae		*Teuchophorus spinigerellus*		GS1	22	7	2013	SW
Diptera	Syrphidae		*Episyrphus balteatus*		GS1	22	7	2013	SS
Diptera	Micropezidae		*Micropeza corrigiolata*		GS1	22	7	2013	SW
Diptera	Ulidiidae		*Herina germinationis*		GS1	22	7	2013	SW
Diptera	Muscidae		*Lispe pygmaea*		GS1	22	7	2013	SW
Hymenoptera	Formicidae		*Myrmica rubra*		GS1	12	5	2013	GS
Hymenoptera	Formicidae		*Myrmica rubra*		GS1	22	7	2013	SS
Hymenoptera	Apidae		*Bombus pascuorum*	Common carder bumblebee	GS1	22	7	2013	SS
Araneae	Araneidae		*Larinioides cornutus*		GS1	12	5	2013	GS
Araneae	Thomisidae		*Xysticus cristatus*		GS1	12	5	2013	GS

A1.1.10. GS2 TA0844583827

Gristhorpe Sands, central eastern section ,mid-cliff. The substrate here was a reddish clay-sand matrix. As with most other parts of this study site, therewass considerable erosion here, with a part of the cliff adjacent to the sample station collapsing between the two visits. There had clearly been considerable water movement through this area over the previous winter, and the vegetation community reflected this, being typical of damp, ruderal conditions, with species such as horsetails, coltsfoot and common fleabane predominating. However, by the time of this survey, conditions were quite dry, with no surface water.

Figure A1.1.10. Sample station GS2. Highly eroded slope with ruderal vegetation

Table A1.1.10. Checklist of invertebrates recorded from GS2 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Lymnaeidae		*Lymnaea truncatula*		GS2	22	7	2013	GS
Mollusca	Succineidae		*Oxyloma pfeifferi*		GS2	11	5	2013	GS
Mollusca	Cochlicopidae		*Cochlicopa lubrica*		GS2	11	5	2013	GS
Mollusca	Arionidae		*Arion ater*		GS2	21	7	2013	SS
Mollusca	Zonitidae		*Nesovitrea hammonis*		GS2	11	5	2013	GS
Mollusca	Zonitidae		*Aegopinella nitidula*		GS2	11	5	2013	GS
Mollusca	Helicidae		*Monacha cantiana*		GS2	21	7	2013	SS
Mollusca	Helicidae		*Arianta arbustorum*		GS2	11	5	2013	GS
Mollusca	Helicidae		*Arianta arbustorum*		GS2	21	7	2013	SS
Mollusca	Helicidae		*Cepaea nemoralis*		GS2	11	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		GS2	21	7	2013	SS
Homoptera	Psyllidae		*Livia junci*		GS2	22	7	2013	GS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	GS2	11	5	2013	GS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	GS2	21	7	2013	SS
Coleoptera	Carabidae		*Loricera pilicornis*		GS2	11	5	2013	GS
Coleoptera	Carabidae		*Bembidion deletum*		GS2	22	7	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		GS2	11	5	2013	GS
Coleoptera	Carabidae		*Pterostichus strenuus*		GS2	11	5	2013	GS
Coleoptera	Hydrophilidae		*Anacaena globulus*		GS2	11	5	2013	GS
Coleoptera	Hydrophilidae		*Anacaena globulus*		GS2	22	7	2013	GS
Coleoptera	Hydraenidae		*Limnebius truncatellus*		GS2	22	7	2013	GS
Coleoptera	Staphylinidae		*Philorinum sordidum*		GS2	11	5	2013	GS
Coleoptera	Staphylinidae		*Mocyta fungi* agg.		GS2	11	5	2013	GS
Coleoptera	Staphylinidae		*Bledius gallicus*		GS2	11	5	2013	GS
Coleoptera	Staphylinidae		*Stenus impressus*		GS2	11	5	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		GS2	21	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		GS2	22	7	2013	SW
Coleoptera	Cryptophagidae		*Micrambe ulicis*		GS2	11	5	2013	GS
Coleoptera	Coccinellidae		*Rhyzobius litura*		GS2	22	7	2013	SW
Coleoptera	Coccinellidae		*Propylea 14-punctata*	14-spot ladybird	GS2	22	7	2013	SW
Coleoptera	Chrysomelidae		*Neocrepidodera transversa*		GS2	22	7	2013	SW
Coleoptera	Chrysomelidae		*Derocrepis rufipes*		GS2	22	7	2013	GS
Coleoptera	Chrysomelidae		*Chaetocnema hortensis*		GS2	22	7	2013	GS

Coleoptera	Apionidae		*Exapion ulicis*		GS2	11	5	2013	GS
Coleoptera	Apionidae		*Protapion apricans*		GS2	22	7	2013	GS
Coleoptera	Apionidae		*Protapion assimile*		GS2	22	7	2013	GS
Coleoptera	Apionidae		*Protapion trifolii*		GS2	22	7	2013	GS
Coleoptera	**Erirhinidae**	**Nb.**	***Grypus equiseti***		**GS2**	**11**	**5**	**2013**	**GS**
Coleoptera	Curculionidae		*Sciaphilus asperatus*		GS2	22	7	2013	GS
Coleoptera	Curculionidae		*Andrion regensteinense*		GS2	11	5	2013	GS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	GS2	21	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	GS2	22	7	2013	SW
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	GS2	21	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	GS2	21	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	GS2	22	7	2013	SW
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	GS2	21	7	2013	SS
Lepidoptera	Nymphalidae	**EBL.**	*Coenonympha pamphilus*	Small heath	GS2	21	7	2013	SS
Lepidoptera	Arctiidae	**EBL.**	*Tyria jacobaeae*	Cinnabar moth	GS2	21	7	2013	SS
Diptera	Tipulidae		*Tipula lateralis*		GS2	22	7	2013	SW
Diptera	Limoniidae		*Erioconopa trivialis*		GS2	22	7	2013	SW
Diptera	Rhagionidae		*Chrysopilus cristatus*		GS2	21	7	2013	SS
Diptera	Rhagionidae		*Rhagio scolopaceus*		GS2	21	7	2013	SS
Diptera	Stratiomyidae		*Beris vallata*		GS2	22	7	2013	SW
Diptera	Stratiomyidae		*Nemotelus nigrinus*		GS2	22	7	2013	SW
Diptera	Empididae		*Empis livida*		GS2	21	7	2013	SS
Diptera	Empididae		*Empis livida*		GS2	22	7	2013	SW
Diptera	Dolichopodidae		*Argyra argyria*		GS2	22	7	2013	SW
Diptera	Syrphidae		*Chrysotoxum bicinctum*		GS2	21	7	2013	SS
Diptera	Syrphidae		*Episyrphus balteatus*		GS2	21	7	2013	SS
Diptera	Syrphidae		*Scaeva pyrastri*		GS2	21	7	2013	SS
Diptera	Tephritidae		*Urophora jaceana*		GS2	22	7	2013	SW
Diptera	Tephritidae		*Urophora stylata*		GS2	22	7	2013	SW
Diptera	Tephritidae		*Xyphosia miliaria*		GS2	22	7	2013	SW
Diptera	Sciomyzidae		*Coremacera marginata*		GS2	21	7	2013	SW
Diptera	Sciomyzidae		*Hydromya dorsalis*		GS2	22	7	2013	SW
Diptera	Sciomyzidae		*Limnia unguicornis*		GS2	22	7	2013	SW
Diptera	**Sciomyzidae**	**N.**	***Tetanocera punctifrons***		**GS2**	**22**	**7**	**2013**	**SW**
Diptera	Tachinidae		*Siphona geniculata*		GS2	21	7	2013	SS

Hymenoptera	Formicidae	*Myrmica rubra*		GS2	11	5	2013	GS
Hymenoptera	Formicidae	*Myrmica rubra*		GS2	21	7	2013	SS
Hymenoptera	Apidae	*Bombus hortorum*	Garden bumblebee	GS2	21	7	2013	SS
Hymenoptera	Apidae	*Bombus lapidarius*	Red-tailed bumblebee	GS2	21	7	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	GS2	11	5	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	GS2	21	7	2013	SS
Isopoda	Trichoniscidae	*Trichoniscus pusillus*		GS2	11	5	2013	GS
Isopoda	Philosciidae	*Philoscia muscorum*		GS2	11	5	2013	GS
Isopoda	Armadillidiidae	*Armadillidium vulgare*		GS2	11	5	2013	GS
Isopoda	Armadillidiidae	*Armadillidium vulgare*		GS2	21	7	2013	SS
Araneae	Araneidae	*Larinioides cornutus*		GS2	11	5	2013	GS
Araneae	Lycosidae	*Arctosa leopardus*		GS2	11	5	2013	GS

A1.1.11. GS3 TA0839383947

Lebberston Cliff, eastern section, mid-cliff. This area was one of the least eroded patches of vegetation on this cliff section. It comprised a series of very wet seepages that had surface water throughout the year. Around these, a tall soft rush-dominated poor fen had developed. On the periphery of the sample station were more actively eroded areas, with some development of more sparsely vegetated seepages, as well as areas of dry, eroded banks with sparse vegetation.

Figure A1.1.11. Sample station GS3. Very wet seepages with dense soft rush fen

Table A1.1.11. Checklist of invertebrates recorded from GS3 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Succineidae		*Oxyloma pfeifferi*		GS3	11	5	2013	GS
Mollusca	Arionidae		*Arion ater*		GS3	21	7	2013	SS
Mollusca	Zonitidae		*Aegopinella nitidula*		GS3	11	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		GS3	11	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		GS3	21	7	2013	SS
Coleoptera	Dytiscidae		*Hydroporus tessellatus*		GS3	11	5	2013	GS
Coleoptera	**Carabidae**		***Bembidion bualei***		**GS3**	**11**	**5**	**2013**	**GS**
Coleoptera	Carabidae		*Bembidion deletum*		GS3	21	7	2013	GS
Coleoptera	Carabidae		*Bembidion tetracolum*		GS3	21	7	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		GS3	11	5	2013	GS
Coleoptera	Carabidae		*Paradromius linearis*		GS3	11	5	2013	GS
Coleoptera	Hydrophilidae		*Anacaena globulus*		GS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Lesteva longoelytrata*		GS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Lesteva sicula*		GS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Tachyporus chrysomelinus* agg.		GS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Tachyporus obtusus*		GS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Stenus flavipes*		GS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Stenus guttula*		GS3	11	5	2013	GS
Coleoptera	Staphylinidae		*Stenus guttula*		GS3	21	7	2013	SS
Coleoptera	**Staphylinidae**	**N.**	***Platydracus latebricola***		**GS3**	**21**	**7**	**2013**	**SS**
Coleoptera	Cantharidae		*Rhagonycha fulva*		GS3	21	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		GS3	21	7	2013	SW
Coleoptera	Coccinellidae		*Rhyzobius litura*		GS3	11	5	2013	GS
Coleoptera	Chrysomelidae		*Neocrepidodera transversa*		GS3	21	7	2013	SW
Coleoptera	Apionidae		*Eutrichapion ervi*		GS3	21	7	2013	GS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	GS3	21	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	GS3	21	7	2013	SW
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	GS3	21	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	GS3	21	7	2013	SW
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	GS3	21	7	2013	SS
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	GS3	21	7	2013	SS
Lepidoptera	Noctuidae		*Gortyna flavago*	Frosted orange	GS3	21	7	2013	SS
Diptera	Tipulidae		*Nephrotoma flavescens*		GS3	21	7	2013	SW

Diptera	Tipulidae		*Tipula oleracea*		GS3	21	7	2013	SW
Diptera	Tipulidae		*Tipula lateralis*		GS3	21	7	2013	SW
Diptera	**Limoniidae**	**RDB2.**	***Idiocera bradleyi***		**GS3**	**21**	**7**	**2013**	**SW**
Diptera	Limoniidae		*Molophilus bifidus*		GS3	21	7	2013	SW
Diptera	Limoniidae		*Molophilus obscurus*		GS3	21	7	2013	SW
Diptera	Limoniidae		*Pilaria discicollis*		GS3	21	7	2013	SW
Diptera	Limoniidae		*Dicranomyia mitis*		GS3	21	7	2013	SW
Diptera	Rhagionidae		*Chrysopilus cristatus*		GS3	21	7	2013	SS
Diptera	Dolichopodidae		*Argyra argyria*		GS3	21	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus brevipennis*		GS3	21	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus plumipes*		GS3	21	7	2013	SW
Diptera	Dolichopodidae		*Rhaphium caliginosum*		GS3	21	7	2013	SW
Diptera	Dolichopodidae		*Campsicnemus scambus*		GS3	21	7	2013	SW
Diptera	Dolichopodidae		*Syntormon denticulatum*		GS3	21	7	2013	SW
Diptera	Dolichopodidae		*Syntormon fuscipes*		GS3	21	7	2013	SW
Diptera	Dolichopodidae		*Syntormon pallipes*		GS3	21	7	2013	SW
Diptera	Dolichopodidae		*Syntormon pumilum*		GS3	21	7	2013	SW
Diptera	Syrphidae		*Episyrphus balteatus*		GS3	21	7	2013	SS
Diptera	Syrphidae		*Episyrphus balteatus*		GS3	21	7	2013	SW
Diptera	Syrphidae		*Paragus haemorrhous*		GS3	21	7	2013	SW
Diptera	Syrphidae		*Scaeva pyrastri*		GS3	21	7	2013	SS
Diptera	Syrphidae		*Syrphus vitripennis*		GS3	21	7	2013	SW
Diptera	Sciomyzidae		*Renocera stroblii*		GS3	21	7	2013	SW
Hymenoptera	Formicidae		*Myrmica rubra*		GS3	11	5	2013	GS
Hymenoptera	Formicidae		*Myrmica rubra*		GS3	21	7	2013	SS
Hymenoptera	Apidae		*Bombus lucorum*	White-tailed bumblebee	GS3	11	5	2013	SS
Hymenoptera	Apidae		*Bombus pascuorum*	Common carder bumblebee	GS3	21	7	2013	SS
Isopoda	Trichoniscidae		*Trichoniscus pusillus*		GS3	11	5	2013	GS
Isopoda	Oniscidae		*Oniscus asellus*		GS3	11	5	2013	GS
Araneae	Lycosidae		*Arctosa leopardus*		GS3	11	5	2013	GS
Araneae	Philodromidae		*Tibellus oblongus*		GS3	11	5	2013	GS

A1.1.12. GS4 TA0844983931

Lebberston Cliff, eastern section, lower cliff. This sample station was located in an area where a line of seepages emerged from the lower cliff. There was a very high degree of erosion, with only sparse, ruderal vegetation at best and much bare clay and sand. This was one of the wettest areas of seepages looked at in 2013, with the ground being permanently saturated throughout the summer despite the rather dry weather. There was little vegetation other than scattered tussocks of soft rush. Drier banks around the edge of the seepages had scattered vegetation dominated by kidney vetch.

Figure A1.1.12. Sample station GS4. Highly eroded cliff with very extensive seepage network

Table A1.1.12. Checklist of invertebrates recorded from GS4 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Lymnaeidae		*Lymnaea truncatula*		GS4	12	5	2013	GS
Mollusca	Succineidae		*Oxyloma pfeifferi*		GS4	12	5	2013	GS
Mollusca	Helicidae		*Trichia striolata*		GS4	22	7	2013	GS
Mollusca	Helicidae		*Arianta arbustorum*		GS4	22	7	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		GS4	22	7	2013	GS
Coleoptera	Tetrigidae		*Tetrix subulata*		GS4	12	5	2013	GS
Orthoptera	Acrididae		*Omocestus viridulus*	Common green grasshopper	GS4	22	7	2013	SS
Orthoptera	Acrididae		*Chorthippus brunneus*	Field grasshopper	GS4	22	7	2013	SS
Coleoptera	Dytiscidae		*Hygrotus impressopunctatus*		GS4	12	5	2013	GS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	GS4	12	5	2013	GS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	GS4	22	7	2013	SS
Coleoptera	Carabidae		*Notiophilus palustris*		GS4	12	5	2013	GS
Coleoptera	Carabidae		*Elaphrus riparius*		GS4	12	5	2013	GS
Coleoptera	Carabidae		*Loricera pilicornis*		GS4	12	5	2013	GS
Coleoptera	**Carabidae**		***Dyschirius aeneus***		**GS4**	**12**	**5**	**2013**	**GS**
Coleoptera	**Carabidae**		***Bembidion bualei***		**GS4**	**12**	**5**	**2013**	**GS**
Coleoptera	Carabidae		*Bembidion deletum*		GS4	12	5	2013	GS
Coleoptera	Carabidae		*Bembidion tetracolum*		GS4	12	5	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		GS4	12	5	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		GS4	22	7	2013	SS
Coleoptera	Carabidae		*Pterostichus nigrita*		GS4	12	5	2013	GS
Coleoptera	Carabidae		*Chlaenius vestitus*		GS4	12	5	2013	GS
Coleoptera	Carabidae		*Chlaenius vestitus*		GS4	22	7	2013	SS
Coleoptera	**Georissidae**	**N.**	***Georissus crenulatus***		**GS4**	**12**	**5**	**2013**	**GS**
Coleoptera	Staphylinidae		*Lesteva longoelytrata*		GS4	12	5	2013	GS
Coleoptera	Staphylinidae		*Carpelimus rivularis*		GS4	12	5	2013	GS
Coleoptera	Staphylinidae		*Carpelimus zealandicus*		GS4	12	5	2013	GS
Coleoptera	Staphylinidae		*Carpelimus corticinus*		GS4	12	5	2013	GS
Coleoptera	Staphylinidae		*Stenus guttula*		GS4	12	5	2013	GS
Coleoptera	Staphylinidae		*Stenus providus*		GS4	12	5	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		GS4	22	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		GS4	22	7	2013	SW
Coleoptera	**Heteroceridae**	**N.**	***Heterocerus marginatus***		**GS4**	**12**	**5**	**2013**	**GS**

Coleoptera	Chrysomelidae		*Longitarsus suturellus*		GS4	12	5	2013	GS
Coleoptera	Chrysomelidae		*Hippuriphila modeeri*		GS4	12	5	2013	GS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	GS4	22	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicerae*	Narrow-bordered 5-spot burnet	GS4	22	7	2013	SW
Lepidoptera	Hesperiidae		*Ochlodes venata*	Large skipper	GS4	22	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	GS4	22	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	GS4	22	7	2013	SW
Lepidoptera	Lycaenidae		*Lysandra icarus*	Common blue	GS4	22	7	2013	SS
Lepidoptera	Nymphalidae		*Aglais urticae*	Small tortoiseshell	GS4	22	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	GS4	22	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	GS4	22	7	2013	SW
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	GS4	22	7	2013	SS
Lepidoptera	Nymphalidae	**EBL.**	*Coenonympha pamphilus*	Small heath	GS4	22	7	2013	SS
Lepidoptera	Noctuidae		*Autographa gamma*	Silver Y	GS4	22	7	2013	SS
Diptera	Limoniidae		*Erioptera flavata*		GS4	22	7	2013	SW
Diptera	Limoniidae		*Molophilus bifidus*		GS4	22	7	2013	SW
Diptera	**Limoniidae**	**RDB1.**	***Symplecta chosenensis***		**GS4**	**22**	**7**	**2013**	**SW**
Diptera	Asilidae		*Leptogaster cylindrica*		GS4	22	7	2013	SW
Diptera	Dolichopodidae		*Argyra argyria*		GS4	22	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus brevipennis*		GS4	22	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus plumipes*		GS4	22	7	2013	SW
Diptera	Dolichopodidae		*Campsicnemus marginatus*		GS4	22	7	2013	SW
Diptera	Dolichopodidae		*Syntormon pumilum*		GS4	22	7	2013	SW
Diptera	Syrphidae		*Episyrphus balteatus*		GS4	22	7	2013	SS
Diptera	Syrphidae		*Melanostoma scalare*		GS4	12	5	2013	GS
Diptera	Syrphidae		*Scaeva pyrastri*		GS4	22	7	2013	SS
Diptera	Conopidae		*Sicus ferrugineus*		GS4	22	7	2013	SS
Diptera	Scathophagidae		*Scathophaga stercoraria*		GS4	12	5	2013	SS
Hymenoptera	Chrysididae		*Chrysis viridula*		GS4	22	7	2013	SS
Hymenoptera	Formicidae		*Myrmica rubra*		GS4	12	5	2013	GS
Hymenoptera	Formicidae		*Myrmica rubra*		GS4	22	7	2013	SS
Hymenoptera	Vespidae		*Odynerus spinipes*		GS4	22	7	2013	SS
Hymenoptera	Apidae		*Bombus hortorum*	Garden bumblebee	GS4	22	7	2013	SS
Hymenoptera	Apidae		*Bombus lapidarius*	Red-tailed bumblebee	GS4	22	7	2013	SS
Hymenoptera	Apidae		*Bombus pascuorum*	Common carder bumblebee	GS4	22	7	2013	SS

Isopoda	Armadillidiidae	*Armadillidium vulgare*	GS4	12	5	2013	GS

A1.1.13. CB1 TA0614585234

Cayton Cliff, middle slopes. In marked contrast to much of the Flamborough to Scarborough coast, this section of the cliffs has been sufficiently stable to develop a cover of woodland. Sample station 1 was typical of the woodland cover, with sycamore and horse chestnut being the most prominent species, though there was also frequent ash. Around the pools and seepages that occur throughout the woods, there were stands of grey willow and alder. The ground and field layer had a rich woodland flora, with hart'stongue *Phyllitis scolopendrium*, opposite-leaved golden saxifrage *Chrysosplenium oppositifolium* and pendulous sedge *Carex pendula* amongst the most conspicuous elements. Around theshallow pool margins, there were stands of marsh marigold.

Figure A1.1.13. Sample station CB1. Sycamore woodland with extensive network of seepages

Table A1.1.13. Checklist of invertebrates recorded from CB1 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Arionidae		*Arion ater*		CB1	13	5	2013	GS
Mollusca	Helicidae		*Trichia striolata*		CB1	13	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		CB1	13	5	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		CB1	21	7	2013	SS
Hemiptera	Veliidae		*Velia caprai*		CB1	13	5	2013	GS
Coleoptera	Carabidae		*Loricera pilicornis*		CB1	13	5	2013	GS
Coleoptera	Carabidae		*Ocys harpaloides*		CB1	13	5	2013	GS
Coleoptera	Staphylinidae		*Atheta castanoptera*		CB1	21	7	2013	GS
Coleoptera	Staphylinidae		*Bolitochara obliqua*		CB1	13	5	2013	GS
Coleoptera	Staphylinidae		*Gyrophaena affinis*		CB1	21	7	2013	GS
Coleoptera	Staphylinidae		*Gyrophaena bihamata*		CB1	21	7	2013	GS
Coleoptera	Staphylinidae		*Gyrophaena fasciata*		CB1	21	7	2013	GS
Coleoptera	Staphylinidae		*Gyrophaena gentilis*		CB1	21	7	2013	GS
Coleoptera	**Staphylinidae**	**N.**	***Gyrophaena joyioides***		**CB1**	**21**	**7**	**2013**	**GS**
Coleoptera	**Staphylinidae**	**N.**	***Gyrophaena manca***		**CB1**	**21**	**7**	**2013**	**GS**
Coleoptera	Staphylinidae		*Gabrius splendidulus*		CB1	13	5	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		CB1	21	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		CB1	21	7	2013	SW
Coleoptera	Nitidulidae		*Epuraea silacea*		CB1	21	7	2013	GS
Coleoptera	Cerylonidae		*Cerylon ferrugineum*		CB1	13	5	2013	GS
Coleoptera	Chrysomelidae		*Gastrophysa polygoni*		CB1	13	5	2013	GS
Lepidoptera	Nymphalidae		*Pararge aegeria*	Speckled wood	CB1	21	7	2013	SS
Diptera	Limoniidae		*Molophilus appendiculatus*		CB1	21	7	2013	SW
Diptera	**Limoniidae**	**N.**	***Molophilus corniger***		**CB1**	**21**	**7**	**2013**	**SW**
Diptera	**Limoniidae**	**N.**	***Neolimnophila carteri***		**CB1**	**21**	**7**	**2013**	**SW**
Diptera	Limoniidae		*Austrolimnophila ochracea*		CB1	21	7	2013	SW
Diptera	Limoniidae		*Pilaria fuscipennis*		CB1	21	7	2013	SW
Diptera	Limoniidae		*Pseudolimnophila lucorum*		CB1	21	7	2013	SW
Diptera	Limoniidae		*Pseudolimnophila sepium*		CB1	21	7	2013	SW
Diptera	Limoniidae		*Dicranomyia fusca*		CB1	21	7	2013	SW
Diptera	Limoniidae		*Limonia macrostigma*		CB1	21	7	2013	SW
Diptera	Ptychopteridae		*Ptychoptera albimana*		CB1	21	7	2013	SW
Diptera	Ptychopteridae		*Ptychoptera lacustris*		CB1	21	7	2013	SW

Diptera	Dolichopodidae	*Argyra diaphana*		CB1	21	7	2013	SW
Diptera	Dolichopodidae	*Dolichopus ungulatus*		CB1	21	7	2013	SW
Diptera	Dolichopodidae	*Sybistroma obscurellum*		CB1	21	7	2013	SW
Diptera	Dolichopodidae	*Sciapus platypterus*		CB1	21	7	2013	SW
Diptera	Syrphidae	*Baccha elongata*		CB1	13	5	2013	SS
Diptera	Syrphidae	*Epistrophe eligans*		CB1	21	7	2013	SS
Diptera	Syrphidae	*Episyrphus balteatus*		CB1	21	7	2013	SS
Diptera	Syrphidae	*Eristalis pertinax*		CB1	21	7	2013	SS
Diptera	Syrphidae	*Helophilus pendulus*		CB1	13	5	2013	SS
Diptera	Syrphidae	*Melanostoma mellinum*		CB1	13	5	2013	SS
Diptera	Syrphidae	*Myathropa florea*		CB1	21	7	2013	SS
Diptera	Syrphidae	*Platycheirus albimanus*		CB1	13	5	2013	SS
Diptera	Syrphidae	*Platycheirus albimanus*		CB1	21	7	2013	SS
Diptera	Syrphidae	*Volucella pellucens*		CB1	21	7	2013	SS
Diptera	Muscidae	*Coenosia rufipalpis*		CB1	21	7	2013	SW
Hymenoptera	Apidae	*Bombus lucorum*	White-tailed bumblebee	CB1	13	5	2013	SS
Hymenoptera	Apidae	*Bombus hypnorum*	Tree bumblebee	CB1	21	7	2013	SS
Hymenoptera	Apidae	*Bombus pratorum*	Early bumblebee	CB1	13	5	2013	SS
Hymenoptera	Apidae	*Bombus pratorum*	Early bumblebee	CB1	21	7	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	CB1	21	7	2013	SS
Isopoda	Trichoniscidae	*Trichoniscus pusillus*		CB1	13	5	2013	GS
Isopoda	Oniscidae	*Oniscus asellus*		CB1	13	5	2013	GS
Isopoda	Porcellionidae	*Porcellio scaber*		CB1	13	5	2013	GS

A1.1.14. CB2 TA0632085192

Cayton Cliff, lower slopes. This sample station was situated at the point where the wooded clay slopes run out onto the beach. Therewass a small pool here fringed with a common reed-dominated tall fen. Behind this, the open wetland backed into woodland with a mix of grey willow, alder, sycamore and ash. Small seepages ran out over sparsely vegetated clay and there was also a small pool behind a shallow ridge of sand and shingle at the top of the beach.

Figure A1.1.14. Sample station CB2. Common reed fen and low clay banks with seepages backed by scrub

Table A1.1.14. Checklist of invertebrates recorded from CB2 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Helicidae		*Cepaea nemoralis*		CB2	12	5	2013	GS
Odonata	Coenagrionidae		*Ischnura elegans*	Blue-tailed damselfly	CB2	21	7	2013	SS
Odonata	Aeshnidae		*Aeshna grandis*	Brown hawker	CB2	21	7	2013	SS
Orthoptera	Acrididae		*Omocestus viridulus*	Common green grasshopper	CB2	21	7	2013	SS
Orthoptera	Acrididae		*Chorthippus brunneus*	Field grasshopper	CB2	21	7	2013	SS
Coleoptera	Dytiscidae		*Rhantus exsoletus*		CB2	12	5	2013	GS
Coleoptera	Carabidae		*Cicindela campestris*	Green tiger beetle	CB2	21	7	2013	GS
Coleoptera	Carabidae		*Bembidion deletum*		CB2	12	5	2013	GS
Coleoptera	**Carabidae**	**Nb.**	***Bembidion saxatile***		**CB2**	**12**	**5**	**2013**	**GS**
Coleoptera	**Carabidae**	**Nb.**	***Bembidion saxatile***		**CB2**	**21**	**7**	**2013**	**GS**
Coleoptera	**Carabidae**		***Bembidion stephensii***		**CB2**	**12**	**5**	**2013**	**GS**
Coleoptera	Carabidae		*Bembidion tetracolum*		CB2	21	7	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		CB2	12	5	2013	GS
Coleoptera	Carabidae		*Pterostichus vernalis*		CB2	12	5	2013	GS
Coleoptera	Carabidae		*Paranchus albipes*		CB2	12	5	2013	GS
Coleoptera	Carabidae		*Paradromius linearis*		CB2	12	5	2013	GS
Coleoptera	Carabidae		*Paradromius linearis*		CB2	21	7	2013	GS
Coleoptera	Helophoridae		*Helophorus brevipalpis*		CB2	12	5	2013	GS
Coleoptera	Hydrophilidae		*Laccobius bipunctatus*		CB2	21	7	2013	GS
Coleoptera	Staphylinidae		*Tachyporus obtusus*		CB2	12	5	2013	GS
Coleoptera	Staphylinidae		*Mocyta fungi* agg.		CB2	12	5	2013	GS
Coleoptera	Staphylinidae		*Anotylus rugosus*		CB2	12	5	2013	GS
Coleoptera	Staphylinidae		*Bledius opacus*		CB2	21	7	2013	GS
Coleoptera	Staphylinidae		*Stenus juno*		CB2	12	5	2013	GS
Coleoptera	Staphylinidae		*Cafius xantholoma*		CB2	21	7	2013	GS
Coleoptera	**Scirtidae**	**N.**	***Elodes elongata***		**CB2**	**21**	**7**	**2013**	**SS**
Coleoptera	Scirtidae		*Cyphon coarctatus*		CB2	21	7	2013	SW
Coleoptera	Scirtidae		*Scirtes hemisphaericus*		CB2	21	7	2013	SW
Coleoptera	Elateridae		*Adrastus pallens*		CB2	21	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		CB2	21	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		CB2	21	7	2013	SW
Coleoptera	Chrysomelidae		*Neocrepidodera transversa*		CB2	21	7	2013	SW
Coleoptera	Chrysomelidae		*Derocrepis rufipes*		CB2	21	7	2013	GS

Coleoptera	Curculionidae		*Barypeithes araneiformis*		CB2	21	7	2013	GS
Coleoptera	Curculionidae		*Hypera venusta*		CB2	21	7	2013	GS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	CB2	21	7	2013	SS
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	CB2	21	7	2013	SS
Lepidoptera	Arctiidae	**EBL.**	*Tyria jacobaeae*	Cinnabar moth	CB2	21	7	2013	SS
Diptera	Tipulidae		*Tipula oleracea*		CB2	21	7	2013	SW
Diptera	Tipulidae		*Tipula lateralis*		CB2	21	7	2013	SW
Diptera	Limoniidae		*Molophilus obscurus*		CB2	21	7	2013	SW
Diptera	Limoniidae		*Symplecta stictica*		CB2	21	7	2013	SW
Diptera	**Limoniidae**	**RDB1.**	***Symplecta chosenensis***		**CB2**	**21**	**7**	**2013**	**SW**
Diptera	Limoniidae		*Pseudolimnophila sepium*		CB2	21	7	2013	SW
Diptera	Rhagionidae		*Chrysopilus asiliformis*		CB2	21	7	2013	SW
Diptera	Rhagionidae		*Chrysopilus cristatus*		CB2	21	7	2013	SS
Diptera	Rhagionidae		*Rhagio lineola*		CB2	21	7	2013	SW
Diptera	Stratiomyidae		*Oxycera nigricornis*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Argyra argyria*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Argyra diaphana*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus longicornis*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus ungulatus*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Hercostomus cupreus*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Liancalus virens*		CB2	21	7	2013	SS
Diptera	Dolichopodidae		*Sciapus platypterus*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Anepsiomyia flaviventris*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Sympycnus aeneicoxa*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Syntormon denticulatum*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Syntormon fuscipes*		CB2	21	7	2013	SW
Diptera	Dolichopodidae		*Teuchophorus monacanthus*		CB2	21	7	2013	SW
Diptera	Syrphidae		*Episyrphus balteatus*		CB2	21	7	2013	SS
Diptera	Syrphidae		*Melanostoma scalare*		CB2	21	7	2013	SW
Diptera	Syrphidae		*Xylota sylvarum*		CB2	21	7	2013	SS
Diptera	Ulidiidae		*Melieria omissa*		CB2	21	7	2013	SW
Diptera	Sciomyzidae		*Pherbellia schoenherri*		CB2	21	7	2013	SW
Diptera	Sciomyzidae		*Renocera stroblii*		CB2	21	7	2013	SW
Diptera	Tachinidae		*Siphona geniculata*		CB2	21	7	2013	SS
Hymenoptera	Formicidae		*Formica lemani*		CB2	21	7	2013	GS

Hymenoptera	Formicidae	*Lasius niger*		CB2	21	7	2013	GS
Hymenoptera	Apidae	*Bombus hortorum*	Garden bumblebee	CB2	21	7	2013	SS
Hymenoptera	Apidae	*Bombus lapidarius*	Red-tailed bumblebee	CB2	21	7	2013	SS
Hymenoptera	Apidae	*Bombus pascuorum*	Common carder bumblebee	CB2	21	7	2013	SS
Isopoda	Trichoniscidae	*Trichoniscus pusillus*		CB2	12	5	2013	GS
Isopoda	Oniscidae	*Oniscus asellus*		CB2	12	5	2013	GS

A1.1.15. CB3 TA0632085192

Cayton Cliff, top of slope. This sample station was in an area of open ground at the top of the wooded cliffs, and marked an area of active erosion that was backed by agricultural land and housing. The sample station had an excellent mosaic of sparsely vegetated ground and more stable areas of grassland, some of which were quite species-rich. A network of small seepages ran down the slopes. Some of these were eroded, but there were others that were less disturbed, with high cover of vegetation such as brown mosses and low sedges. The site was surrounded by scrub and woodland, and there were also scattered bushes of sea buckthorn *Hippophae rhamnoides* here.

Figure A1.1.15. Sample station CB3. Mosaic of actively eroding clay-sand with more stable grassland

Table A1.1.15. Checklist of invertebrates recorded from CB3 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Helicidae		*Trichia striolata*		CB3	13	5	2013	GS
Mollusca	Helicidae		*Arianta arbustorum*		CB3	13	5	2013	GS
Mollusca	Helicidae		*Arianta arbustorum*		CB3	21	7	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		CB3	21	7	2013	GS
Mollusca	Helicidae		*Cepaea nemoralis*		CB3	21	7	2013	SS
Orthoptera	Acrididae		*Chorthippus brunneus*	Field grasshopper	CB3	21	7	2013	SS
Orthoptera	Tetrigidae		*Tetrix undulata*	Common groundhopper	CB3	13	5	2013	GS
Coleoptera	Carabidae		*Notiophilus biguttatus*		CB3	21	7	2013	GS
Coleoptera	Carabidae		*Elaphrus cupreus*		CB3	13	5	2013	GS
Coleoptera	Carabidae		*Loricera pilicornis*		CB3	21	7	2013	GS
Coleoptera	Carabidae		*Bembidion deletum*		CB3	13	5	2013	GS
Coleoptera	Carabidae		*Bembidion deletum*		CB3	21	7	2013	GS
Coleoptera	Carabidae		*Bembidion tetracolum*		CB3	13	5	2013	GS
Coleoptera	Carabidae		*Bembidion illigeri*		CB3	13	5	2013	GS
Coleoptera	Carabidae		*Pterostichus nigrita*		CB3	13	5	2013	GS
Coleoptera	Carabidae		*Paranchus albipes*		CB3	13	5	2013	GS
Coleoptera	**Georissidae**	**N.**	***Georissus crenulatus***		**CB3**	**21**	**7**	**2013**	**GS**
Coleoptera	Staphylinidae		*Bledius gallicus*		CB3	21	7	2013	GS
Coleoptera	**Staphylinidae**	**Nb.**	***Stenus fuscicornis***		**CB3**	**21**	**7**	**2013**	**GS**
Coleoptera	Staphylinidae		*Stenus impressus*		CB3	13	5	2013	GS
Coleoptera	Staphylinidae		*Stenus nitidiusculus*		CB3	13	5	2013	GS
Coleoptera	Staphylinidae		*Stenus providus*		CB3	13	5	2013	GS
Coleoptera	Staphylinidae		*Stenus providus*		CB3	21	7	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		CB3	21	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		CB3	21	7	2013	SW
Coleoptera	Coccinellidae		*Coccinella 7-punctata*	7-spot ladybird	CB3	13	5	2013	SW
Lepidoptera	Zygaenidae		*Zygaena lonicera*	Narrow-bordered 5-spot burnet	CB3	21	7	2013	SS
Lepidoptera	Zygaenidae		*Zygaena lonicera*	Narrow-bordered 5-spot burnet	CB3	21	7	2013	SW
Lepidoptera	Hesperiidae		*Ochlodes venata*	Large skipper	CB3	21	7	2013	SS
Lepidoptera	Hesperiidae		*Thymelicus sylvestris*	Small skipper	CB3	21	7	2013	SS
Lepidoptera	Pieridae		*Gonepteryx rhamni*	Brimstone	CB3	21	7	2013	SS
Lepidoptera	Pieridae		*Pieris napi*	Green-veined white	CB3	13	5	2013	SS
Lepidoptera	Lycaenidae		*Lycaena phlaeas*	Small copper	CB3	13	5	2013	SS

Lepidoptera	Nymphalidae		*Aglais urticae*	Small tortoiseshell	CB3	21	7	2013	SS
Lepidoptera	Nymphalidae		*Pararge aegeria*	Speckled wood	CB3	21	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	CB3	21	7	2013	SS
Lepidoptera	Nymphalidae		*Maniola jurtina*	Meadow brown	CB3	21	7	2013	SW
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	CB3	21	7	2013	SS
Lepidoptera	Nymphalidae		*Aphantopus hyperantus*	Ringlet	CB3	21	7	2013	SW
Diptera	Limoniidae		*Erioptera lutea*		CB3	21	7	2013	SW
Diptera	Limoniidae		*Molophilus bifidus*		CB3	21	7	2013	SW
Diptera	Limoniidae		*Molophilus obscurus*		CB3	21	7	2013	SW
Diptera	Limoniidae		*Pseudolimnophila sepium*		CB3	21	7	2013	SW
Diptera	Rhagionidae		*Chrysopilus cristatus*		CB3	21	7	2013	SS
Diptera	**Stratiomyidae**	**N.**	***Oxycera morrisii***		**CB3**	**21**	**7**	**2013**	**SS**
Diptera	**Stratiomyidae**	**N.**	***Stratiomys potamida***		**CB3**	**21**	**7**	**2013**	**SS**
Diptera	Bombyliidae		*Bombylius major*		CB3	13	5	2013	SS
Diptera	Dolichopodidae		*Argyra argentina*		CB3	21	7	2013	SW
Diptera	Dolichopodidae		*Argyra argyria*		CB3	21	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus ungulatus*		CB3	21	7	2013	SW
Diptera	Dolichopodidae		*Hercostomus gracilis*		CB3	21	7	2013	SW
Diptera	Dolichopodidae		*Rhaphium caliginosum*		CB3	21	7	2013	SW
Diptera	Dolichopodidae		*Campsicnemus curvipes*		CB3	21	7	2013	SW
Diptera	Dolichopodidae		*Syntormon denticulatum*		CB3	21	7	2013	SW
Diptera	Dolichopodidae		*Syntormon fuscipes*		CB3	21	7	2013	SW
Diptera	Dolichopodidae		*Teuchophorus spinigerellus*		CB3	21	7	2013	SW
Diptera	Syrphidae		*Brachypalpoides lentus*		CB3	21	7	2013	SS
Diptera	Syrphidae		*Cheilosia illustrata*		CB3	21	7	2013	SS
Diptera	Syrphidae		*Episyrphus balteatus*		CB3	21	7	2013	SS
Diptera	Syrphidae		*Eristalis arbustorum*		CB3	21	7	2013	SS
Diptera	Syrphidae		*Eristalis interruptus*		CB3	13	5	2013	SS
Diptera	Syrphidae		*Eristalis tenax*		CB3	13	5	2013	SS
Diptera	Syrphidae		*Helophilus pendulus*		CB3	21	7	2013	SS
Diptera	Syrphidae		*Melanostoma mellinum*		CB3	13	5	2013	SS
Diptera	Syrphidae		*Melanostoma mellinum*		CB3	13	5	2013	SW
Diptera	Syrphidae		*Melanostoma scalare*		CB3	13	5	2013	SS
Diptera	Syrphidae		*Platycheirus albimanus*		CB3	13	5	2013	SW
Diptera	Syrphidae		*Xylota segnis*		CB3	21	7	2013	SS

Diptera	Micropezidae		*Micropeza corrigiolata*		CB3	21	7	2013	SW
Diptera	Tephritidae		*Urophora jaceana*		CB3	21	7	2013	SW
Diptera	Tephritidae		*Tephritis vespertina*		CB3	21	7	2013	SW
Diptera	Muscidae		*Coenosia rufipalpis*		CB3	21	7	2013	SW
Diptera	Tachinidae		*Siphona geniculata*		CB3	21	7	2013	SS
Hymenoptera	Mutillidae		*Myrmosa atra*		CB3	21	7	2013	SS
Hymenoptera	Formicidae		*Myrmica rubra*		CB3	21	7	2013	GS
Hymenoptera	Crabronidae		*Oxybelus uniglumis*		CB3	21	7	2013	SS
Hymenoptera	Crabronidae		*Passaloecus gracilis*		CB3	21	7	2013	SS
Hymenoptera	**Crabronidae**	**Na.**	***Argogorytes fargeii***		**CB3**	**21**	**7**	**2013**	**SS**
Hymenoptera	Apidae		*Bombus lucorum*	White-tailed bumblebee	CB3	13	5	2013	SS
Hymenoptera	Apidae		*Bombus terrestris*	Buff-tailed bumblebee	CB3	13	5	2013	SS
Hymenoptera	Apidae		*Bombus terrestris*	Buff-tailed bumblebee	CB3	21	7	2013	SS
Hymenoptera	Apidae		*Bombus hortorum*	Garden bumblebee	CB3	21	7	2013	SS
Hymenoptera	Apidae		*Bombus lapidarius*	Red-tailed bumblebee	CB3	21	7	2013	SS
Hymenoptera	Apidae		*Bombus pratorum*	Early bumblebee	CB3	13	5	2013	SS
Hymenoptera	Apidae		*Bombus pascuorum*	Common carder bumblebee	CB3	13	5	2013	SS
Hymenoptera	Apidae		*Bombus pascuorum*	Common carder bumblebee	CB3	21	7	2013	SS
Isopoda	Trichoniscidae		*Androniscus dentiger*		CB3	13	5	2013	GS
Isopoda	Oniscidae		*Oniscus asellus*		CB3	13	5	2013	GS

A1.1.16. CB4 TA0624984861

Tenants Cliff, middle slopes. This sample station was centred on a pond and its surroundings located in an old cliff slump. A fence runs through the centre of the pond, with the section to the south being cattle grazed and having trampled margins with low growth of floating sweet-grass *Glyceria fluitans* and water-crowfoot *Ranunculus* sp. plus much bare, poached mud. To the north, the pond edges were ungrazed, and there was taller vegetation, including beds of yellow flag *Iris pseudacorus*.

Figure A1.1.16. Sample station CB4. Shallow pool and cattle-trampled margins

Table A1.1.16. Checklist of invertebrates recorded from CB4 sample station in 2013

Group	Family	Status	Species scientific name	Species common name	Sample station	Dy	Mo	Year	Sample
Mollusca	Lymnaeidae		*Lymnaea truncatula*		CB4	13	5	2013	GS
Mollusca	Lymnaeidae		*Lymnaea stagnalis*		CB4	13	5	2013	GS
Mollusca	Planorbidae		*Anisus vortex*		CB4	13	5	2013	GS
Mollusca	Arionidae		*Arion ater*		CB4	13	5	2013	GS
Orthoptera	Tetrigidae		*Tetrix subulata*	Slender groundhopper	CB4	13	5	2013	GS
Coleoptera	Carabidae		*Elaphrus cupreus*		CB4	13	5	2013	GS
Coleoptera	Carabidae		*Elaphrus riparius*		CB4	13	5	2013	GS
Coleoptera	Carabidae		*Loricera pilicornis*		CB4	13	5	2013	GS
Coleoptera	Carabidae		*Agonum fuliginosum*		CB4	13	5	2013	GS
Coleoptera	Carabidae		*Agonum gracile*		CB4	13	5	2013	GS
Coleoptera	Carabidae		*Agonum marginatum*		CB4	13	5	2013	GS
Coleoptera	Carabidae		*Pterostichus nigrita*		CB4	13	5	2013	GS
Coleoptera	Carabidae		*Stenolophus mixtus*		CB4	13	5	2013	GS
Coleoptera	Carabidae		*Acupalpus dubius*		CB4	13	5	2013	GS
Coleoptera	Hydrophilidae		*Hydrobius fuscipes*		CB4	13	5	2013	GS
Coleoptera	Staphylinidae		*Stenus cicindeloides*		CB4	13	5	2013	GS
Coleoptera	Staphylinidae		*Stenus bifoveolatus*		CB4	13	5	2013	GS
Coleoptera	Staphylinidae		*Stenus nitidiusculus*		CB4	13	5	2013	GS
Coleoptera	Staphylinidae		*Stenus picipennis*		CB4	13	5	2013	GS
Coleoptera	Staphylinidae		*Stenus boops*		CB4	13	5	2013	GS
Coleoptera	Staphylinidae		*Stenus juno*		CB4	13	5	2013	GS
Coleoptera	Staphylinidae		*Philonthus umbratilis*		CB4	13	5	2013	GS
Coleoptera	Staphylinidae		*Quedius maurorufus*		CB4	13	5	2013	GS
Coleoptera	Cantharidae		*Rhagonycha fulva*		CB4	21	7	2013	SS
Coleoptera	Cantharidae		*Rhagonycha fulva*		CB4	21	7	2013	SW
Lepidoptera	Pieridae		*Pieris napi*	Green-veined white	CB4	13	5	2013	SS
Diptera	Limoniidae		*Austrolimnophila ochracea*		CB4	21	7	2013	SW
Diptera	Ptychopteridae		*Ptychoptera minuta*		CB4	21	7	2013	SW
Diptera	Rhagionidae		*Chrysopilus cristatus*		CB4	21	7	2013	SS
Diptera	Stratiomyidae		*Chloromyia formosa*		CB4	21	7	2013	SS
Diptera	Hybotidae		*Hybos culiciformis*		CB4	21	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus latilimbatus*		CB4	21	7	2013	SW
Diptera	Dolichopodidae		*Dolichopus ungulatus*		CB4	21	7	2013	SW

Diptera	Dolichopodidae	*Poecilobothrus nobilitatus*	CB4	21	7	2013	SW
Diptera	Dolichopodidae	*Poecilobothrus principalis*	CB4	21	7	2013	SW
Diptera	Dolichopodidae	*Rhaphium caliginosum*	CB4	21	7	2013	SW
Diptera	Syrphidae	*Eristalis tenax*	CB4	21	7	2013	SS
Diptera	Syrphidae	*Melanostoma scalare*	CB4	21	7	2013	SW
Diptera	Syrphidae	*Platycheirus rosarum*	CB4	21	7	2013	SW
Diptera	Sciomyzidae	*Elgiva cucularia*	CB4	21	7	2013	SW

APPENDIX 2: INVERTEBRATE CHECKLIST, 2013 SURVEY

A full checklist of all the invertebrate species recorded during the 2013 survey is given in Table A2 below. The abbreviated statuses given for some species in the second column are explained at the beginning of sub-section 4.1 and any of the key species listed in Table 4.1.1 are shown emboldened here. The identity of the 2013 site abbreviations used in column three can be found in the notes at the end of Table 4.1.1. The ongoing notification review proposes that all of the coastal soft cliffs present along the coast of south-east Yorkshire should be included within two new Sites of Special Scientific Interest (SSSI). The first of these proposed new SSSI (pSSSI) would stretch from the northern edge of Bridlington to Muston Sands, at the southern end of Filey. The second would run from the northern edge of Filey to the southern tip of Scarborough. The fourth and fifth columns of the checklist show the presence of each invertebrate species within the two proposed SSSI, with those recorded from Bridlington to Filey being ticked in the 'BF pSSSI' column, while those found between Filey and Scarborough are entered in the 'FS' column.

Species	Status	2013 sites	BF pSSSI	FS pSSSI
Lymnaea truncatula		FH, RS, GS	✓	✓
Oxyloma pfeifferi		FH, GS	✓	✓
Ena obscura		RS	✓	
Cochlicopa lubrica		GS		✓
Cochlicopa lubricella		FH	✓	
Discus rotundatus		GS		✓
Arion ater		FH, RS, GS, CB	✓	✓
Arion subfuscus		FH	✓	
Nesovitrea hammonis		GS		✓
Aegopinella pura		RS	✓	
Aegopinella nitidula		GS		✓
Milax gagates		FH	✓	
Deroceras panormitanum		FH	✓	
Deroceras reticulatum		FH	✓	
Deroceras laeve		FH	✓	
Clausilia bidentata		FH	✓	
Candidula intersecta		RS	✓	
Cernuella virgata		FH	✓	
Monacha cantiana		FH, GS	✓	✓
Trichia striolata		GS, CB		✓
Trichia hispida		FH, RS	✓	
Arianta arbustorum		GS, CB		✓
Cepaea nemoralis		FH, RS, GS, CB	✓	✓
Helix aspersa		FH, RS	✓	
Ischnura elegans		CB		✓
Aeshna grandis		CB		✓
Tetrix subulata		RS, GS	✓	✓
Tetrix undulata		RS, GS, CB	✓	✓
Omocestus viridulus		FH, RS, GS, CB	✓	✓
Chorthippus brunneus		FH, RS, GS, CB	✓	✓
Livia junci		GS		✓

Velia caprai		FH, CB	✓	✓
Rhantus exsoletus		CB		✓
Hydroporus tessellatus		RS, GS	✓	✓
Hygrotus impressopunctatus		GS		✓
Cicindela campestris		FH, RS, GS, CB	✓	✓
Notiophilus biguttatus		CB		✓
Notiophilus palustris		GS		✓
Elaphrus cupreus		CB		✓
Elaphrus riparius		GS, CB		✓
Loricera pilicornis		FH, RS, GS, CB	✓	✓
Clivina fossor		RS	✓	
Dyschirius aeneus		GS		✓
Ocys harpaloides		CB		✓
Bembidion bualei		GS		✓
Bembidion deletum		FH, RS, GS, CB	✓	✓
Bembidion saxatile	**Nb./CSC2.**	CB		✓
Bembidion stephensii	**CSC3.**	CB		✓
Bembidion tetracolum		GS, CB		✓
Bembidion illigeri		FH, RS, GS, CB	✓	✓
Bembidion articulatum		RS	✓	
Bembidion lunulatum		RS	✓	
Pterostichus madidus		RS	✓	
Pterostichus nigrita		RS, GS, CB	✓	✓
Pterostichus vernalis		CB		✓
Pterostichus strenuus		GS		✓
Paranchus albipes		FH, GS, CB	✓	✓
Agonum dorsale		FH	✓	
Chlaenius vestitus		GS		✓
Paradromius linearis		GS, CB		✓
Philorhizus melanocephalus		FH	✓	
Demetrias atricapillus		FH	✓	
Helophorus brevipalpis		CB		✓
Georissus crenulatus	**N.**	RS, GS, CB	✓	✓
Anacaena globulus		RS, GS	✓	✓
Laccobius bipunctatus		CB		✓
Limnebius truncatellus		GS		✓
Ochthebius dilatatus		GS		✓
Silpha atrata		FH, RS	✓	
Lesteva longoelytrata		RS, GS	✓	✓
Lesteva sicula		GS		✓
Philorinum sordidum		FH, GS	✓	✓
Sepedophilus nigripennis		FH	✓	
Tachyporus chrysomelinus agg.		GS		✓
Tachyporus hypnorum		FH	✓	
Tachyporus obtusus		FH, GS, CB	✓	✓
Acrotona pygmaea		RS	✓	

Aloconota gregaria		GS		✓
Atheta aquatica		RS	✓	
Atheta castanoptera		CB		✓
Datomicra celata		RS	✓	
Microdota amicula		RS	✓	
Mocyta fungi agg.		RS, GS, CB	✓	✓
Philhygra elongatula		GS		✓
Philhygra palustris		RS	✓	
Bolitochara obliqua		CB		✓
Gyrophaena affinis		CB		✓
Gyrophaena bihamata		CB		✓
Gyrophaena fasciata		CB		✓
Gyrophaena gentilis		CB		✓
Gyrophaena joyioides	**N.**	CB		✓
Gyrophaena manca	**N.**	CB		✓
Drusilla canaliculata		RS	✓	
Oxypoda brevicornis		RS	✓	
Oxypoda elongatula		FH	✓	
Anotylus rugosus		CB		✓
Bledius gallicus		RS, GS, CB	✓	✓
Bledius opacus		CB		✓
Carpelimus elongatulus		GS		✓
Carpelimus rivularis		GS		✓
Carpelimus zealandicus		FH, RS, GS	✓	✓
Carpelimus corticinus		GS		✓
Stenus flavipes		FH, GS	✓	✓
Stenus fuscicornis	**Nb.**	CB		✓
Stenus impressus		GS, CB		✓
Stenus fulvicornis		GS		✓
Stenus nitidiusculus		CB		✓
Stenus guttula		RS, GS	✓	✓
Stenus juno		CB		✓
Stenus providus		GS, CB		✓
Stenus pusillus		RS	✓	
Gabrius breviventer		RS	✓	
Gabrius splendidulus		CB		✓
Cafius xantholoma		CB		✓
Platydracus latebricola	**Nb.**	RS, GS	✓	✓
Elodes elongata	**N.**	CB		✓
Cyphon coarctatus		CB		✓
Scirtes hemisphaericus		CB		✓
Heterocerus marginatus	**N.**	GS		✓
Adrastus pallens		RS, CB	✓	✓
Rhagonycha fulva		FH, RS, GS, CB	✓	✓
Epuraea silacea		CB		✓
Cerylon ferrugineum		CB		✓

Micrambe ulicis		FH, RS, GS	✓	✓
Rhyzobius litura		FH, GS	✓	✓
Propylea quattuordecimpunctata		RS, GS	✓	✓
Coccinella septempunctata		FH, CB	✓	✓
Subcoccinella vigintiquattuorpunctata		FH, RS	✓	
Gastrophysa polygoni		CB		✓
Phaedon tumidulus		FH, RS	✓	
Galeruca tanaceti		RS	✓	
Longitarsus suturellus		GS		✓
Neocrepidodera transversa		FH, GS, RS, CB	✓	✓
Derocrepis rufipes		RS, GS, CB	✓	✓
Hippuriphila modeeri		GS		✓
Chaetocnema hortensis		GS		✓
Exapion ulicis		GS		✓
Eutrichapion ervi		FH, GS		
Holotrichapion ononis		FH	✓	
Oxystoma subulatum		RS	✓	
Ischnopterapion loti		FH, RS	✓	
Protapion apricans		RS, GS	✓	✓
Protapion assimile		FH, RS, GS	✓	✓
Protapion trifolii		RS, GS	✓	✓
Grypus equiseti	**Nb.**	RS, GS	✓	✓
Mecinus pascuorum		FH, RS	✓	
Microplontus rugulosus		FH	✓	
Trichosirocalus dawsoni	**Nb.**	FH	✓	
Trichosirocalus troglodytes		RS	✓	
Phyllobius roboretanus		FH	✓	
Barypeithes araneiformis		CB		✓
Sciaphilus asperatus		GS		✓
Andrion regensteinensis		FH, GS	✓	✓
Sitona lineelus		RS	✓	
Hypera nigrirostris		RS	✓	
Hypera venusta		RS, CB	✓	✓
Orobitis cyaneus		FH	✓	
Hepialus humuli		FH	✓	
Zygaena filipendulae		FH	✓	
Zygaena lonicerae		FH, RS, GS, CB	✓	✓
Pleuroptya ruralis		FH	✓	
Marasmarcha lunaedactyla		FH	✓	
Ochlodes venata		FH, RS, GS, CB	✓	✓
Thymelicus sylvestris		FH, RS, GS, CB	✓	✓
Gonepteryx rhamni		CB		✓
Pieris brassicae		FH, RS	✓	
Pieris napi		GS, CB		✓
Lycaena phlaeas		CB		✓
Lysandra icarus		FH, GS	✓	✓

Aglais urticae		FH, GS, CB	✓	✓
Inachis io		FH	✓	
Pararge aegeria		CB		✓
Melanargia galathea		RS	✓	
Maniola jurtina		FH, RS, GS, CB	✓	✓
Aphantopus hyperantus		FH, RS, GS, CB	✓	✓
Coenonympha pamphilus		RS, GS	✓	✓
Euthrix potatoria		FH, RS	✓	
Odezia atrata		FH	✓	
Orgyia antiqua		FH	✓	
Tyria jacobaeae		RS, GS, CB	✓	✓
Mesoligia literosa		FH	✓	
Gortyna flavago		GS		✓
Autographa gamma		FH, GS	✓	✓
Nephrotoma flavescens		FH, RS, GS	✓	✓
Tipula oleracea		RS, GS, CB	✓	✓
Tipula lateralis		RS, GS, CB	✓	✓
Erioconopa trivialis		RS, GS	✓	✓
Erioptera flavata		GS		✓
Erioptera lutea		CB		✓
Idiocera bradleyi	**RDB2./CSC2**	RS, GS	✓	✓
Molophilus appendiculatus		CB		✓
Molophilus bifidus		RS, GS, CB	✓	✓
Molophilus corniger	**N.**	CB		✓
Molophilus obscurus		RS, GS, CB	✓	✓
Neolimnophila carteri	**N.**	CB		✓
Symplecta stictica		FH, RS, CB	✓	✓
Symplecta chosenensis	**RDB1./CSC1.**	RS, GS, CB	✓	✓
Austrolimnophila ochracea		CB		✓
Pilaria discicollis		GS		✓
Pilaria fuscipennis		CB		✓
Pseudolimnophila lucorum		CB		✓
Pseudolimnophila sepium		CB		✓
Dicranomyia goritiensis	**RDB3./CSC2.**	FH	✓	
Dicranomyia mitis		GS		✓
Dicranomyia modesta		RS	✓	
Dicranomyia fusca		CB		✓
Limonia macrostigma		CB		✓
Orfelia nemoralis		FH	✓	
Ptychoptera albimana		CB		✓
Ptychoptera lacustris		CB		✓
Ptychoptera minuta		CB		✓
Chrysopilus asiliformis		CB		✓
Chrysopilus cristatus		FH, RS, GS, CB	✓	✓
Rhagio lineola		CB		✓
Rhagio scolopacea		FH, GS	✓	✓

Beris vallata		GS		✓
Nemotelus nigrinus		GS		✓
Oxycera morrisii	**N.**	CB		✓
Oxycera nigricornis		CB		✓
Oxycera pygmaea	**N.**	RS	✓	
Oxycera trilineata		RS	✓	
Chloromyia formosa		FH	✓	
Stratiomys potamida	**N.**	CB		✓
Bombylius major		CB		✓
Leptogaster cylindrica		RS, GS	✓	
Hybos culiciformis		CB		✓
Tachydromia aemula		GS		✓
Empis livida		FH, RS, GS	✓	✓
Argyra argentina		CB		✓
Argyra argyria		RS, GS, CB	✓	✓
Argyra diaphana		CB		✓
Chrysotus gramineus		FH	✓	
Dolichopus brevipennis		FH, GS	✓	✓
Dolichopus latilimbatus		CB		✓
Dolichopus longicornis		CB		✓
Dolichopus plumipes		FH, GS	✓	✓
Dolichopus trivialis		FH	✓	
Dolichopus ungulatus		FH, RS, GS, CB	✓	✓
Dolichopus wahlbergi		RS	✓	
Hercostomus cupreus		CB		✓
Hercostomus germanus		FH	✓	
Hercostomus gracilis		CB		✓
Hercostomus nigripennis		FH	✓	
Poecilobothrus nobilitatus		FH, RS, CB	✓	✓
Poecilobothrus principalis		CB		✓
Sybistroma obscurellum		CB		✓
Tachytrechus notatus		FH, RS	✓	
Liancalus virens		CB		✓
Rhaphium caliginosum		GS, CB		✓
Sciapus contristans		FH	✓	
Sciapus platypterus		CB		✓
Anepsiomyia flaviventris		CB		✓
Campsicnemus curvipes		RS, CB	✓	✓
Campsicnemus marginatus		GS		✓
Campsicnemus scambus		GS		✓
Sympycnus aeneicoxa		CB		✓
Sympycnus desoutteri		RS	✓	
Syntormon denticulatum		GS, CB		✓
Syntormon fuscipes		GS, CB		✓
Syntormon monile		RS	✓	
Syntormon pallipes		RS, GS	✓	✓

Syntormon pumilum		GS		✓
Teucophorus monacanthus		CB		✓
Teucophorus spinigerellus		GS, CB		✓
Chrysotoxum bicinctum		GS		✓
Baccha elongata		FH, CB	✓	✓
Brachypalpoides lentus		CB		✓
Cheilosia illustrata		FH, CB	✓	✓
Epistrophe eligans		CB		✓
Episyrphus balteatus		RS, GS, CB	✓	✓
Eristalis arbustorum		CB		✓
Eristalis interruptus		CB		✓
Eristalis pertinax		CB		✓
Eristalis tenax		RS, CB	✓	✓
Eumerus strigatus		RS	✓	
Eupeodes corollae		FH	✓	
Helophilus pendulus		RS, CB	✓	✓
Lejogaster metallina		FH	✓	
Melanogaster hirtella		RS	✓	
Melanostoma mellinum		CB		✓
Melanostoma scalare		FH, GS, CB	✓	✓
Merodon equestris		FH	✓	
Myathropa florea		CB		✓
Paragus haemorrhous		GS		✓
Platycheirus albimanus		CB		✓
Platycheirus manicatus		FH, RS	✓	
Platycheirus rosarum		CB		✓
Rhingia campestris		RS	✓	
Scaeva pyrastri		FH, GS	✓	✓
Syritta pipiens		FH	✓	
Syrphus ribesii		FH	✓	
Syrphus vitripennis		RS, GS	✓	✓
Volucella bombylans		FH, RS	✓	✓
Volucella pellucens		CB		✓
Xylota segnis		CB		✓
Xylota sylvarum		CB		✓
Micropeza corrigiolata		RS, GS, CB	✓	✓
Sicus ferrugineus		FH, GS	✓	✓
Herina frondescentiae		FH	✓	
Herina germinationis		FH, RS, GS	✓	✓
Melieria omissa		CB		✓
Myopites inulaedyssentericae	**RDB3.**	RS	✓	
Urophora jaceana		FH, RS, CB	✓	✓
Urophora stylata		GS		✓
Tephritis vespertinus		CB		✓
Chaetorellia jaceae		RS	✓	
Xyphosia miliaria		GS		✓

Pherbellia cinerella		RS	✓	
Pherbellia schoenherri		CB		✓
Coremacera marginata		FH, GS	✓	✓
Elgiva cucularia		CB		✓
Hydromya dorsalis		GS		✓
Limnia unguicornis		FH, RS, GS	✓	✓
Pherbina coryleti		FH	✓	
Renocera stroblii		GS, CB		✓
Tetanocera ferruginea		FH	✓	
Tetanocera punctifrons	**N.**	RS, GS	✓	✓
Trypetoptera punctulata		FH, RS	✓	
Scathophaga stercoraria		GS		✓
Coenosia rufipalpis		CB		✓
Coenosia tigrina		RS	✓	
Lispe pygmaea		GS		✓
Eriothrix rufomaculata		FH	✓	
Actia lamia		RS	✓	
Siphona geniculata		RS, GS, CB	✓	✓
Chrysis viridula		GS		✓
Myrmosa atra		CB		✓
Formica lemani		FH, RS, CB	✓	✓
Lasius flavus		RS	✓	
Lasius niger		CB		✓
Myrmica rubra		FH, RS, GS, CB	✓	✓
Myrmica scabrinodis		RS	✓	
Priocnemis confusor	**Nb.**	FH	✓	
Priocnemis exaltata		RS	✓	
Anoplius nigerrimus		RS	✓	
Anoplius infuscatus		RS	✓	
Odynerus spinipes		GS		✓
Gymnomerus laevipes		RS	✓	
Ancistrocerus oviventris		FH	✓	
Tachysphex pompiliformis		RS	✓	
Crossocerus elongatulus		FH	✓	
Crossocerus tarsatus		RS	✓	
Oxybelus uniglumis		CB		✓
Passaloecus gracilis		CB		✓
Mellinus arvensis		RS	✓	
Argogorytes fargeii	**Na.**	FH, RS, CB	✓	✓
Andrena bicolor		RS	✓	
Andrena haemorrhoa		RS	✓	
Lasioglossum punctatissimum		RS	✓	
Lasioglossum villosulum		FH	✓	
Lasioglossum cupromicans		RS	✓	
Anthidium manicatum		FH	✓	
Megachile versicolor		RS	✓	

Anthophora plumipes	FH	✓	
Bombus lucorum	FH, RS, GS, CB	✓	✓
Bombus terrestris	FH, RS, CB	✓	✓
Bombus hortorum	FH, RS, GS, CB	✓	✓
Bombus lapidarius	FH, RS, GS, CB	✓	✓
Bombus hypnorum	CB		✓
Bombus pratorum	RS, CB	✓	✓
Bombus pascuorum	FH, RS, GS, CB	✓	✓
Androniscus dentiger	RS, CB	✓	✓
Trichoniscus pusillus	FH, RS, GS, CB	✓	✓
Oniscus asellus	FH, RS, GS, CB	✓	✓
Philoscia muscorum	FH, RS, GS	✓	✓
Porcellio scaber	FH, RS, CB	✓	✓
Armadillidium vulgare	FH, RS, GS	✓	✓
Harpactea hombergi	FH	✓	
Enoplognatha ovata	FH	✓	
Meta mengei	FH, RS	✓	
Araneus quadratus	FH	✓	
Larinioides cornutus	FH, RS, GS	✓	✓
Arctosa leopardus	RS, GS	✓	✓
Micaria pulicaria	FH	✓	
Tibellus oblongus	GS		✓
Xysticus cristatus	GS		✓