Kessingland Coast - Survey of Aculeate Hymenoptera

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Summary

This survey was carried out as part of the national Buglife project 'The Sustainable Management of Soft Cliffs and their Invertebrate Fauna'. A major component of the project is to study the ecology of soft cliffs in the UK with an aim to inform and initiate the measures required for the sustainable management this habitat and its invertebrate biodiversity in the future.

Coastal soft cliffs in the UK are of national and perhaps international importance for their invertebrate faunas (Howe, 2003). They support a large number of species of conservation concern, plus impressive populations of more widespread species. With 11.4km of unprotected soft cliff (Pye & French, 1993), the Suffolk coast boasts a significant proportion of the UK resource – approximately 400km. As with most of the UK soft cliff sites data for sites in Suffolk is in short supply. Studies such as this are of vital importance to our future management of the coast and to inform invertebrate conservation in the UK.

The study area of Kessingland Cliffs forms part of the Pakefield to Easton Bavents Site of Special Scientific Interest (SSSI). The SSSI citation does not mention the invertebrate fauna of the site as an interest feature, however from this survey it is clear that the site is of regional and national importance for its invertebrates. This survey has recorded fifteen Nationally Scarce and three Red Data Book species of insect on the section of cliff. Further invertebrate surveys of the entire site will undoubtedly uncover more. Buglife recommend that further invertebrate surveys are carried out for the Suffolk soft cliffs to determine their nature conservation value and to ensure appropriate management of Suffolk soft cliff sites in the future.

Survey area
The coastal strip from TM536862 to TM537892, including the small and shallow dune system at the southern end and, where access permitted, the stable mature land slips and cliff top path.

In view of the change of habitat along this stretch of coast, the survey was divided into three sections:
TM536862 to TM536876 (South Section)
TM536876 to TM536885 (Central Section)
TM536885 to TM537892 (North Section)

Habitat description
The cliff here is about 25m high, and there are no obvious sea defence or erosion prevention measures.

There is clearly a southward movement of sand along this section of coast, it being actively eroded in the northern and central sections, and a net deposited at the southern end. Therefore at the northern end (Fig.1), and most notably in the central section (Fig 2.), the high tide comes close to the cliff base, eroding it away, and producing a steep and continually slipping and shearing cliff (Fig. 2). Conversely, at the southern end the sea is 100 - 200m from the cliff (Fig.3) with a stable shallow dune system developing (Fig. 4, 5) with Sea Couch and Marram Grass. The cliff here is well vegetated with dense woody shrubs and bramble. Between these two extremes (North and South Section) is a transitional section of naturally maturing land slip (Fig.6, 7), with a succession of vegetation that matches the different times that have elapsed since the last slippage (Fig.8).


Fig 1. Northern eroding cliff.


Fig 2. Centre eroding cliff.


Fig 3. Southern sand deposition.


Fig 4. Southern shallow dunes


Fig 5. Southern area stabilising


Fig 6. Transition to South


Fig 7. Transition at South/Centre


Fig 8. Transition vegetation

Flora
Flora for pollen and nectar was diverse, but only a few species were abundant during the surveys. Alexanders (*Smyrnium olusatrum*) was abundant in May and there is plenty of bramble throughout. There was always a reasonable flowering of Asteraceae throughout with no one species dominating. Wild Carot (*Daucus carota*) was the most frequent Apiaceae in August.

Appendix 1 (below) shows recorded flora. This list is far from comprehensive but includes the main pollen and nectar sources, plus a few plants of particular interest for their scarcity.

Invertebrate survey dates and methods
Specimens were collected using a hand net and yellow pan traps. Two visits were made: 29th – 30th/5/2006 and 4th – 8th/8/2006. A similar amount of recording effort was exercised on the Southern and Central Sections, and only a little less effort on the Northern Section.

Results
91 species were identified (Appendix 2). Of these 2 are listed in the 'Red Data Book' (*Andrena proxima* and *Lasioglossum nitidiuscula*); 5 are 'Nationally Scarce A' and 8 are 'Nationally Scarce B'. Many of the species are associated with soft cliffs and landslips, but all of these are also found inland (Appendix 3). Of the 17 cleptoparasitic aculeate species recorded, all but two of the host species were also recorded. There would appear to be a greater diversity of species associated with the Southern Section compared to the other two sections, and (subjectively) would seem to outweigh any differences in recording effort in the sections.

Flora along the coast is reasonably supportive of aculeate Hymenoptera including many Asteraceae and Apiaceae (Alexanders in May and Wild Carrot in August).

Additional non-aculeate species were identified as follows: 2 common Harvestman, 17 Diptera (Steve Gregory: mostly Hoverflies), 10 Spiders (Lawrence Bee) and 5 Sawflies (Appendix 4).

Conclusions
Appendix 2 shows a considerable list of species from just two samples (May and August). Timing of visits means that some spring species (*Andrena, Nomada*) are absent from the list, further visits should aim to address this. Of the 91 species represented, a few were abundant with more than 20 specimens caught, however, 29 species are represented by a single specimen each. It is likely that there are well over 100 species using the habitat. Of the 91 species recorded during this survey, 7 are known to be associated with soft cliffs in the UK (Howe, 2002): *Andrena humilis, A. proxima, Lasioglossum xanthopum, L. malachurum, L. puncticolle, Sphecodes rubicundus, Nomada fucata*.

The range of habitat type, from young to mature slippage, and the range of associated transitional micro-habitats and vegetation types, have contributed to making this section of coast of regional and possibly national importance for its invertebrate fauna. Given the impressive list of species from just two survey visits it is surprising that Kessingland Cliffs have not been recognised as an important invertebrate site. Although the site has been notified as a Site of Special Scientific Interest (it is within the Pakefield to Easton Bavents SSSI), there is no mention of the importance of the soft cliff habitats for their invertebrate fauna. Buglife recommend that further invertebrate surveys are carried out at Kessingland, and the ecological importance of the soft cliff habitats within the SSSI be recognised in the SSSI citation should the opportunity arise for revision.

The invertebrate interest reported here is maintained through the natural erosion of the soft cliffs. Habitat features such as bare ground and pioneer plant communities have become scarce in the wider countryside and soft cliffs are now some of the few sites where a historical continuity of such features in maintained. Any disruption of the natural functioning of cliff erosion, e.g. through the building of artificial sea defences or artificial drainage, will destroy the habitats that the invertebrate fauna is reliant upon. This should be noted in any future management of the coast such as Shoreline Management Plans.

The cliff top management of the Suffolk soft cliff sites is wide ranging, it includes intensive agriculture, improved grassland, golf courses, caravan parks, heathland and other land managed for wildlife. Cliff tops can provide resources for invertebrates such as nectar and pollen, or provide linkages between fragmented sites (Whitehouse, 2005). Where cliff tops are managed insensitively, e.g. intensive arable agriculture or improved grassland, the soft cliff invertebrate fauna can become degraded. Opportunities for arable reversion schemes or cliff top buffer strips should be explored as opportunities for enhancing soft cliff sites in Suffolk.

Of course, future threats associated with climate change (sea level rise, increased storm frequency and ferocity) could have a large impact on the site. However, this short report is perhaps not the forum for such discussions.

More comprehensive management advice for soft cliff sites will be published in 2007 by Buglife.

Recommendations for further work

It is clear that Kessingland is an important invertebrate site, particularly for bees and wasps. However, as with other soft cliff sites in the county Kessingland has had few surveys in the past, our assessment is that Suffolk soft cliffs sites are chronically under surveyed. We strongly recommend that further surveys are carried out at Kessingland and other soft cliff sites along the Suffolk coast.

References

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APPENDIX 1. Recorded flora – det: J. A. Wright	
Atriplex prostrata sens.str.	Spear-leaved Orache
Honckenya peploides	Sea Sandwort
Cerastium fontanum	Common Mouse-ear
Silene latifolia	White Campion
Rumex obtusifolius	Broad-leaved Dock
Crambe maritima	Sea-kale
Raphanus raphanistrum ssp. marit	Sea Radish
Anagallis arvensis ssp. arvensis	Scarlet Pimpernel
Rubus fruticosus agg.	Bramble
Potentilla reptans	Creeping Cinquefoil
Agrimonia eupatoria	Agrimony
Lotus corniculatus	Common Bird's-foot-trefoil
Vicia cracca	Tufted Vetch
Vicia sativa	Common Vetch
Vicia bithynica	Bithynian Vetch
Lathyrus japonicus	Sea Pea
Lathyrus pratensis	Meadow Vetchling
Medicago lupulina	Black Medick
Euphorbia helioscopia	Sun Spurge
Eryngium maritimum	Sea Holly
Smyrnium olusatrum	Alexanders
Heracleum sphondylium	Hogweed
Daucus carota	Wild Carrot
Centaurium erythraea	Common Centaury
Plantago lanceolata	Ribwort Plantain
Cirsium arvense	Creeping Thistle
Centaurea scabiosa	Greater Knapweed
Hypochaeris radicata	Cat's-ear
Sonchus oleraceus	Smooth Sow-thistle
Sonchus asper	Prickly Sow-thistle
Taraxacum officinale agg.	Dandelion
Crepis vesicaria	Beaked Hawk's-beard
Pilosella officinarum	Mouse-ear-hawkweed
Pulicaria dysenterica	Common Fleabane
Bellis perennis	Daisy
Achillea millefolium	Yarrow
Senecio vulgaris	Groundsel
Tussilago farfara	Colt's-foot

APPENDIX 2. **Complete Aculeate Species List**	**Status**	**Abundance**			
		South	Central	North	All sites
Myrmica ruginodis (Nyla.)	Common	9		1	10
Myrmica scabrinodis (Nyla.)	Common	1			1
Formica fusca (L)	Common	10			10
Lasius flavus (Fabr.)	Common	1			1
Lasius niger (L.)	Common	13	5	1	19
Tiphia femorata (Fabr.)	Local		1		1
Myrmosa atra (Panz.)	Local	4	2	1	7
Smicromyrme rufipes (Fabr.)	NS(b)		1	1	2
Priocnemis exaltata (Fabr.)	Local	7	7	1	15
Caliadurgus fasciatellus (Spin.)	Local	5			5
Pompilus cinereus_(Fabr.)	Local	12		5	17
Agenioideus cinctellus (Spin.)	Local	2			2
Arachnospila anceps (Wesm.)	Local	3	1	1	5
Evagetes crassicornis (Shuck.)	Local	1			1
Anoplius infuscatus (VanL.)	Local	2	4	8	14
Anoplius nigerrimus (Scop.)	Local			1	1
Episyron rufipes (L.)	Local	2	6	1	9
Odynerus spinipes (L.)	Common	12			12
Ancistrocerus parietum (L.)	Common		3	2	5
Vespula germanica (Fabr.)	Common	3	2		5
Trypoxylon attenuatum (Smith)	Common	12	3		15
Trypoxylon figulus (L.)	Common			1	1
Trypoxylon medium (DeBeau.)	Common	4	1		5
Crossocerus elongatulus (VanL.)	Common		2		2
Crossocerus wesmaeli (VanL.)	Common	4	23	10	37
Crossocerus quadrimaculatus (Fabr.)	Common		1		1
Ectemnius continuus (Fabr.)	Common	9	2		11
Oxybelus uniglumis (L.)	Common		2		2
Pemphredon lethifer (Shuck.)	Common	3	2	1	6
Diodontus minutus (Fabr.)	Common		21	2	23
Diodontus tristis (VanL.)	Local		2	3	5
Ammophila sabulosa (L.)	Local	1	1		2
Mellinus arvensis (L.)	Common	3	10	5	18
Didineis lunicornis (Fabr.)	NS(a)	12		1	13
Nysson trimaculatus (Ross.)	NS(b)		5		5
Philanthus triangulum (Fabr.)	pRDB4	2		5	7
Cerceris rybyensis (L.)	Local	3	4	1	8
Cerceris arenaria (L.)	Common			1	1
Colletes similis (Schen.)	Local	2			2
Hylaeus brevicornis (Nyla.)	Local	1			1
Andrena flavipes (Panz.)	Local	29	43	9	81
Andrena thoracica (Fabr.)	Common	12	30	2	4
Andrena nitida (Mull.)	Common	1	2		3
Andrena nigroaenea (Kirby)	Common	3	8		11
Andrena bicolor (Fabr.)	Common		1		1
Andrena scotica (Perk.)	Common	3			3
Andrena varians (Kirby)	NS(b)	1			1
Andrena fulva (Mull.)	Common	1			1
Andrena barbilabris (Kirby)	Local	1	2	1	4
Andrena humilis (Imho.)	NS(b)	5			5
Andrena chrysosceles (Kirby)	Local	1			1
Andrena minutula (Kirby)	Common	3			3
Andrena subopaca (Nyla.)	Common		1		1
Andrena proxima (Kirby)	RDB3	20			20
Halictus tumulorum (L.)	Common	1			1
Lasioglossum xanthopum (Kirby)	NS(b)	2		1	3
Lasioglossum leucozonium (Schr.)	Common	4	11	1	16

Lasioglossum calceatum (Scop.)	Common	6		2	8
Lasioglossum albipes (Fabr.)	Common	1			1
Lasioglossum malachurum (Kirby)	NS(b)	8	6		14
Lasioglossum pauxillum (Schen.)	NS(a)	1			1
Lasioglossum villosulum (Kirby)	Common	17	7	3	27
Lasioglossum puncticolle (Mora.)	NS(b)	1			1
Lasioglossum minutissimum (Kirby)	Common	1	19	4	24
Lasioglossum nitidiuscula (Kirby)	RDB3		1		1
Lasioglossum parvulum (Schen.)	Common		1	1	2
Lasioglossum smeathmanellum (Kirby)	Common		8	1	9
Lasioglossum morio (Fabr.)	Common	58	10	9	77
Lasioglossum leucopus (Kirby)	Local	2	1	1	4
Sphecodes rubicundus (vonHag.)	NS(a)		1		1
Sphecodes pellucidus (Smith)	Local			1	1
Sphecodes ephippius (L.)	Common	1	1		2
Sphecodes puncticeps (Thom.)	Local	2	2	1	5
Sphecodes miniatus (vonHag.)	NS(b)	1	1		2
Sphecodes geoffrellus (Kirby)	Common	1			1
Dasypoda hirtipes (Fabr.)	NS(b)	4	2	2	8
Hoplitis spinulosa (Kirby)	Local	1			1
Megachile centuncularis (L.)	Local	1			1
Megachile versicolor (Smith)	Local	1			1
Coelioxys inermis (Kirby)	Local	1			1
Nomada fucata (Panz.)	NS(a)		2		2
Nomada goodeniana (Kirby)	Common	5	2	1	8
Nomada marshamella (Kirby)	Common	1	1		2
Nomada leucophthalma (Kirby)	Local	1	1		2
Nomada flava (Panz.)	Common	12	1		13
Bombus terrestris (L.)	Common	1			1
Bombus lapidarius (L.)	Common	6	8	1	15
Bombus hortorum (L.)	Common	1			1
Bombus barbutellus (Kirby)	Common	1			1
Bombus vestalis (Geoff.)	Common	2			2
Apis mellifera (L.)	Common			1	1
Totals species		**70**	**51**	**39**	**91**

APPENDIX 3. **Notes on <u>selected aculeate species</u> (25 of 91)**	**Status**	Notes of relevance to coastal habitats, soft cliffs and/or the Suffolk Coast. (based on 'Recorder 3.3' and BWARS Atlases)	
		Coastal habitats	**Suffolk Coast**
Tiphia femorata (Fabr.)	Local	Coastal dunes and landslips as well as inland habitats.	A few old records, plus more recently one record from Southwold in 2002.
Smicromyrme rufipes (Fabr.)	Nb	Sand dunes and inland habitats.	Only a few old records, plus more recently at Bawdsey Cliffs in 2002.
Caliadurgus fasciatellus (Spin.)	Local		This is only the fifth county record. The only other coastal one was in 2006 fairly well up the Orwell estuary near Ipswich.
Pompilus cinereus (Fabr.)	Local	Throughout Britain, but especially coastal.	
Agenioideus cinctellus (Spin.)	Local	Sandy places, but also unstable clay cliffs in Dorset	This is only the fourth county record. The only other coastal site is up the Orwell estuary
Anoplius infuscatus (VanL.)	Local	Sandy places, most frequently in coastal sand dunes.	
Anoplius nigerrimus (Scop.)	Local		Recorded at Southwold in 1935, but this is the only modern record.
Episyron rufipes (L.)	Local	Associated with open sand, particularly sand dunes, but also inland.	
Odynerus spinipes (L.)	Common		One old record. This is the first modern record for the county.
Crossocerus elongatulus (VanL.)	Common		This is only the fourth county record. Only other coastal record is Orwell estuary.
Crossocerus quadrimaculatus (Fabr.)	Common	Various habitats including soft cliffs.	
Ammophila sabulosa (L.)	Local	Dunes and other coastal	
Didineis lunicornis (Fabr.)	Na	Soft cliffs and inland	One old record. This is a first modern record.
Philanthus triangulum (Fabr.)	pRDB4		This species is increasing its range, although the only other Suffolk coastal records are from Minsmere and Dunwich heath rather than sea cliffs *sensu stricto.*
Andrena barbilabris (Kirby)	Local	Restricted to places with exposures of sand or light sandy soils, including coastal dunes and landslips.	

Andrena humilis (Imho.)	Nb	**'Grade 3' soft cliff species.**	
Andrena proxima (Kirby)	RDB3	Coastal landslips and soft cliffs, as well as inland. **'Grade 3' soft cliff species.**	First modern record.
Lasioglossum xanthopum (Kirby)	Nb	Grassland and coastal landslips. **'Grade 3' soft cliff species.**	First modern record.
Lasioglossum malachurum (Kirby)	Nb	Coastal cliffs and landslips, but now more common inland. **'Grade 3' soft cliff species.**	One other site for this species – Bawdsey Cliffs.
Lasioglossum pauxillum (Schen.)	Na	At a variety of disturbed situations, including soft cliffs.	No previous records at the coast.
Lasioglossum puncticolle (Mora.)	Nb	Coastal soft cliffs and clay pits in the southernmost counties of England. **'Grade 3' soft cliff species.**	Few records, although has been recently recorded from Bawdsey Cliffs and Felixstowe Ferry "dune" area.
Lasioglossum nitidiuscula (Kirby)	RDB3	Soft cliffs and inland.	This is only the third modern record; the only other coastal site is Bawdsey Cliffs.
Lasioglossum smeathmanellum (Kirby)	Common		No previous records at the coast and only one other modern record from elsewhere.
Sphecodes pellucidus (Smith)	Local	Recorded host in Britain is *A. barbilabris*	
Sphecodes rubicundus (vonHag.)	Na	**'Grade 3' soft cliff species.**	
Dasypoda hirtipes (Fabr.)	Nb	Occurring mainly in sandy coastal habitats, especially dunes. Inland decline.	Mostly old records only. Has beenrecorded on coastal heaths rather than soft cliffs.
Nomada fucata (Panz.)	Na	**'Grade 3' soft cliff species.**	
Nomada leucophthalma (Kirby)	Local		One previous record.

APPENDIX 4. **Additional species**	**Species**	**Status**	**Determiner**
Arachnida	Araneus diadematus	Common	L.Bee
Arachnida	Diplostyla concolor	Common	L.Bee
Arachnida	Dysdera erythrina	Common	L.Bee
Arachnida	Enoplognatha ovata	Common	L.Bee
Arachnida	Heliophanus flavipes	Common	L.Bee
Arachnida	Lepthyphantes tenuis	Common	L.Bee
Arachnida	Pardosa nigriceps	Common	L.Bee
Arachnida	Pardosa prativaga	Common	L.Bee
Arachnida	Xysticus cristatus	Common	L.Bee
Arachnida	Zelotes latreillei	Common	L.Bee
Diptera	Cheilosia proxima	Common	S.J.Gregory
Diptera	Chloromyia formosa	Common	S.J.Gregory
Diptera	Chrysotoxum bicinctum	Local	S.J.Gregory
Diptera	Episyrphus balteatus	Common	S.J.Gregory
Diptera	Eristalinus sepulchralis	Local	S.J.Gregory
Diptera	Eristalis tenax	Common	S.J.Gregory
Diptera	Eumerus strigatus	Common	S.J.Gregory
Diptera	Eumerus tuberculatus	Common	S.J.Gregory
Diptera	Eupeodes corollae	Common	S.J.Gregory
Diptera	Eupeodes luniger	Common	S.J.Gregory
Diptera	Paragus haemorrhous	Local	S.J.Gregory
Diptera	Platycheirus albimanus	Common	S.J.Gregory
Diptera	Scaeva pyrastri	Common	S.J.Gregory
Diptera	Sphaerophoria scripta	Common	S.J.Gregory
Diptera	Syrphus ribesii	Common	S.J.Gregory
Diptera	Thereva nobilitata	Common	S.J.Gregory
Opilione	Phalangium opilio	Common	S.J.Gregory
Opilione	Platybubus triangularis	Common	L.Bee
Symphyta	Allantus cinctus	Common	I.R.Wright
Symphyta	Athalia cinctus	Common	I.R.Wright
Symphyta	Athalia circularis	Common	I.R.Wright
Symphyta	Athalia rosae	Common	I.R.Wright
Symphyta	Metallus albipes	Common	I.R.Wright