

# **Invertebrate survey of the soft-rock cliffs in Co. Durham, Sunderland and South Tyneside**

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**Buglife - The Invertebrate Conservation Trust**  
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## 0. Summary

- A general invertebrate survey was carried out of soft-rock cliffs on the Co. Durham coast, visiting four main sites in July and August 2007.
- The survey identified 374 species of invertebrate, of which 18 (4.8%) are rare or scarce, including a Grade 1 and a Grade 2 soft-rock cliff specialist.
- Collectively, these sites are of at least county importance for invertebrate conservation, and some are probably important in a regional (north-east England) context also. The soft-rock cliffs of Co. Durham appear to have been underestimated and neglected by entomologists: further survey work is recommended.

## 1. Introduction and Methods

In 2007, the authors were commissioned by Buglife to undertake invertebrate surveys of the soft-rock cliffs of the coast of Co. Durham (vice-county 66). The coast is within the administrative regions of (from north to south) South Tyneside, Sunderland and Durham County Council. The survey project was funded by the Durham Biodiversity Partnership.

Soft-rock cliff is one of those habitats that supports relatively little non-invertebrate biodiversity and as a consequence has been rather neglected by British conservationists until recently. Soft-rock cliffs are now included within the UK Habitat Action Plan (HAP) for "Maritime cliff and slopes" ([www.ukbap.org.uk/UKPlans.aspx?ID=27](http://www.ukbap.org.uk/UKPlans.aspx?ID=27)) where they are referred to as simply "soft cliffs".

The HAP offers the following description of the habitat:

"Soft cliffs are formed in less resistant rocks such as shale or in unconsolidated materials such as boulder clay; being unstable they often form less steep slopes and are therefore more easily colonised by vegetation. Soft cliffs are subject to frequent slumping and landslips, particularly where water percolates into the rock and reduces its effective shear strength."

"...they are particularly important for invertebrates as they provide a suite of conditions which are rarely found together in other habitats. The combination of friable soils, hot substrates and open conditions maintained by cliff slippages offer a continuity of otherwise very restricted microhabitats and these support many rare invertebrates which are confined to such sites."

The reasons why soft-rock cliffs make good invertebrate habitat are discussed by Howe (2003). Bare ground is the key factor on soft-rock cliffs, in combination with a profusion of ruderal plants, and suitable soil conditions for burrowing. Bare ground is an important invertebrate micro-habitat within heathlands, arable margins and 'brownfield sites' but in all these situations, the processes creating bare ground are unpredictable and short-lived. The natural erosion of soft-rock cliffs means that bare ground is reliably present year-in year-out, allowing important invertebrate assemblages to develop. Seepages and trickles also support important assemblages of invertebrates, particularly flies and beetles, on soft-rock cliffs. Typically these are also species that require early-successional conditions, with little or no vegetation. Soft-rock cliffs are some of the few, or for some species the only, places that perennially and reliably provide suitable habitat.

Pye & French (1993) estimated that 8 km of the Durham coastline was unprotected soft-rock cliff: 3.1% of England's 255.6 km of soft-rock coastline (Howe, 2003).

This survey concentrated on the sector between the top of the beach and the lip of the cliff-top but some survey work was also carried out on the immediately adjacent cliff-top, especially where the cliff-face was inaccessible. Some survey work was also carried out on the beach, including investigation of strandline and inter-tidal habitats.

There appears to have been little previous entomological work on the soft-rock cliffs of this stretch of coast, although this project did not include a review of previous records. The Co. Durham cliffs have the potential to support many of the species found on the soft-rock cliffs of the Yorkshire coast, an area surveyed in 2006 (Telfer, 2006b).

The aims of this survey were:

- to gather new data on the invertebrate communities of selected sites on the soft-rock cliffs of the Co. Durham coast,
- to contribute data to Buglife's UK-wide study into the sustainable management of maritime soft-rock cliffs and their invertebrate ecology, and
- to develop recommendations for the future management of the Co. Durham coast and identify opportunities for enhancing biodiversity.

## 2. Survey sites

The following main survey sites were selected (from north to south):

### ***Jackie's Beach, north of Souter Point, South Tyneside (NZ4162)***

Much of the soft-rock cliff here was not safely accessible, being on slopes above vertical hard cliffs. Where the cliffs were safely accessible, behind Jackie's Beach, there was very little exposed soil (Fig. 1). Survey work at this site extended beyond the cliff-slopes themselves and included the level ground behind the beach itself with herb-rich grassland. Invertebrates were also sampled on the beach, including the strandline, and by splitting rocks in the intertidal zone, looking for some of the specialist insects of such habitats.



**Fig. 1:** Herb-rich grassland behind Jackie's Beach with small areas of eroding cliff behind.

***Ryhope Dene, Sunderland (NZ419519)***

The seaward cliffs either side of Ryhope Dene were very steep, largely dry and almost devoid of vegetation. The few wet bits of cliff were largely inaccessible. Survey work here was focussed on the cliff-top habitat to the north of the dene (recently abandoned arable), and on the herb-rich grassland parts of the south-facing north slope of the dene itself. The bottom of the dene was flooded on the July visit but dry on the August visit, leaving malodorous organic sediments. Some survey effort was focussed on the small area around the mouth of the dene where freshwater reached the beach (Fig. 2), and small trickles down the cliff which could be reached from the beach.



**Fig. 2:** The mouth of Ryhope Dene in July, looking inland.

***Busiers Holes (between Fox Holes and Loom), Easington Colliery (NZ4444 and NZ 4443)***

Though they appear to be at least partially formed of natural soft-rock, it seems that the cliffs here are in fact formed entirely of colliery spoil and other waste material. There are extensive accessible cliff-slope habitats, including several seepages, some with tufa-deposition. A lagoon with sparse reed *Phragmites* was surveyed at the back of the artificial beach.



**Fig. 3:** View of the artificial soft-rock cliffs at Busiers Holes, with the lagoon in the foreground.

### ***Cross Gill, Blackhall Rocks (NZ4738)***

A largely natural site with herb-rich Magnesian limestone grassland on the cliff-slopes. The slopes are rather steep and inaccessible but with a few accessible seepages (Fig. 4, see also picture on front cover).



**Fig. 4:** An accessible seepage at Cross Gill, Blackhall Rocks. Andy Lees on the left, David Gibbs on the right.

In addition, during reconnaissance, invertebrates were recorded at a few intermediate sites:

- Hendon Promenade (NZ412548),
- un-named dene at Ryhope (north of Ryhope Dene) (NZ416531), and
- Nose's Point (NZ437477).

The species recorded from these sites are indicated in Appendix 2.

### **3. Methods**

A reconnaissance visit was made on 11 July 2007 with Andy Lees, continuing the following morning. Although the main purpose of the reconnaissance was to select survey sites, the opportunity was also taken by both authors to start recording invertebrates. Survey work proper started on the afternoon of 12 July, continuing on the morning of 13 July. The second survey visit was made on the afternoon of 7 August,

continuing on the morning of 8 August. A range of survey techniques were used (Table 1).

**Table 1:** Survey techniques used by this survey.

<b>Technique</b>	<b>Target groups</b>	<b>Target habitats</b>
Grubbing at ground level, turning over stones, etc.	A wide range of ground-living invertebrates, particularly beetles (Coleoptera), bugs (Heteroptera), ants (Hymenoptera: Formicidae) woodlice (Isopoda) and molluscs.	All habitats, especially bare ground.
Sieving.	A useful supplement to grubbing in denser vegetation. Handfuls of vegetation are sieved over a white tray to reveal a range of beetles, bugs and other ground-living invertebrates.	Plant debris in grassland and fen.
Sweep-netting.	Solitary bees and wasps (aculeate Hymenoptera) and, especially, flies (Diptera); also beetles and bugs in grassland and fen vegetation.	All vegetated habitats, paying particular attention to potential foodplants and to nectar and pollen sources.
Direct observation and netting.	Bumblebees, hoverflies (Syrphidae), butterflies, damselflies and dragonflies (Odonata), grasshoppers and crickets (Orthoptera).	All habitats, paying particular attention to nectar and pollen sources.
Water trapping (also known as pan trapping).	Flying insects, principally bees and wasps, and various flies that are attracted to flowers.	Cliff-slopes.

The weather on the July visit was largely overcast, occasionally showery but with little or no wind. The weather on the August visit was cloudless and sunny with a light breeze. Conditions for invertebrate survey work thus varied from adequate to good.

Where practical, invertebrates were identified in the field but wherever the slightest doubt existed, one or more specimens were collected for more detailed scrutiny. To achieve rigorously accurate identifications, specimens were identified using our respective libraries and entomological collections. We have also made use of experts and museum collections to identify some specimens or to confirm our own identifications. Selected specimens have been retained in our personal collections as vouchers.

#### **4. Results**

The survey identified 374 species of invertebrate overall (listed in Appendix 2). A broad range of invertebrate groups was covered to a greater or lesser extent including molluscs, woodlice, millipedes, spiders, harvestmen, pseudoscorpions, bugs, earwigs, grasshoppers, beetles, flies, bees, ants, wasps, moths and butterflies. There was a concentration of effort on beetles (Coleoptera) and flies (Diptera).

18 rare or scarce invertebrate species were recorded on the Durham coast by this survey: three Red Data Book (RDB) and 15 Nationally Scarce (Table 2). The proportion of rare or scarce species in a sample provides a guide to the overall conservation importance of a site for invertebrates: in this case, 4.8% of the 374 recorded species were rare or scarce. Further information about all 18 is provided under the heading 'Key Invertebrates' below.

Howe (2002) listed invertebrates that are restricted to coastal soft-rock cliff in the UK as Grade 1 species, or those that have a strong or moderate association with it as Grade 2 and Grade 3 respectively. See Appendix 3 for full definitions. On the current survey, two of the species listed by Howe (2002) were recorded: one Grade 1 species (the crane fly *Symplecta chosenensis*) and one Grade 2 species (the crane fly *Idiocera bradleyi*) (Table 2). Both are also Red Data Book species and further details are given under 'Key Invertebrates' below.

Three of the invertebrate species found were added to the UK Biodiversity Action Plan list (Biodiversity Reporting and Information Group, 2007) in June 2007: Cinnabar moth *Tyria jacobaeae*, Wall butterfly *Lasiommata megera* and Small Heath butterfly *Coenonympha pamphilus*. Unlike most other BAP invertebrates, these species are still reasonably common and widespread; conservation concern is centred on their declines. Action for these species should focus on research and monitoring rather than site protection and habitat management. Further information about all three is provided under the heading 'Key Invertebrates' below.

**Table 2:** The 18 rare or scarce species and the three recently-added BAP species recorded by this survey. Both the soft-rock cliff specialists from Howe (2002) are included.

Order: Family	Species	English Name	Conservation Status	Howe (2002) Grade
Diptera: Limoniidae	<i>Symplecta chosenensis</i>	a crane fly	pRDB1	1
Diptera: Limoniidae	<i>Idiocera bradleyi</i>	a crane fly	RDB2	2
Coleoptera: Cryptophagidae	<i>Micrambe lindbergorum</i>	a cryptophagid beetle	RDBK	
Coleoptera: Chrysomelidae	<i>Longitarsus parvulus</i>	a flea-beetle	Nationally Scarce (Na)	
Coleoptera: Carabidae	<i>Aepus marinus</i> or <i>robinii</i>	a ground beetle	Nationally Scarce (Nb)	
Coleoptera: Carabidae	<i>Licinus depressus</i>	a ground beetle	Nationally Scarce (Nb)	
Coleoptera: Coccinellidae	<i>Adonia variegata</i>	Adonis' Ladybird	Nationally Scarce (Nb)	
Coleoptera: Dytiscidae	<i>Agabus conspersus</i>	a water beetle	Nationally Scarce (Nb)	
Coleoptera: Hydraenidae	<i>Ochthebius bicolon</i>	a water beetle	Nationally Scarce (Nb)	

Order: Family	Species	English Name	Conservation Status	Howe (2002) Grade
Hymenoptera: Aculeata: Pompilidae	<i>Priocnemis schioedtei</i>	a spider-hunter wasp	Nationally Scarce (Nb)	
Lepidoptera: Lycaenidae	<i>Aricia artaxerxes</i>	Northern Brown Argus	Nationally Scarce (Nb), BAP	
Lepidoptera: Tortricidae	<i>Aethes piercei</i>	a moth	Nationally Scarce (Nb)	
Diptera: Sciomyzidae	<i>Tetanocera punctifrons</i>	a snail-killing fly	Nationally Scarce	
Diptera: Stratiomyidae	<i>Oxycera morrisii</i>	a soldierfly	Nationally Scarce	
Diptera: Stratiomyidae	<i>Oxycera pygmaea</i>	a soldierfly	Nationally Scarce	
Diptera: Stratiomyidae	<i>Stratiomys potamida</i>	a soldierfly	Nationally Scarce	
Diptera: Dolichopodidae	<i>Chrysotus suavis</i>	a dollie fly	Nationally Scarce (None)	
Diptera: Dolichopodidae	<i>Micromorphus sp.</i> A	a dollie fly	Nationally Scarce (None)	
Lepidoptera: Arctiidae	<i>Tyria jacobaeae</i>	Cinnabar	BAP	
Lepidoptera: Satyridae	<i>Lasiommata megera</i>	Wall	BAP	
Lepidoptera: Satyridae	<i>Coenonympha pamphilus</i>	Small Heath	BAP	

#### 4.1 KEY INVERTEBRATES

For each of the key invertebrates, a species account is given which summarises the distribution and ecology of the species, and gives further detail of the record(s) made by this survey.

##### ***Symplecta chosenensis* (Diptera: Limoniidae) a crane fly, pRDB1**

This small black and yellow crane fly has only recently been recognised in Britain (Chandler & Crossley, 2003), earlier records being referred to *Symplecta novaezembiae scotica*. The references by Howe (2002) and Howe (2003) to *S. novaezembiae scotica* as one of the species confined to coastal soft-rock cliffs in the UK (Grade 1 species) should actually refer to *S. chosenensis*. So far in Britain only found on coastal soft-rock cliffs where it is associated with permanent early successional seepages on boulder clay, often very unstable, eroding sites (Howe, 2002). Larvae presumably develop in damp soil in such seepages. *S. chosenensis* has been recorded from nine British 10-km squares: five in Wales, one in Cumberland, and two each in Norfolk and Yorkshire (Howe *et al.*, 2006; Telfer, 2006a; Whitehouse, 2007).

On the current survey, six males and seven females were swept from an extensive seepage at Busiers Holes on 12 July. This is the first record for Co. Durham and the most northerly to date.

***Idiocera bradleyi* (Diptera: Limoniidae) a crane-fly, RDB2**

This species was listed as a Grade 2 soft-rock cliff species by Howe (2002). It is a slender, greyish crane-fly, and was first found in the Wyre Forest in the 19th century then not seen till specimens were taken at two sites near Cardigan in 1987 and 2000 and at three sites in Yorkshire in 1988. Also apparently recorded in southwest Scotland (Howe, 2002) and southeast Scotland (NBN); perhaps referring to the same record. Howe (2002) and Falk (1991b) suggest that all but the original record are from soft rock cliffs but one NBN record from Yorkshire is inland and it has recently been found at several river cliffs in Cumbria (Steve Hewitt, pers. comm.). There do not seem to be any published records from Co. Durham. Found at coastal and riparian seepages and wet clayey land slips where the vegetation is sparse. The larvae probably develop in damp soil in such flushes. Adults recorded in July (Falk, 1991b).

On the current survey, a single male was found at Ryhope Dene on 11 July from alongside the main stream, and two females were swept from horsetail on an extensive seepage at Busiers Holes on 12 July.

***Micrambe lindbergorum* (Coleoptera: Cryptophagidae) a cryptophagid beetle, RDBK**

This undistinguished small brown beetle was discovered at Spurn in 1949 and has since been recorded from Northants (by Tony Drane, associated with Dyer's Greenweed) and 'E. Inverness and Nairn' (Hyman & Parsons, 1994). Colin Johnson (by email, 5.xi.2007) has indicated that he has additional unpublished records.

On the current survey, identified from Cross Gill, Blackhall Rocks where 10 were recorded on 12 July and 9 on 8 August, on both occasions by sweeping herb-rich sward.

***Longitarsus parvulus* (Coleoptera: Chrysomelidae) a flea-beetle, Nationally Scarce (Na)**

This flea-beetle is associated with flax. It had declined and Hyman and Parsons (1992) knew of it from only four vice-counties between 1970 and their publication. Subsequently, from about 1990, linked to the increased popularity of flax (linseed) as a crop, this has become a common and ubiquitous beetle that occurs almost anywhere and everywhere, at least in southern England. Cox (2007) notes the northern limit of the species as being a line from Morecambe Bay to the Tees. It no longer deserves its official Na status.

On the current survey, one was recorded at Blackhall Rocks on 12 July, the first record for Co. Durham and the most northerly British record by about 30 km (Cox, 2007).

***Aepus marinus* or *robinii* (Coleoptera: Carabidae) a ground beetle, Nationally Scarce (Nb)**

Both of the British species of *Aepus* are Nationally Scarce (Nb) so even though the species is unknown in this case, the status is correct. A single larva was found in the intertidal zone at Jackie's Beach on 13 July by splitting sedimentary rocks. The rock crevices also contained larvae, pupae and adults of the staphylinid beetle *Micralymma marinum*. This is the typical habitat of *Aepus robinii* but *A. marinus* cannot be ruled out: its larvae are undescribed, adults can also occur in intertidal rock crevices, and it is the more widely recorded of the two species in north-east England.

Luff (1998) mapped *A. marinus* from NZ52 which lies in Teesside on the border between Co. Durham and NE Yorkshire. Otherwise, there are no records of either *Aepus* for Co. Durham.

***Licinus depressus* (Coleoptera: Carabidae) a ground beetle, Nationally Scarce (Nb)**

This is a specialist snail-feeding beetle, using its asymmetrical mandibles to open snail-shells like a tin-opener. It has a very scattered distribution in southern Britain, extending up the west coast as far as south Wales and up the east coast as far as Co. Durham. It inhabits calcareous grassland, chalk pits and the like but may also be found in non-calcareous sites such as gravel pits, heaths and sandy grasslands.

On the current survey, one was found running across a footpath down the cliffs at Busiers Holes on 12 July. This appears to be the most northerly British record and the first in Co. Durham since before 1970 (Luff, 1998).

***Adonia variegata* (Coleoptera: Coccinellidae) Adonis' Ladybird, Nationally Scarce (Nb)**

A smallish ladybird with (typically) seven black spots on its red wing-cases. The arrangement of the spots and the white rim to the black pronotum make this an instantly recognisable species. Until recently, this species was known as *Hippodamia variegata*. The species feeds on aphids, typically on weedy plants of disturbed or cultivated ground. This species is widespread but scarce in England and Wales with most records in the south-east or on the coast. It has increased in range and abundance, at least in London and the surrounding counties, since the late 1980s.

On the current survey, one was noted at Hendon Promenade on 11 July, and several at Cross Gill on 12 July. We know of no other records for Co. Durham where it is likely to be a recent arrival at the northern edge of its current range.

***Agabus conspersus* (Coleoptera: Dytiscidae) a water beetle, Nationally Scarce (Nb)**

This medium-sized diving beetle is effectively confined to coastal brackish water, including pools of more than 50% seawater. It is widespread but scarce with records from 22 10-km squares in England and one each in Wales and Scotland (Foster, in press).

On the current survey, a single teneral individual was recorded from the lagoon at Busiers Holes on 12 July.

***Ochthebius bicolon* (Coleoptera: Hydraenidae) a water beetle, Nationally Scarce (Nb)**

A small semi-aquatic beetle typically found on the sloping banks of streams and rivers, though also recorded from shaded, mossy ponds and a mining subsidence pool (Foster, in press). This species occurs throughout Britain but is thinly scattered everywhere, more so in Scotland. The NBN Gateway has records for over 200 British 10-km squares so this species should probably no longer be regarded as Nationally Scarce.

On the current survey, one was found in a seepage at Blackhall Rocks on 12 July.

***Priocnemis schioedtei* (Hymenoptera: Aculeata: Pompilidae) a spider-hunting wasp, Nationally Scarce (Nb)**

This black and red spider-hunting wasp is a subterranean nester, usually found in open situations on sandy soils but also known from limestone grasslands, road verges and open areas in woodlands. The multi-celled nest-chamber is provisioned with spiders, in this species probably Clubionidae, Gnaphosidae, Salticidae and Lycosidae. Nests often in natural cavities or old burrows of other aculeates. Adults are active from June to early October (Falk, 1991a; Edwards & Telfer, 2002). This species has a wide but patchy

distribution in Britain. It shows a strong tendency to occur inland with very few coastal records. Edwards & Telfer (2002) mapped this species from the Pennines but showed no coastal records for Co. Durham. Robinson (2007) reported it to be widespread in north-east England with recent records from six sites.

On the current survey, two females were found at Jackie's Beach on 13 July.

***Aricia artaxerxes (Lepidoptera: Lycaenidae) Northern Brown Argus, Nationally Scarce (Nb), BAP***

The Northern Brown Argus is well distributed across England from Derbyshire northwards and into Scotland (possibly also in north Wales). Apparently declining with losses in England and southern Scotland. Both of the two subspecies in Britain are endemic, the nominate in Scotland and *A.a. salmacis* in England. In Durham this butterfly occurs in two discrete populations. Inland on the Magnesian limestone the insects are accepted as the true *salmacis*. However, coastal colonies are considered (at least by some) to represent a hybrid *salmacis* × *artaxerxes* population and include white-spotted individuals (Dunn & Parrack, 1986). Found on well-drained calcareous grassland with thin soils and a profusion of nectar plants on south-facing slopes, especially limestone pavement, quarries and coastal valleys. Lightly grazed or ungrazed slopes seem to suit its food plant, common rock-rose (Anon., 1999). Single brooded, *salmacis* emerging from about the third week of June to early July, the nominate rather later (Emmet & Heath, 1990).

On the current survey, a single individual was noted at Cross Gill on 12 July.

***Aethes piercei (Lepidoptera: Tortricidae) a moth, Nationally Scarce (Nb)***

This very attractive tortrix moth is widespread and locally common in Britain north to Orkney. In Co. Durham it is generally but thinly distributed (Dunn & Parrack, 1992). Found on grassland where both calcicolous and calcifuge plants occur in association with its host plant. The larvae feed on devil's-bit scabious, feeding in the rootstock. Adults are on the wing from May to early July (Bradley *et al.*, 1973).

On the current survey, a single female was caught on the grassy slope at the southern end of the bay at Busiers Holes on 12 July.

***Tetanocera punctifrons (Diptera: Sciomyzidae) a snail-killing fly, Nationally Scarce***

One of the larger snail-killing flies, and one which is widely but locally distributed in Britain with about 20 post-1960 sites noted by Falk (1991b) but many more recent localities (D. Gibbs, pers. obs.) so perhaps no longer meriting its Nationally Scarce status. Already recorded from several sites on the Co. Durham coast (Ball & McLean, 1986; NBN). Inhabits damp woodland, riparian situations, damp heathland and coastal marshes. The larvae probably develop as predators or parasitoids of snails; adults have been recorded from June to August (Falk, 1991b).

On the current survey, found at seepages at Busiers Holes and Cross Gill on 12 July and 8 August.

***Oxycera morrisii (Diptera: Stratiomyidae) a soldierfly, Nationally Scarce***

This tiny black and yellow soldierfly is widespread in Britain northwards to SW Scotland and Co. Durham but thinly scattered within this range (Falk, 1991b). Typically associated with sparsely vegetated seepages on coastal soft-rock cliffs though also found widely inland on similar habitats.

On the current survey, one larva was found at Busiers Holes on 12 July.

***Oxycera pygmaea* (Diptera: Stratiomyidae) a soldierfly, Nationally Scarce**

This tiny black and yellow soldierfly is widespread in Britain but extremely local (Falk, 1991b). In Co. Durham it is well recorded along the coast and the denes with 4 records on the NBN Gateway. Frequents small base-rich seepages with short and sparse vegetation which are both open and sunny. Typical sites are on hillsides or coastal cliffs but it has also been recorded from wet fen and seepages on limestone grassland. The larvae develop amongst saturated moss in seepages and along the edges of tiny trickles. Adults are on the wing in June and July (Falk, 1991b).

On the current survey, adults were found at seepages at Busiers Holes and Cross Gill, Blackhall Rocks on 12 July and 8 August. In addition to the adult records, two pupae were found in a seepage at Blackhall Rocks on the earlier date, and larvae were found at Busiers Holes on the later date.

***Stratiomys potamida* (Diptera: Stratiomyidae) a soldierfly, Nationally Scarce**

This is a striking black and yellow fly, with a widespread but scattered distribution across most of England and Wales, mostly in southern England (Drake, 1991). Larvae are aquatic and are typically found in ditches, streams, springs or seepages. These can be in open habitats such as fens and meadows but also in lightly wooded places. Adults are typically found close to the larval habitat (Stubbs & Drake, 2001).

On the current survey, two pupal exuviae were found in a seepage at Busiers Holes on 12 July.

***Chrysotus suavis* (Diptera: Dolichopodidae) a dollie fly, Nationally Scarce (None)**

This tiny metallic green dolichopodid fly is widespread in southern England and South Wales and now known from 12 counties. It is no longer regarded as Nationally Scarce (Falk & Crossley, 2005). There are no records for Co. Durham on the NBN Gateway although it was frequent in Northumberland in 2007 (D. Gibbs, pers. obs.). A coastal species usually found on dunes but also with records from a gravel pit and the sandy Brecks. Adults in June and July (Fonseca, 1978).

On the current survey, found at Busiers Holes on 12 July.

***Micromorphus* sp. A (Diptera: Dolichopodidae) a dollie fly, Nationally Scarce (None)**

One of the smallest dolichopodid flies, widespread but local in Britain, no doubt much overlooked due to its small size. In Britain it has long been known that this genus includes at least two species although only one has been listed. It is not known what names should be applied to these species. If records of both species are combined then it is too frequent to merit Nationally Scarce status; on this basis it was excluded from the latest review (Falk & Crossley, 2005). However, when the true identity of the British species is sorted out this may change. The genus is known to occur in 23 counties in Britain (Falk & Crossley, 2005). In Co. Durham known from Castle Eden Dene (NBN). Frequents a variety of wetland habitats with records from June to August (Fonseca, 1978).

On the current survey, swept from wet areas at Busiers Holes on 12 July and 8 August.

***Tyria jacobaeae* (Lepidoptera: Arctiidae) Cinnabar, BAP**

A common moth occurring throughout most of England and Wales though becoming more local and coastal into northern England and Scotland. The black-and-scarlet adults are as distinctive as the black-and-orange ringed caterpillars, feeding mainly on common ragwort *Senecio jacobaea*.

The addition of this species to the BAP list appears to be on the basis of a substantial national decline. The indications are that action for this species will take place through research programmes, national agricultural and forestry schemes, and national monitoring.

On the current survey, adults were noted at Blackhall Rocks on 12 July.

***Lasiommata megera (Lepidoptera: Satyridae) Wall, BAP***

One of the 'browns' but with a delicate pattern of orange markings over brown upper-wings, with a series of eyespots. The Wall is widely distributed over southern Britain, extending to the coasts of Northumberland and Galloway but it has declined severely, particularly in the inland parts of its range. It breeds in short, open grassland where the turf is broken or stony. It is found in coastal grasslands as well as inland habitats such as disturbed or derelict land, disused quarries, cliff-slopes and banks. The caterpillars feed on a variety of grasses including Tor-grass *Brachypodium pinnatum*, False Brome *B. sylvaticum*, Cock's-foot *Dactylis glomerata* and Yorkshire-fog *Holcus lanatus* (Asher *et al.*, 2001).

Despite its declining population, Wall butterfly is still a widespread and relatively common species. The indications are that action for this species will cover national monitoring and research programmes.

On the current survey, adults were noted at Blackhall Rocks on 8 August.

***Coenonympha pamphilus (Lepidoptera: Satyridae) Small Heath, BAP***

This is a very widespread butterfly occurring throughout Britain. It prefers grassland with fine grasses (the larval foodplants), particularly where the sward is short and sparse in dry, well-drained conditions. It appears to be declining (Asher *et al.*, 2001).

On the current survey, noted at Nose's Point on 11 July, Busiers Holes on 12 July and Blackhall Rocks on 8 August.

## **4.2 OTHER NOTEWORTHY INVERTEBRATES**

Several other species, though lacking any national conservation status, appear to be worthy of some comment. These include several species which do not appear to have been recorded in Co. Durham previously, or have been recorded in the county on very few occasions or from very few sites. In some cases, we have been able to consult excellent up-to-date publications (Cox, 2007; Robinson, 2007) but in other cases our comments are based on older or less comprehensive sources and we may have overlooked some records. Equally, for some groups (e.g. staphylinid beetles) we have no distributional information and may have overlooked the significance of some of our records.

### **Mollusca**

*Cecilioides acicula*: one of the most northerly British records. No recent (in or after 1965) Co. Durham records in Kerney (1999).

### **Woodlice**

*Armadillidium pulchellum*: only one old (pre-1970) record for Co. Durham in Harding & Sutton (1985).

### **Lepidoptera**

*Monochroa tenebrella*: seems to be very rare in Co. Durham with only three recent records (Dunn & Parrack, 1992).

*Hypsopygia costalis* The Gold Triangle: seems to be unknown in Co. Durham although there are a few records from Northumberland (Dunn & Parrack, 1992).

*Emmelina monodactyla*: although a very common species in the south, seems to be very scarce in Co. Durham with only a couple of recent records (Dunn & Parrack, 1992).

## **Diptera**

*Geranomyia unicolor*: no records on the NBN Gateway.

*Chamaemyia juncorum*: a little known northern species with few records from England and none from Co. Durham.

## **Hymenoptera: Aculeata**

*Myrmica sabuleti*: not recorded from Co. Durham since before 1964 (Robinson, 2007).

*Chrysis ignita*: *C. ignita* agg. has been recorded from Co. Durham but this appears to be the first record of the segregate taxon (Robinson, 2007).

*Chrysis viridula*: only three previous records for Co. Durham (Robinson, 2007).

*Crossocerus dimidiatus* Blunt Tailed Digger Wasp: no Co. Durham records in Edwards & Telfer (2001) but two listed by Robinson (2007) who considered it to be 'probably widespread' in north-east England.

*Diodontus tristis* Melancholy Black Wasp: no Co. Durham records in Edwards & Telfer (2002) but recorded for Co. Durham by Robinson (2007) (four records for NE England).

*Pemphredon lethifera*: no previous records for Co. Durham (Robinson, 2007).

*Trypoxylon attenuatum* Slender Wood Borer Wasp: recently recorded from five sites in Co. Durham (Robinson, 2007).

*Andrena wilkella*: only two previous Co. Durham records, one in 1915 and one in 1983 (Robinson, 2007).

*Megachile circumcincta*: recorded from five sites in Co. Durham (Robinson, 2007).

*Nomada fabriciana* Fabricius' Nomad Bee: three records from Co. Durham (Robinson, 2007).

*Nomada rufipes* Golden-rod Nomad Bee: two records from Co. Durham (Robinson, 2007).

*Nomada striata*: recorded from two Co. Durham localities (Robinson, 2007).

## **Coleoptera**

*Bembidion geniculatum*: a ground beetle of habitats beside flowing water, typically exposed riverine sediments. Possibly deserves Nationally Scarce status.

*Oulema rufocyanea*: a male at Blackhall Rocks on 8 August is about 40 km further north than any other British record mapped in Cox (2007) and the only record for Co. Durham.

*Aphthona euphorbiae*: most northerly British record. Next nearest record mapped in Cox (2007) is for Teesside.

## **4.3 RESULTS FOR EACH SITE**

Survey work at each site was relatively brief, and briefer at some sites than others. Consequently the comparative results presented here (Table 3) for each site are as likely to reflect differences in survey as they are to reflect differences in the invertebrates at each site. Nevertheless, Easington Colliery appears to be the best site, with more species, more rare and scarce species, and the only site for the Grade 1 soft-rock cliff

specialist *Symplecta chosenensis*. Blackhall Rocks yielded slightly fewer species and slightly fewer rare and scarce species. Jackie's Beach and Ryhope Dene yielded species lists of 122 and 84 respectively with only two scarce species at Jackie's Beach and one RDB species at Ryhope Dene.

**Table 3:** Comparative results for the four main survey sites.

Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Jackie's Beach	Ryhope Dene	Total no. of sites
<i>Symplecta chosenensis</i>	a crane-fly	pRDB1		1			1
<i>Idiocera bradleyi</i>	a crane-fly	RDB2		1		1	2
<i>Micrambe lindbergorum</i>	a cryptophagid beetle	RDBK	1				1
<i>Longitarsus parvulus</i>	a flea-beetle	Na	1				1
<i>Aepus</i> sp.	a ground beetle	Nb			1		1
<i>Licinus depressus</i>	a ground beetle	Nb		1			1
<i>Adonia variegata</i>	Adonis' Ladybird	Nb	1				1
<i>Agabus conspersus</i>	a water beetle	Nb		1			1
<i>Ochthebius bicolon</i>	a water beetle	Nb	1				1
<i>Priocnemis schioedtei</i>	a spider-hunter wasp	Nb			1		1
<i>Aricia artaxerxes</i>	Northern Brown Argus	Nb, BAP	1				1
<i>Aethes piercei</i>	a moth	Nb		1			1
<i>Tetanocera punctifrons</i>	a snail-killing fly	N	1	1			2
<i>Oxycera morrisii</i>	a soldierfly	N		1			1
<i>Oxycera pygmaea</i>	a soldierfly	N	1	1			2
<i>Stratiomys potamida</i>	a soldierfly	N		1			1
<i>Chrysotus suavis</i>	a dollie fly	N (None)		1			1
<i>Micromorphus</i> sp. A	a dollie fly	N (None)		1			1
<i>Tyria jacobaeae</i>	Cinnabar	BAP	1				1
<i>Lasiommata megera</i>	Wall	BAP	1				1
<i>Coenonympha pamphilus</i>	Small Heath	BAP	1	1			2
No. of RDB species			1	2	0	1	3
No. of Scarce species			6	9	2	0	15
No. of RDB or Scarce spp.			7	11	2	1	18
No. of species			146	185	122	84	374
% RDB or Scarce spp.			4.8%	5.9%	1.6%	1.2%	4.8%
No. of BAP species			4	1	0	0	4

#### 4.4 COMPARISON BETWEEN CO. DURHAM, YORKSHIRE AND NORFOLK

Surveys of soft-rock cliffs in Norfolk and Yorkshire were carried out by the first author in 2006 (Telfer, 2006a, 2006b). These surveys are not directly comparable with the Co. Durham survey, the main differences being as follows:

- fieldwork in Norfolk and Yorkshire was carried out almost entirely by MGT, whereas fieldwork in Co. Durham was by MGT and DJG,
- less fieldwork time was spent at each of the sites in Co. Durham than in Yorkshire and Norfolk,
- fieldwork in Yorkshire and Norfolk was confined to the cliff-slopes but in Co. Durham included the cliff-top habitats and some beach habitats,
- the taxonomic scope of the Norfolk and Yorkshire surveys was focussed on several pre-defined groups, whereas in Co. Durham a much wider taxonomic scope was covered, including many more beetles and flies though excluding spiders.

For each of the three surveys, the number of species recorded, and the numbers and proportion of rare and scarce species have been calculated (Table 4). Coincidentally, the Co. Durham survey recorded exactly as many species (374) as the Norfolk survey, and one more rare or scarce species than that survey, despite only five man-days in the field compared to eight man-days in Norfolk. Compared to the Yorkshire survey, Co. Durham appears to be even better, with 101 more species and a higher proportion of rare or scarce species.

**Table 4:** Comparative results for the soft-rock cliff surveys of Norfolk, Yorkshire and Co. Durham.

	No. days	No. spp	RDB	Na	Nb	N	%RDB/Scarce
Durham soft-rock	5	374	3	1	8	6	4.8
Yorkshire soft-rock	5	273	1	2	7	1	4.0
Norfolk soft-rock	8	374	2	4	8	3	4.6

#### 5. Discussion and Recommendations

This was a fairly small -scale invertebrate survey but the discovery of 374 species, including three RDB species (two of which are soft-rock cliff specialists in Howe (2002)) and 15 Scarce species suggests that the soft-rock cliffs and associated habitats of the Co. Durham coast are of importance for invertebrates. That these sites are, collectively, of county importance for invertebrates is clear from the number of species that have been found new to the county or which have few previous county records. A similar case could probably be made for the importance of these sites in a regional (north-east England) context also.

In comparison with the results of similar surveys of soft-rock cliffs in Yorkshire and Norfolk, the Co Durham coast appears to be the best for invertebrates. However, this comparison flatters the Co. Durham coast and more likely reflects the greater success of an unconstrained rapid-survey approach at finding more species, and more rare or scarce species.

The best soft-rock cliff sites for invertebrates are generally in the extreme south of Britain, have a roughly south-facing aspect and are large and dynamic. Both climate and aspect favour warmth-loving invertebrates, whilst the large size and dynamic nature enable the persistence of a wide range of species with narrow habitat requirements. By contrast, the Co. Durham sites are in northern Britain, face east, and are relatively small and stable. For the Co. Durham sites to be even as good as the Yorkshire sites would be surprising.

Nevertheless, this survey appears to show that the soft-rock cliffs of Co. Durham have been underestimated and neglected by entomologists. This survey should be seen as an indication of the potential of these sites and further survey work is likely to discover more rare and specialist species.

In spite of its industrial past, the coast adjacent to Easington Colliery (Busiers Holes) was the best of the invertebrate sites covered by this survey. It is yet another example of the ability of abandoned post-industrial or 'brownfield' sites to support populations of rare invertebrates. There was rather little overlap between the rare or scarce species found at Easington Colliery and those found at Blackhall Rocks, the second best site covered by this survey. Easington Colliery appears to be a site of county and regional importance for invertebrate conservation. Blackhall Rocks is likewise of county importance (and conceivably also of regional importance).



**Fig. 5:** This seepage should be restored by removing the drainage pipe. Seepages at Blackhall Rocks are important for invertebrates but at least one has been diverted into a section of plastic pipe (Fig. 5). This should be removed as soon as possible to allow natural drainage.

Both Jackie's Beach and Ryhope Dene are smaller sites compared to Easington Colliery and Blackhall Rocks. Jackie's Beach lacks any seepages at all, whereas those at Ryhope Dene are eroding rather too rapidly for all but a few invertebrates to persist. Consequently, these two sites yielded fewer species and fewer rare or scarce species than the others. This is not through any fault of management and the continuation of minimal intervention management would be appropriate at both sites.

Jackie's Beach is a site of local interest for invertebrate conservation, with only 1.6% rare or scarce species. Even allowing for generally lower proportions of rare and scarce species in northern England, this seems insufficient to qualify as a site of county importance. The same probably applies to Ryhope Dene, but in this case, with a species list of only 84, any conclusions are necessarily tentative. Nevertheless, the discovery of a single RDB species suggests that Ryhope Dene may have more potential for invertebrates than has so far come to light.

## **6. Acknowledgements**

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## **Appendix 1: British conservation status categories – definitions.**

### **Red Data Book category 1, Endangered**

Definition Species in danger of extinction and whose survival is unlikely if causal factors continue to operate. Endangered species either (a) occur as only a single population within one 10-km square, or (b) only occur in especially vulnerable habitats, or (c) have been declining rapidly or continuously for twenty years or more to the point where they occur in five or fewer 10-km squares, or (d) may already have become extinct.

### **Red Data Book category 2, Vulnerable**

Definition Species which are likely to move into the Endangered category in the near future if causal factors continue to operate. Vulnerable species are declining throughout their range or occupy vulnerable habitats.

### **Red Data Book category 3, Rare**

Definition Species which occur in small populations and although not currently either Endangered or Vulnerable are at risk. Rare species exist in 15 or fewer 10-km squares, or are more widespread than this but dependent on small areas of especially vulnerable habitat.

### **Red Data Book category K, Insufficiently Known**

Definition Species suspected to merit either Endangered, Vulnerable, Rare or Indeterminate status but lacking sufficient information. Species included in this category may have only recently been discovered in Britain, or may be very poorly recorded for a variety of reasons.

### **Nationally Scarce Category A, Na.**

Definition Species which do not fall within Red Data Book categories but which are nonetheless uncommon in Great Britain and thought to occur in 30 or fewer (typically between 16 and 30) 10-km squares of the National Grid, or for less well-recorded groups, in seven or fewer vice-counties.

### **Nationally Scarce Category B, Nb.**

Definition Species which do not fall within Red Data Book categories but which are nonetheless uncommon in Great Britain and thought to occur in between 31 and 100 10-km squares of the National Grid, or for less well-recorded groups, between eight and twenty vice-counties.

### **Nationally Scarce, N.**

Definition Species which do not fall within Red Data Book categories but which are nonetheless uncommon in Great Britain. This status category has been used where information has not been sufficient to allocate a species to

either Na or Nb. These species are thought to occur in between 16 and 100 10-km squares of the National Grid.

**Appendix 2: List of invertebrates recorded on the Co. Durham coast in July and August 2007 by Mark G. Telfer and David J. Gibbs.**

Key species are listed in red text.

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Arachnida	Araneae	Araneidae	<i>Araneus diadematus</i>			1							1
Arachnida	Araneae	Salticidae	<i>Salticus scenicus</i>						1				1
Arachnida	Opiliones	Nemastomatidae	<i>Nemastoma bimaculatum</i>				1						1
Arachnida	Pseudoscorpiones	Chthoniidae	<i>Chthonius ischnocheles</i>						1				1
Diplopoda	Julida	Julidae	<i>Cylindroiulus punctatus</i>	Blunt-tailed Snake-millipede							1		1
Gastropoda	Stylommatophora	Agriolimacidae	<i>Deroceras laeve</i>	Marsh Slug		1	1						2
Gastropoda	Stylommatophora	Agriolimacidae	<i>Deroceras reticulatum</i>	Field Slug			1			1			2
Gastropoda	Stylommatophora	Clausiliidae	<i>Clausilia bidentata</i>	Common Door Snail		1							1
Gastropoda	Stylommatophora	Cochlicopidae	<i>Cochlicopa lubrica</i>	Slippery Moss Snail					1		1		2
Gastropoda	Stylommatophora	Discidae	<i>Discus rotundatus</i>	Rounded Snail		1	1		1	1			4
Gastropoda	Stylommatophora	Ferussaciidae	<i>Cecilioides acicula</i>	Blind Snail					1				1
Gastropoda	Stylommatophora	Helicidae	<i>Candidula intersecta</i>	Wrinkled Snail		1	1		1	1	1		5
Gastropoda	Stylommatophora	Helicidae	<i>Cernuella virgata</i>	Striped Snail				1	1				2
Gastropoda	Stylommatophora	Helicidae	<i>Ashfordia granulata</i>	Silky Snail		1	1						2
Gastropoda	Stylommatophora	Helicidae	<i>Trichia striolata</i>	Strawberry Snail							1		1
Gastropoda	Stylommatophora	Helicidae	<i>Arianta arbustorum</i>	Copse Snail		1	1						2
Gastropoda	Stylommatophora	Helicidae	<i>Cepaea nemoralis</i>	Brown-lipped Snail			1		1				2
Gastropoda	Stylommatophora	Helicidae	<i>Helix aspersa</i>	Garden Snail			1		1	1	1		4
Gastropoda	Stylommatophora	Pupillidae	<i>Lauria cylindracea</i>	Common Chrysalis Snail		1	1		1		1		4
Gastropoda	Stylommatophora	Valloniidae	<i>Vallonia costata</i>	Ribbed Grass Snail					1				1
Gastropoda	Stylommatophora	Vertiginidae	<i>Vertigo pygmaea</i>	Common Whorl Snail					1				1
Gastropoda	Stylommatophora	Vitrinidae	<i>Vitrina pellucida</i>	Pellucid Glass Snail			1			1			2
Gastropoda	Stylommatophora	Zonitidae	<i>Oxychilus cellarius</i>	Cellar Snail						1			1
Insecta	Coleoptera	Anthicidae	<i>Omonadus floralis</i>				1						1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Coleoptera	Apionidae	<i>Ceratapion gibbirostre</i>			1							1
Insecta	Coleoptera	Apionidae	<i>Protapion apricans</i>				1						1
Insecta	Coleoptera	Apionidae	<i>Protapion assimile</i>				1						1
Insecta	Coleoptera	Apionidae	<i>Catapion seniculus</i>			1							1
Insecta	Coleoptera	Apionidae	<i>Ischnopterapion loti</i>				1						1
Insecta	Coleoptera	Apionidae	<i>Holotrichapion ononis</i>			1					1		2
Insecta	Coleoptera	Cantharidae	<i>Rhagonycha fulva</i>			1	1	1	1	1	1		6
Insecta	Coleoptera	Carabidae	<i>Notiophilus biguttatus</i>				1		1				2
Insecta	Coleoptera	Carabidae	<i>Cicindela campestris</i>	Green Tiger Beetle			1				1		2
Insecta	Coleoptera	Carabidae	<i>Aepus marinus/ robinii</i>		Nb				1				1
Insecta	Coleoptera	Carabidae	<i>Trechus quadristriatus</i>				1		1				2
Insecta	Coleoptera	Carabidae	<i>Bembidion lampros</i>									1	1
Insecta	Coleoptera	Carabidae	<i>Bembidion properans</i>									1	1
Insecta	Coleoptera	Carabidae	<i>Bembidion geniculatum</i>								1	1	2
Insecta	Coleoptera	Carabidae	<i>Bembidion deletum</i>			1	1					1	3
Insecta	Coleoptera	Carabidae	<i>Bembidion tetracolum</i>				1				1		2
Insecta	Coleoptera	Carabidae	<i>Bembidion illigeri</i>				1						1
Insecta	Coleoptera	Carabidae	<i>Pterostichus madidus</i>			1	1			1			3
Insecta	Coleoptera	Carabidae	<i>Pterostichus melanarius</i>						1				1
Insecta	Coleoptera	Carabidae	<i>Olisthopus rotundatus</i>				1						1
Insecta	Coleoptera	Carabidae	<i>Paranchus albipes</i>				1				1		2
Insecta	Coleoptera	Carabidae	<i>Amara familiaris</i>				1						1
Insecta	Coleoptera	Carabidae	<i>Curtonotus aulicus</i>						1		1		2
Insecta	Coleoptera	Carabidae	<i>Licinus depressus</i>		Nb		1						1
Insecta	Coleoptera	Carabidae	<i>Badister bullatus</i>						1				1
Insecta	Coleoptera	Carabidae	<i>Demetrias atricapillus</i>								1		1
Insecta	Coleoptera	Chrysomelidae	<i>Oulema rufocyanea</i>			1							1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Coleoptera	Chrysomelidae	<i>Galeruca tanacetii</i>						1				1
Insecta	Coleoptera	Chrysomelidae	<i>Aphthona euphorbiae</i>						1				1
Insecta	Coleoptera	Chrysomelidae	<i>Aphthona herbigrada</i>			1							1
Insecta	Coleoptera	Chrysomelidae	<i>Longitarsus parvulus</i>		Na	1							1
Insecta	Coleoptera	Chrysomelidae	<i>Longitarsus pratensis</i>								1		1
Insecta	Coleoptera	Chrysomelidae	<i>Longitarsus succineus</i>			1	1						2
Insecta	Coleoptera	Chrysomelidae	<i>Altica palustris</i>				1						1
Insecta	Coleoptera	Chrysomelidae	<i>Neocrepidodera transversa</i>			1							1
Insecta	Coleoptera	Chrysomelidae	<i>Derocrepis rufipes</i>				1						1
Insecta	Coleoptera	Chrysomelidae	<i>Sphaeroderma rubidum</i>			1	1						2
Insecta	Coleoptera	Coccinellidae	<i>Rhyzobius litura</i>								1		1
Insecta	Coleoptera	Coccinellidae	<i>Propylea quatuordecimpunctata</i>	14-spot Ladybird		1	1	1	1				4
Insecta	Coleoptera	Coccinellidae	<i>Adalia decempunctata</i>	10-spot Ladybird		1		1					2
Insecta	Coleoptera	Coccinellidae	<i>Coccinella septempunctata</i>	7-spot Ladybird		1	1	1	1		1		5
Insecta	Coleoptera	Coccinellidae	<i>Adonia variegata</i>	Adonis' Ladybird	Nb	1		1					2
Insecta	Coleoptera	Cryptophagidae	<i>Telmatophilus typhae</i>				1						1
Insecta	Coleoptera	Cryptophagidae	<i>Micrambe lindbergorum</i>		RDBK	1							1
Insecta	Coleoptera	Cryptophagidae	<i>Micrambe vini</i>			1							1
Insecta	Coleoptera	Curculionidae	<i>Otiorhynchus rugifrons</i>								1		1
Insecta	Coleoptera	Curculionidae	<i>Otiorhynchus ovatus</i>						1				1
Insecta	Coleoptera	Curculionidae	<i>Trachyphloeus angustisetulus</i>						1				1
Insecta	Coleoptera	Curculionidae	<i>Phyllobius viridiaeris</i>	Green Nettle Weevil							1		1
Insecta	Coleoptera	Curculionidae	<i>Liophloeus tessulatus</i>				1						1
Insecta	Coleoptera	Curculionidae	<i>Sitona striatellus</i>						1				1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Coleoptera	Curculionidae	<i>Hypera plantaginis</i>			1							1
Insecta	Coleoptera	Curculionidae	<i>Zacladus geranii</i>	Meadow Cranesbill Weevil		1	1						2
Insecta	Coleoptera	Curculionidae	<i>Ceutorhynchus floralis</i>			1	1						2
Insecta	Coleoptera	Curculionidae	<i>Ceutorhynchus obstrictus</i>			1	1						2
Insecta	Coleoptera	Curculionidae	<i>Ceutorhynchus picitarsis</i>						1				1
Insecta	Coleoptera	Curculionidae	<i>Tychius meliloti</i>				1						1
Insecta	Coleoptera	Curculionidae	<i>Mecinus pyraeter</i>						1				1
Insecta	Coleoptera	Curculionidae	<i>Gymnetron pascuorum</i>				1						1
Insecta	Coleoptera	Curculionidae	<i>Gymnetron antirrhini</i>				1						1
Insecta	Coleoptera	Dytiscidae	<i>Hydroporus discretus</i>				1						1
Insecta	Coleoptera	Dytiscidae	<i>Nebrioporus elegans</i>								1		1
Insecta	Coleoptera	Dytiscidae	<i>Agabus conspersus</i>		Nb		1						1
Insecta	Coleoptera	Dytiscidae	<i>Agabus guttatus</i>								1		1
Insecta	Coleoptera	Dytiscidae	<i>Ilybius fuliginosus</i>								1		1
Insecta	Coleoptera	Helophoridae	<i>Helophorus brevipalpis</i>			1							1
Insecta	Coleoptera	Hydraenidae	<i>Limnebius truncatellus</i>				1						1
Insecta	Coleoptera	Hydraenidae	<i>Ochthebius bicolon</i>		Nb	1							1
Insecta	Coleoptera	Hydraenidae	<i>Ochthebius dilatatus</i>				1						1
Insecta	Coleoptera	Hydrophilidae	<i>Laccobius bipunctatus</i>				1						1
Insecta	Coleoptera	Hydrophilidae	<i>Laccobius striatulus</i>				1						1
Insecta	Coleoptera	Hydrophilidae	<i>Cercyon littoralis</i>						1				1
Insecta	Coleoptera	Lathridiidae	<i>Latridius anthracinus</i>				1						1
Insecta	Coleoptera	Lathridiidae	<i>Aridius bifasciatus</i>			1			1				2
Insecta	Coleoptera	Lathridiidae	<i>Aridius nodifer</i>			1							1
Insecta	Coleoptera	Lathridiidae	<i>Corticarina fuscula</i>						1				1
Insecta	Coleoptera	Lathridiidae	<i>Corticara gibbosa</i>			1	1						2
Insecta	Coleoptera	Nitidulidae	<i>Epuraea aestiva</i>			1							1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Coleoptera	Nitidulidae	<i>Meligethes aeneus</i>	Common Pollen Beetle		1	1						2
Insecta	Coleoptera	Phalacridae	<i>Stilbus testaceus</i>			1							1
Insecta	Coleoptera	Ptiliidae	<i>Ptenidium punctatum</i>						1				1
Insecta	Coleoptera	Staphylinidae	<i>Micralymma marinum</i>						1				1
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus atriceps</i>						1				1
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus hypnorum</i>			1			1				2
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus nitidulus</i>			1	1		1				3
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus tersus</i>						1				1
Insecta	Coleoptera	Staphylinidae	<i>Tachinus signatus</i>								1		1
Insecta	Coleoptera	Staphylinidae	<i>Myllaena brevicornis</i>			1	1						2
Insecta	Coleoptera	Staphylinidae	<i>Aloconota gregaria</i>			1	1		1		1		4
Insecta	Coleoptera	Staphylinidae	<i>Dimetrota atramentaria</i>			1							1
Insecta	Coleoptera	Staphylinidae	<i>Aleochara grisea</i>						1				1
Insecta	Coleoptera	Staphylinidae	<i>Drusilla canaliculata</i>								1		1
Insecta	Coleoptera	Staphylinidae	<i>Myrmecopora sulcata</i>						1				1
Insecta	Coleoptera	Staphylinidae	<i>Carpelimus zealandicus</i>				1					1	2
Insecta	Coleoptera	Staphylinidae	<i>Stenus pusillus</i>			1							1
Insecta	Coleoptera	Staphylinidae	<i>Cafius xantholoma</i>						1				1
Insecta	Coleoptera	Staphylinidae	<i>Platydracus stercorarius</i>			1							1
Insecta	Coleoptera	Staphylinidae	<i>Tasgius globulifer</i>				1						1
Insecta	Coleoptera	Staphylinidae	<i>Megalinus glabratus</i>								1		1
Insecta	Coleoptera	Tenebrionidae	<i>Lagria hirta</i>			1							1
Insecta	Coleoptera	Tenebrionidae	<i>Isomira murina</i>			1							1
Insecta	Dermaptera	Forficulidae	<i>Forficula auricularia</i>	Common Earwig					1		1		2
Insecta	Diptera	Agromyzidae	<i>Ophiomyia orbiculata</i>				1						1
Insecta	Diptera	Agromyzidae	<i>Cerodontha denticornis</i>			1	1				1		3
Insecta	Diptera	Agromyzidae	<i>Cerodontha hammi</i>			1							1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Diptera	Agromyzidae	<i>Cerodontha biseta</i>			1							1
Insecta	Diptera	Agromyzidae	<i>Chromatomyia millii</i>			1	1		1				3
Insecta	Diptera	Agromyzidae	<i>Chromatomyia nigra</i>				1						1
Insecta	Diptera	Agromyzidae	<i>Liriomyza pusio</i>						1				1
Insecta	Diptera	Agromyzidae	<i>Phytomyza ranunculi</i>				1						1
Insecta	Diptera	Agromyzidae	<i>Phytomyza rufipes</i>				1						1
Insecta	Diptera	Anisopodidae	<i>Sylvicola cinctus</i>									1	1
Insecta	Diptera	Anisopodidae	<i>Sylvicola punctatus</i>			1	1		1			1	4
Insecta	Diptera	Anthomyiidae	<i>Anthomyia liturata</i>				1		1				2
Insecta	Diptera	Anthomyiidae	<i>Botanophila fugax</i>						1				1
Insecta	Diptera	Anthomyiidae	<i>Delia florilega</i>				1						1
Insecta	Diptera	Anthomyiidae	<i>Delia platura</i>			1	1		1				3
Insecta	Diptera	Anthomyiidae	<i>Delia radicum</i>								1		1
Insecta	Diptera	Anthomyiidae	<i>Heterostylodes pratensis</i>				1						1
Insecta	Diptera	Anthomyiidae	<i>Phorbia fumigata</i>			1							1
Insecta	Diptera	Anthomyiidae	<i>Pegoplata infirma</i>				1		1				2
Insecta	Diptera	Asteiidae	<i>Asteia amoena</i>				1		1				2
Insecta	Diptera	Calliphoridae	<i>Bellardia pandia</i>								1		1
Insecta	Diptera	Calliphoridae	<i>Bellardia vulgaris</i>			1							1
Insecta	Diptera	Calliphoridae	<i>Melanomya nana</i>						1				1
Insecta	Diptera	Chamaemyiidae	<i>Chamaemyia aridella</i>				1						1
Insecta	Diptera	Chamaemyiidae	<i>Chamaemyia herbarum</i>				1						1
Insecta	Diptera	Chamaemyiidae	<i>Chamaemyia juncorum</i>				1						1
Insecta	Diptera	Chamaemyiidae	<i>Chamaemyia polystigma</i>			1					1		2
Insecta	Diptera	Chloropidae	<i>Cetema neglectum</i>				1						1
Insecta	Diptera	Chloropidae	<i>Thaumatomyia glabra</i>				1						1
Insecta	Diptera	Chloropidae	<i>Dicraeus vagans</i>				1						1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Diptera	Chloropidae	<i>Oscinella frit</i>			1	1		1		1	1	5
Insecta	Diptera	Chloropidae	<i>Oscinella nigerrima</i>				1						1
Insecta	Diptera	Chloropidae	<i>Oscinella nitidissima</i>			1	1						2
Insecta	Diptera	Coelopidae	<i>Coelopa frigida</i>				1		1				2
Insecta	Diptera	Conopidae	<i>Sicus ferrugineus</i>			1	1						2
Insecta	Diptera	Dolichopodidae	<i>Argyra argyria</i>				1						1
Insecta	Diptera	Dolichopodidae	<i>Chrysotus gramineus</i>			1	1						2
Insecta	Diptera	Dolichopodidae	<i>Chrysotus suavis</i>		N (None)		1						1
Insecta	Diptera	Dolichopodidae	<i>Dolichopus festivus</i>				1						1
Insecta	Diptera	Dolichopodidae	<i>Dolichopus rupestris</i>				1						1
Insecta	Diptera	Dolichopodidae	<i>Tachytrechus notatus</i>				1						1
Insecta	Diptera	Dolichopodidae	<i>Hydrophorus balticus</i>				1						1
Insecta	Diptera	Dolichopodidae	<i>Liancalus virens</i>			1	1				1	1	4
Insecta	Diptera	Dolichopodidae	<i>Medetera truncorum</i>			1	1		1				3
Insecta	Diptera	Dolichopodidae	<i>Rhaphium caliginosum</i>				1						1
Insecta	Diptera	Dolichopodidae	<i>Campsicnemus curvipes</i>			1							1
Insecta	Diptera	Dolichopodidae	<i>Micromorphus sp. A</i>		N (None)		1						1
Insecta	Diptera	Dolichopodidae	<i>Syntormon pallipes</i>				1						1
Insecta	Diptera	Dolichopodidae	<i>Teuchophorus spinigerellus</i>				1						1
Insecta	Diptera	Drosophilidae	<i>Drosophila subobscura</i>						1				1
Insecta	Diptera	Drosophilidae	<i>Scaptomyza pallida</i>			1	1		1		1		4
Insecta	Diptera	Drosophilidae	<i>Scaptomyza flava</i>			1	1		1				3
Insecta	Diptera	Dryomyzidae	<i>Malacomyia sciomyzina</i>								1	1	2
Insecta	Diptera	Empididae	<i>Clinocera stagnalis</i>			1							1
Insecta	Diptera	Empididae	<i>Dolichocephala</i>				1						1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
			<i>oblongoguttata</i>										
Insecta	Diptera	Empididae	<i>Kowarzia bipunctata</i>			1	1						2
Insecta	Diptera	Empididae	<i>Empis tessellata</i>						1				1
Insecta	Diptera	Empididae	<i>Empis livida</i>				1		1				2
Insecta	Diptera	Ephydriidae	<i>Parydra coarctata</i>				1				1	1	3
Insecta	Diptera	Ephydriidae	<i>Scatella paludum</i>			1	1				1	1	4
Insecta	Diptera	Ephydriidae	<i>Scatella stagnalis</i>			1							1
Insecta	Diptera	Ephydriidae	<i>Scatella tenuicosta</i>			1	1		1		1	1	5
Insecta	Diptera	Ephydriidae	<i>Hydrellia griseola</i>			1	1				1		3
Insecta	Diptera	Ephydriidae	<i>Hydrellia maura</i>			1	1						2
Insecta	Diptera	Ephydriidae	<i>Notiphila cinerea</i>				1						1
Insecta	Diptera	Ephydriidae	<i>Philygria punctatonervosa</i>						1				1
Insecta	Diptera	Ephydriidae	<i>Philygria vittipennis</i>			1							1
Insecta	Diptera	Heleomyzidae	<i>Tephrochlaena halterata</i>				1						1
Insecta	Diptera	Hybotidae	<i>Hybos culiciformis</i>			1					1		2
Insecta	Diptera	Hybotidae	<i>Platypalpus albifacies</i>				1						1
Insecta	Diptera	Hybotidae	<i>Platypalpus kirtlingensis</i>				1						1
Insecta	Diptera	Hybotidae	<i>Platypalpus longiseta</i>				1						1
Insecta	Diptera	Hybotidae	<i>Platypalpus pallidiventris</i>			1							1
Insecta	Diptera	Hybotidae	<i>Tachypeza nubila</i>			1							1
Insecta	Diptera	Keroplastidae	<i>Isoneuromyia semirufa</i>			1							1
Insecta	Diptera	Keroplastidae	<i>Orfelia nemoralis</i>			1							1
Insecta	Diptera	Lauxaniidae	<i>Minettia longipennis</i>			1							1
Insecta	Diptera	Lauxaniidae	<i>Minettia fasciata (=rivosa)</i>			1	1		1		1		4
Insecta	Diptera	Limoniidae	<i>Idiocera bradleyi</i>		RDB2		1				1		2
Insecta	Diptera	Limoniidae	<i>Ilisia maculata</i>				1						1
Insecta	Diptera	Limoniidae	<i>Molophilus bifidus</i>				1						1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Diptera	Limoniidae	<i>Symplecta stictica</i>				1					1	2
Insecta	Diptera	Limoniidae	<i>Symplecta hybrida</i>				1						1
Insecta	Diptera	Limoniidae	<i>Dicranomyia chorea</i>			1	1		1			1	4
Insecta	Diptera	Limoniidae	<i>Geranomyia unicolor</i>									1	1
Insecta	Diptera	Limoniidae	<i>Limonia nubeculosa</i>			1						1	2
Insecta	Diptera	Limoniidae	<i>Symplecta chosenensis</i>		pRDB1		1						1
Insecta	Diptera	Lonchopteridae	<i>Lonchoptera bifurcata</i>				1		1				2
Insecta	Diptera	Lonchopteridae	<i>Lonchoptera lutea</i>				1		1				2
Insecta	Diptera	Muscidae	<i>Coenosia mollicula</i>				1						1
Insecta	Diptera	Muscidae	<i>Coenosia tigrina</i>								1		1
Insecta	Diptera	Muscidae	<i>Schoenomyza litorella</i>			1	1						2
Insecta	Diptera	Muscidae	<i>Drymeia hamata</i>			1					1		2
Insecta	Diptera	Muscidae	<i>Morellia hortorum</i>						1				1
Insecta	Diptera	Muscidae	<i>Neomyia cornicina</i>						1				1
Insecta	Diptera	Mycetophilidae	<i>Boletina dubia</i>			1	1						2
Insecta	Diptera	Opomyzidae	<i>Opomyza florum</i>						1		1		2
Insecta	Diptera	Opomyzidae	<i>Opomyza germinationis</i>			1					1		2
Insecta	Diptera	Pallopteridae	<i>Palloptera modesta</i>								1		1
Insecta	Diptera	Phaeomyiidae	<i>Pelidnoptera fuscipennis</i>						1				1
Insecta	Diptera	Pipunculidae	<i>Verrallia aucta</i>				1						1
Insecta	Diptera	Pipunculidae	<i>Eudorylas longifrons</i>									1	1
Insecta	Diptera	Pipunculidae	<i>Tomosvaryella geniculata</i>			1							1
Insecta	Diptera	Pipunculidae	<i>Tomosvaryella sylvatica</i>								1		1
Insecta	Diptera	Psilidae	<i>Chamaepsila rosae</i>								1		1
Insecta	Diptera	Psychodidae	<i>Panimerus albifacies</i>				1						1
Insecta	Diptera	Psychodidae	<i>Panimerus maynei</i>				1						1
Insecta	Diptera	Psychodidae	<i>Paramormia ustulata</i>				1						1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Diptera	Psychodidae	<i>Philosepedon humeralis</i>				1		1				2
Insecta	Diptera	Rhagionidae	<i>Chrysopilus cristatus</i>			1	1						2
Insecta	Diptera	Rhinophoridae	<i>Melanophora roralis</i>						1				1
Insecta	Diptera	Scathophagidae	<i>Cordilura pubera</i>				1						1
Insecta	Diptera	Scathophagidae	<i>Scathophaga stercoraria</i>						1				1
Insecta	Diptera	Scatopsidae	<i>Reichertella geniculata</i>						1				1
Insecta	Diptera	Scatopsidae	<i>Scatopse notata</i>						1				1
Insecta	Diptera	Sciomyzidae	<i>Pherbellia cinerella</i>			1	1		1		1		4
Insecta	Diptera	Sciomyzidae	<i>Coremacera marginata</i>			1							1
Insecta	Diptera	Sciomyzidae	<i>Euthycera fumigata</i>						1				1
Insecta	Diptera	Sciomyzidae	<i>Pherbina coryleti</i>			1							1
Insecta	Diptera	Sciomyzidae	<i>Tetanocera punctifrons</i>		N	1	1						2
Insecta	Diptera	Sciomyzidae	<i>Trypetoptera punctulata</i>			1	1		1				3
Insecta	Diptera	Sepsidae	<i>Sepsis fulgens</i>						1		1		2
Insecta	Diptera	Sepsidae	<i>Themira lucida</i>			1							1
Insecta	Diptera	Stratiomyidae	<i>Oxycera morrisii</i>		N		1						1
Insecta	Diptera	Stratiomyidae	<i>Oxycera pygmaea</i>		N	1	1						2
Insecta	Diptera	Stratiomyidae	<i>Chloromyia formosa</i>				1		1				2
Insecta	Diptera	Stratiomyidae	<i>Stratiomys potamida</i>		N		1						1
Insecta	Diptera	Syrphidae	<i>Melanostoma mellinum</i>								1		1
Insecta	Diptera	Syrphidae	<i>Platycheirus albimanus</i>			1	1		1				3
Insecta	Diptera	Syrphidae	<i>Platycheirus angustatus</i>				1						1
Insecta	Diptera	Syrphidae	<i>Platycheirus clypeatus</i>			1							1
Insecta	Diptera	Syrphidae	<i>Paragus haemorrhous</i>				1						1
Insecta	Diptera	Syrphidae	<i>Episyrphus balteatus</i>			1			1				2
Insecta	Diptera	Syrphidae	<i>Eupeodes luniger</i>						1				1
Insecta	Diptera	Syrphidae	<i>Sphaerophoria interrupta</i>			1							1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Diptera	Syrphidae	<i>Sphaerophoria scripta</i>				1						1
Insecta	Diptera	Syrphidae	<i>Cheilosia illustrata</i>						1		1		2
Insecta	Diptera	Syrphidae	<i>Cheilosia impressa</i>				1						1
Insecta	Diptera	Syrphidae	<i>Cheilosia latifrons</i>			1							1
Insecta	Diptera	Syrphidae	<i>Rhingia campestris</i>						1				1
Insecta	Diptera	Syrphidae	<i>Eristalis tenax</i>						1				1
Insecta	Diptera	Syrphidae	<i>Helophilus pendulus</i>			1							1
Insecta	Diptera	Syrphidae	<i>Pipizella viduata</i>				1		1				2
Insecta	Diptera	Syrphidae	<i>Volucella bombylans</i>						1		1		2
Insecta	Diptera	Tachinidae	<i>Eriothrix rufomaculata</i>						1		1		2
Insecta	Diptera	Tachinidae	<i>Meigenia mutabilis</i>								1		1
Insecta	Diptera	Tachinidae	<i>Siphona geniculata</i>				1						1
Insecta	Diptera	Tephritidae	<i>Urophora jaceana</i>			1	1		1		1		4
Insecta	Diptera	Tephritidae	<i>Tephritis cometa</i>				1						1
Insecta	Diptera	Tephritidae	<i>Tephritis formosa</i>				1						1
Insecta	Diptera	Therevidae	<i>Thereva nobilitata</i>			1							1
Insecta	Diptera	Tipulidae	<i>Tipula lateralis</i>			1	1						2
Insecta	Diptera	Ulidiidae	<i>Herina frondescentiae</i>			1	1						2
Insecta	Diptera	Ulidiidae	<i>Herina nigrina</i>			1	1				1		3
Insecta	Diptera	Ulidiidae	<i>Herina lugubris</i>			1	1		1		1		4
Insecta	Hemiptera: Auchenorrhyncha	Cixiidae	<i>Cixius nervosus</i>			1	1						2
Insecta	Hemiptera: Heteroptera	Anthocoridae	<i>Anthocoris nemoralis</i>			1							1
Insecta	Hemiptera: Heteroptera	Hydrometridae	<i>Hydrometra stagnorum</i>				1						1
Insecta	Hemiptera: Heteroptera	Lygaeidae	<i>Stygnocoris sabulosus</i>						1				1
Insecta	Hemiptera: Heteroptera	Miridae	<i>Dicyphus annulatus</i>			1					1		2
Insecta	Hemiptera: Heteroptera	Miridae	<i>Adelphocoris lineolatus</i>			1					1		2
Insecta	Hemiptera: Heteroptera	Miridae	<i>Calocoris roseomaculatus</i>			1							1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Hemiptera: Heteroptera	Miridae	<i>Calocoris norwegicus</i>								1		1
Insecta	Hemiptera: Heteroptera	Miridae	<i>Capsus ater</i>				1						1
Insecta	Hemiptera: Heteroptera	Miridae	<i>Lygocoris lucorum</i>								1		1
Insecta	Hemiptera: Heteroptera	Miridae	<i>Leptopterna ferrugata</i>			1	1						2
Insecta	Hemiptera: Heteroptera	Miridae	<i>Stenodema laevigata</i>				1						1
Insecta	Hemiptera: Heteroptera	Miridae	<i>Macrotylus paykulli</i>			1							1
Insecta	Hemiptera: Heteroptera	Saldidae	<i>Saldula saltatoria</i>				1						1
Insecta	Hemiptera: Heteroptera	Tingidae	<i>Campylosteira verna</i>						1				1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Andrena coitana</i>	a mining bee			1						1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Andrena nigroaenea</i>	a mining bee						1			1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Andrena wilkella</i>	a mining bee					1	1			2
Insecta	Hymenoptera: Aculeata	Apidae	<i>Bombus hortorum</i>	Small Garden Bumble Bee			1		1				2
Insecta	Hymenoptera: Aculeata	Apidae	<i>Bombus lapidarius</i>	Large Red Tailed Bumble Bee		1	1	1	1		1		5
Insecta	Hymenoptera: Aculeata	Apidae	<i>Bombus lucorum</i>	White-tailed Bumble Bee							1		1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Bombus pascuorum</i>	Common Carder Bee					1	1			2
Insecta	Hymenoptera: Aculeata	Apidae	<i>Bombus terrestris</i>	Buff-tailed Bumble Bee			1		1	1			3
Insecta	Hymenoptera: Aculeata	Apidae	<i>Bombus vestalis</i>	a bumblebee					1				1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Colletes daviesanus</i>	a mining bee		1					1		2
Insecta	Hymenoptera: Aculeata	Apidae	<i>Lasioglossum smeathmanellum</i>	a mining bee		1	1						2
Insecta	Hymenoptera: Aculeata	Apidae	<i>Lasioglossum villosulum</i>	Shaggy Mining Bee					1				1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Megachile circumcincta</i>	a leaf-cutter bee						1			1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Nomada fabriciana</i>	Fabricius' Nomad Bee			1						1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Nomada rufipes</i>	Golden-rod Nomad Bee			1						1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Nomada striata</i>	a solitary bee							1		1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Osmia rufa</i>	Red Mason Bee			1						1
Insecta	Hymenoptera: Aculeata	Apidae	<i>Sphecodes Geoffrellus</i>	a cuckoo bee			1						1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Hymenoptera: Aculeata	Chrysididae	<i>Chrysis ignita</i>	a cuckoo wasp					1	1			2
Insecta	Hymenoptera: Aculeata	Chrysididae	<i>Chrysis viridula</i>	a cuckoo wasp					1				1
Insecta	Hymenoptera: Aculeata	Eumenidae	<i>Ancistrocerus scoticus</i>	a mason wasp					1				1
Insecta	Hymenoptera: Aculeata	Formicidae	<i>Formica lemani</i>	an ant			1				1	1	3
Insecta	Hymenoptera: Aculeata	Formicidae	<i>Myrmica ruginodis</i>	an ant			1						1
Insecta	Hymenoptera: Aculeata	Formicidae	<i>Myrmica sabuleti</i>	an ant			1						1
Insecta	Hymenoptera: Aculeata	Formicidae	<i>Myrmica scabrinodis</i>	an ant					1				1
Insecta	Hymenoptera: Aculeata	Pompilidae	<i>Dipogon variegatus</i>	a spider-hunter wasp			1						1
Insecta	Hymenoptera: Aculeata	Pompilidae	<i>Priocnemis schioedtei</i>	a spider-hunter wasp	Nb				1				1
Insecta	Hymenoptera: Aculeata	Sphecidae	<i>Crossocerus dimidiatus</i>	Blunt Tailed Digger Wasp		1							1
Insecta	Hymenoptera: Aculeata	Sphecidae	<i>Crossocerus elongatulus</i>	Slender Digger Wasp			1		1		1		3
Insecta	Hymenoptera: Aculeata	Sphecidae	<i>Diodontus tristis</i>	Melancholy Black Wasp		1							1
Insecta	Hymenoptera: Aculeata	Sphecidae	<i>Mellinus arvensis</i>	Field Digger Wasp		1	1						2
Insecta	Hymenoptera: Aculeata	Sphecidae	<i>Pemphredon lethifera</i>	a digger wasp					1				1
Insecta	Hymenoptera: Aculeata	Sphecidae	<i>Tachysphex pompiliformis</i>	a digger wasp					1				1
Insecta	Hymenoptera: Aculeata	Sphecidae	<i>Trypoxylon attenuatum</i>	Slender Wood Borer Wasp			1						1
Insecta	Hymenoptera: Symphyta	Argidae	<i>Arge cyanocrocea</i>	a sawfly					1				1
Insecta	Hymenoptera: Symphyta	Tenthredinidae	<i>Dolerus germanicus</i>	a sawfly			1						1
Insecta	Hymenoptera: Symphyta	Tenthredinidae	<i>Athalia rosae</i>	a sawfly					1				1
Insecta	Hymenoptera: Symphyta	Tenthredinidae	<i>Allantus calceatus</i>	a sawfly							1		1
Insecta	Lepidoptera	Arctiidae	<i>Tyria jacobaeae</i>	Cinnabar	BAP	1							1
Insecta	Lepidoptera	Gelechiidae	<i>Monochroa tenebrella</i>						1				1
Insecta	Lepidoptera	Geometridae	<i>Scotopteryx chenopodiata</i>	Shaded Broad-bar		1							1
Insecta	Lepidoptera	Geometridae	<i>Camptogramma bilineata</i>	Yellow Shell			1						1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Insecta	Lepidoptera	Geometridae	<i>Perizoma alchemillata</i>	Small Rivulet		1							1
Insecta	Lepidoptera	Hesperiidae	<i>Thymelicus sylvestris</i>	Small Skipper		1							1
Insecta	Lepidoptera	Hesperiidae	<i>Ochlodes faunus</i>	Large Skipper					1				1
Insecta	Lepidoptera	Lycaenidae	<i>Aricia artaxerxes</i>	Northern Brown Argus	Nb, BAP	1							1
Insecta	Lepidoptera	Lycaenidae	<i>Polyommatus icarus</i>	Common Blue					1	1	1		3
Insecta	Lepidoptera	Noctuidae	<i>Noctua pronuba</i>	Large Yellow Underwing							1		1
Insecta	Lepidoptera	Noctuidae	<i>Autographa gamma</i>	Silver Y		1							1
Insecta	Lepidoptera	Nymphalidae	<i>Aglais urticae</i>	Small Tortoiseshell		1	1						2
Insecta	Lepidoptera	Nymphalidae	<i>Inachis io</i>	Peacock		1					1		2
Insecta	Lepidoptera	Pieridae	<i>Pieris brassicae</i>	Large White		1			1				2
Insecta	Lepidoptera	Pieridae	<i>Pieris napi</i>	Green-veined White		1					1		2
Insecta	Lepidoptera	Pterophoridae	<i>Platyptilia gonodactyla</i>				1						1
Insecta	Lepidoptera	Pterophoridae	<i>Emmelina monodactyla</i>			1							1
Insecta	Lepidoptera	Pyalidae	<i>Chrysoteuchia culmella</i>	Garden Grass-veneer		1							1
Insecta	Lepidoptera	Pyalidae	<i>Hypsopygia costalis</i>	Gold Triangle		1							1
Insecta	Lepidoptera	Satyridae	<i>Pararge aegeria</i>	Speckled Wood								1	1
Insecta	Lepidoptera	Satyridae	<i>Lasiommata megera</i>	Wall	BAP	1							1
Insecta	Lepidoptera	Satyridae	<i>Maniola jurtina</i>	Meadow Brown		1	1		1	1	1		5
Insecta	Lepidoptera	Satyridae	<i>Coenonympha pamphilus</i>	Small Heath	BAP	1	1			1			3
Insecta	Lepidoptera	Satyridae	<i>Aphantopus hyperantus</i>	Ringlet		1			1		1	1	4
Insecta	Lepidoptera	Tortricidae	<i>Aethes piercei</i>		Nb		1						1
Insecta	Lepidoptera	Tortricidae	<i>Celypha lacunana</i>						1				1
Insecta	Lepidoptera	Zygaenidae	<i>Zygaena filipendulae</i>	Six-spot Burnet		1			1	1			3
Insecta	Lepidoptera	Zygaenidae	<i>Zygaena lonicerae</i>	Narrow-bordered Five-spot Burnet			1			1			2
Insecta	Orthoptera	Acrididae	<i>Chorthippus brunneus</i>	Common Field Grasshopper		1	1			1	1		4
Malacostraca	Isopoda	Armadillidiidae	<i>Armadillidium pulchellum</i>			1							1

Classification1	Classification2	Classification3	Taxon	Vernacular	Conservation Status	Blackhall Rocks	Easington Colliery	Hendon Promenade	Jackie's Beach	Nose's Point	Ryhope Dene	Ryhope, un-named dene	Total no. of sites
Malacostraca	Isopoda	Armadillidiidae	<i>Armadillidium vulgare</i>	Common pill woodlouse		1	1		1	1	1		5
Malacostraca	Isopoda	Cylisticidae	<i>Cylisticus convexus</i>				1						1
Malacostraca	Isopoda	Ligiidae	<i>Ligia oceanica</i>	Common sea-slater					1				1
Malacostraca	Isopoda	Oniscidae	<i>Oniscus asellus</i>	Common shiny woodlouse		1	1				1		3
Malacostraca	Isopoda	Philosciidae	<i>Philoscia muscorum</i>	Common striped woodlouse		1	1		1	1			4
Malacostraca	Isopoda	Platyarthridae	<i>Platyarthrus hoffmannseggi</i>	Ant woodlouse					1				1
Malacostraca	Isopoda	Porcellionidae	<i>Porcellio scaber</i>	Common rough woodlouse					1		1		2
Malacostraca	Isopoda	Trichoniscidae	<i>Androniscus dentiger</i>	Rosy woodlouse		1	1						2
Malacostraca	Isopoda	Trichoniscidae	<i>Haplophthalmus mengei</i>			1			1				2
Malacostraca	Isopoda	Trichoniscidae	<i>Trichoniscus pusillus</i>	Common pygmy woodlouse		1	1						2
			No. of species			146	185	7	123	18	84	21	374

## **Appendix 3: Definitions used by Howe (2002) to determine the fidelity of invertebrate species associated with coastal soft cliff in the UK.**

**Grade 1 species** are restricted to coastal soft cliff in the UK and dependent, for at least some stage of their life cycle, on soft cliff habitats. These include species which have always been restricted to coastal soft cliff and others which were once more widespread but are now confined to this habitat.

**Grade 2 species** are strongly associated with coastal soft cliff in the UK, for at least some stage of their life cycle, with the majority of populations or the strongest populations occurring at such localities. However, they can also be found in other habitat types where extensive areas of bare ground and pioneer vegetation, or seepages and fen vegetation occur, such as sand dunes, dry sandy heathland, coastal grassland, sand or gravel pits, inland seepages and reedbeds.

**Grade 3 species** are associated with coastal soft cliff in the UK, at least in some part of their geographic range, but also occur in a wide range of habitat types where the presence of bare ground, pioneer vegetation, seepages or fen vegetation is of fundamental importance for some of their life cycle.