



Net Zero Teesside – Environmental Statement

Planning Inspectorate Reference: EN010103

Volume III – Appendices

Appendix 12I: Terrestrial Invertebrate Survey Coatham Dunes

The Infrastructure Planning (Environmental Impact Assessment) Regulations
2017 (as amended)



Prepared by: **AECOM**

Richard Wilson Ecology Limited



Terrestrial Invertebrate Survey, Coatham Dunes,
nr. Redcar, Teesside

Prepared for AECOM Ltd

December 2020

Notice

This document and its contents have been prepared for AECOM Limited and is intended solely for information and use in relation to the proposed pipeline works located within the Coatham Dunes (within the Teesmouth and Cleveland Coast SSSI), located immediately adjacent to the former Redcar steelworks Cleveland.

Richard Wilson Ecology Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/ or its contents.

Document History

JOB NUMBER: RWE0234			DOCUMENT REF: RW-DB-001-RWE0234-INV		
Revision	Purpose Description	Date	Checked by Client	Amended by Richard Wilson Ecology	Final Version Issued
0.1	Draft for Client	18 November 2020	27 November 2020	4 December 2020	
1.0	Final Issue				15 December 2020

Table of contents

Chapter	pages
Executive Summary	i
1 Introduction	1
1.1 Background	1
1.2 Study Site	1
1.3 Survey Limitations	3
2 Legislation	5
2.1 Legislation	5
2.2 Policy	5
3 Methodology	6
3.1 Desk Study	6
3.2 Field Survey	6
3.3 Evaluation Methodologies	6
3.4 Personnel	8
4 Results and Interpretation	9
4.1 Desk Study	9
4.2 Field Survey	11
4.3 Baseline Invertebrate Assemblage Analysis	14
5 Nature Conservation Evaluation	17
5.1 Individual Species	17
5.2 Habitat Assemblages	18
5.3 Taxonomic Assemblages	20
5.4 Conclusion	20
6 Mitigation	22
6.1 Proposed Mitigation	22
7 References	23

Tables

Table 1: Published taxa recorded within the Coatham Dune system in the early 1990s as supplied by Natural England.	9
Table 2: Weather conditions for survey visits.	11
Table 3: Distribution of main taxonomic groups studied. Red numbers in parentheses equate to Key Species (excluding Research Only – see text for explanation).	11
Table 4: Selection of species recorded with an NCS (nationally and within Yorkshire).	12
Table 5: Invertebrates scoring high, moderate or low fidelity to calcareous grassland recorded at Coatham Dunes in 2020 (after Alexander, 2003).	15
Table 6: Invertebrate assemblage assessment for Coatham Dunes from 2020 survey data.	19
Table 7: Relevant Local Wildlife Site Selection criteria and attributes for the identification of sites of county nature conservation value for invertebrates.	20
Table 8: Species recorded at Coatham Dunes, near Redcar during 2020.	H
Table 9: Stenotopic species recorded within Coatham Dunes in 2020.	V

Annex

A.	Annex A: Figures.	A
B.	Annex B: Nature Conservation Status Categories (Definitions)	D
C.	Annex C: Species Lists	G
D.	Annex D: Site Photographs	Y
E.	Annex E: Sites Scoped for Further Survey	DD

Executive Summary

- AECOM Ltd commissioned Richard Wilson Ecology Limited to undertake terrestrial invertebrate surveys on Coatham Dunes ('the study site'), adjacent to the former Redcar steelworks. This included a bespoke targeted survey for the Nationally Rare money-spider, *Silometopus incurvatus*, in early March 2020, and broader surveys covering a wider range of invertebrate groups between May and September 2020. Furthermore, an additional four land parcels elsewhere within the industrial landscape were scoped to determine if further invertebrate surveys were appropriate. The scoping surveys are reported separately in Annex E for ease of reading, but only one (Seal Sands Compound) merits further attention.
- Coatham Dunes is located on a promontary that has its origins following the construction of the South Gare breakwater in the latter half of the 19th Century. The dune system is located within the Teesside and Cleveland Coast Site of Special Scientific Interest (SSSI), a large protected site that subsumed a number of individual SSSIs. The study site was originally designated in the 1980s for its nationally important sand dune habitats and, amongst other features, noteworthy invertebrate assemblages.
- The purpose of the survey work was to obtain baseline data to understand more fully, the presence and geospatial distribution of invertebrate assemblages within the proposed study site, which occupies a proportion of the much larger Coatham Dunes system. The study site is defined as the terrestrial habitat between the former Redcar steelworks and Mean High Water, west of the Cleveland Golf Links for approximately 1.8 km towards the South Gare breakwater.
- This report presents the results of the terrestrial invertebrate surveys, which were undertaken in early March 2020 (specifically for the money-spider) and then between late May and late September. The report evaluates the assemblages present and makes comment on mitigation of the proposed CO₂ export pipeline construction, based on the results of the survey work.
- A wide range of taxa were collected, resulting in 322 species being identified. The most abundant taxa were beetles (120 species), flies (54 species), spiders (51 species), bugs (48 species), bees, wasps, ants and sawflies (28 species), and butterflies and moths (14 species).
- A total of 15 Key Species of invertebrate, defined as those which are formally assigned a nature conservation status, have been recorded, of which nine are considered to be Rare Key Species (Red Data Book, threatened with extinction and/ or Nationally Rare). Five of these are also Species of Principal Importance (SoPI, also referred to as UK Priority Species): the Nationally Rare and Vulnerable spiders *Silometopus incurvatus* and *Rhysodromus fallax*; and the butterflies small heath, wall and grayling. Over 20 species were recorded as either new to the vice-county (62: North-east Yorkshire) or all of Yorkshire; or are very rare in the county.
- A total of 58 species are reliant on the vegetation communities present to complete their lifecycle, of which 21 species are intrinsically linked with the fore-dune and mobile dune communities, including four Key Species: *S. incurvatus*, *R. fallax*, the weevil *Trichosirocalus barnevillei* and the grayling (butterfly). A further dozen species are associated with the floristically species-rich fixed dune and dune grassland vegetation communities including the wall and small heath (both SoPI).
- The survey work at Coatham did not distinguish a dune slack invertebrate assemblage, suggesting that any difference in vegetation communities is possibly not that important from an invertebrate ecology perspective. This doesn't diminish the vegetation community's nature conservation value, more that it contributes to the overall resource of the habitat that includes the fixed dune habitats.
- A minimum of 87 species were recorded on the historic deposits of slag, a waste product of the steel industry, which now supports Open Mosaic Habitat. Three SoPI (small heath, wall and grayling butterflies) and a further three Key Species (the silken fungus-beetle *Atomaria scutellaris*, the gall-forming fly *Tephritis matricariae* and the Nationally Scarce leafhopper *Agallia brachyptera*) were recorded in this habitat, but none are considered exclusive to it. The vegetation community present is considered to link the sand dunes with the wider brownfield habitat resource within the former steelworks. It also supports the case for further survey work in the Seal Sands Compound following the scoping visit.

- The invertebrate assemblages associated with the sand dune habitats have been evaluated to be of **national nature conservation value**, based on the number of specialist species recorded, high number and proportion of Key Species, and the relative quality and extent of the habitat resource present for invertebrates within the wider region.
- If considered in isolation, the OMH has been evaluated as being of **county nature conservation value**. However, whilst the invertebrate assemblage associated with the OMH on the slag is not exclusive to this habitat and none of the Key Species are restricted to it, it nevertheless provides an important resource for invertebrates linking them to brownfield habitats in the wider area such as within the former steelworks and thus contributes to the overall value of Coatham Dunes.

1 Introduction

1.1 Background

Richard Wilson Ecology Limited was commissioned by AECOM Ltd in early March 2020 to undertake targeted surveys for a Nationally Rare money-spider (*Silometopus incurvatus*), and subsequently in mid-May 2020 for broader terrestrial invertebrate surveys. The Brief also included a scoping visit to several land parcels within the industrial landscape surrounding the former Redcar Steelworks to determine if further, more detailed invertebrate survey would be required in addition to detailed surveys within the sand dune system at Coatham Dunes.

This work has been undertaken to inform the Ecological Impact Assessment (EclA) for the proposed Net Zero Teesside development project.

1.1.1 Previous Invertebrate Surveys

Informal invertebrate forays and commissioned surveys have been undertaken at ¹Coatham Dunes over several decades since at least the 1980s, resulting in the dune system becoming a known important location on the north-east England coast for noteworthy invertebrate species and assemblages. Surveys have been undertaken here on several occasions and for various reasons. Relevant historical studies that have informed this work include a Cleveland-wide spider survey (Horsfield, 1980) which included the Dunes; a comprehensive survey undertaken in the early 1990s (supplied by Natural England via a Freedom of Information Request) and invertebrate surveys, focussing on Diptera, on various Teesside sites, including Coatham Dunes, which informed statutory site designation (Godfrey, 2015) and a more general appraisal of the area's natural history recording including moths (Woods, 2012). Reference to this data has been made in placing the 2020 survey in context and to inform the evaluation. Further details are conveyed in relevant sections of this report.

1.2 Study Site

1.2.1 Scoping Surveys

An initial desk-based review of land parcels within the extensive potential footprint required for the proposed development was completed, placing reliance on aerial photography, statutory site information available via the ²Multi-Agency Geographic Information for the Countryside (MAGIC) website and local knowledge, identified four land parcels that merited ground-truthing to establish if further invertebrate surveys were justifiable. These were in addition to Coatham Dunes, which were scoped in for further survey from the outset, owing to the habitats present, its statutory status and known invertebrate interest.

The ground-truthing scoping surveys included three disparate land parcels within and adjacent to the Wilton Works, the site of a former chemical works west of Redcar; and one larger land parcel within the Seal Sands compound north of the River Tees, east of Billingham. The sites are located within/ adjacent to:

- Main Dike Corridor (NZ 576 235 to NZ 586 211);
- Grangetown Woodland (NZ 559 198);
- Lazenby Woodlands (NZ 569 199); and
- Seal Sands Compound (NZ 526 244).

The scoping surveys at these locations were restricted to public rights of way (Main Dike Corridor), permissive or informal footpaths (Woodlands) and internal access road (Seal Sand Compound). None of these sites were taken forward for further survey in 2020 and no further reference is given in the main body of this report. Instead, a summary of the habitats within each of the land parcels is provided in Annex E.

¹ Depending on the literature source, Coatham Dunes is also known as South Gare, Coatham Sands or Coatham Common.

² <https://magic.defra.gov.uk/>

1.2.2 Coatham Dunes

Coatham Dunes is located on a north-west – south-east orientated promontary that forms the eastern edge of Teesmouth, approximately 2.7 km west of Redcar (central railway station), Teesside (vice-county 62: North-east Yorkshire). The dunes are located on the seaward side of the former Redcar steelworks, forming an approximate 540 m wide buffer. For the purposes of this study, the surveys were focussed on the dune system immediately west of the Cleveland Golf Links for approximately 1.8 km west, more or less matching the steelworks' frontage and covered c. 100 ha (centred on National Grid Reference: NZ 568 261), which is defined as the study site.

The study site sits within the extensive Teesmouth and Cleveland Coast (T&CC) Site of Special Scientific Interest (SSSI) and is represented by Unit 27 (South Gare to Marske), Unit 28 (South Gare and Coatham Dunes) and Unit 29 (Coatham Quarries and Lagoons). The T&CC SSSI subsumed a number of contiguous SSSIs into a single legal entity, including what was the South Gare and Coatham Sands SSSI, within which the current study site is located.

The dune system has been influenced by the long industrial history associated with Teesmouth, including the former Redcar Steelworks, and this has relevance in placing the current survey in some context with the proposals. Whilst the Steelworks were constructed in 1917, the earlier construction of the South Gare breakwater at Teesmouth in the mid-nineteenth century, including a tramway, and subsequent associated industry (slag and tarmacadam works) led to the dunes accretion and formation. The works associated with the tramway persisted until the 1950s, and the tramway until the 1970s; with both still partially evident within the study site.

More recent development has included pipelines that have been constructed on three previous occasions. In 1991 (Central Area Transmission System), 2011 (connecting the Breagh Alpha [gas] Platform to the Seal Sands Teesside Gas Processing Plant), and 2013 (Teesside Offshore Wind Farm) (Denning, 2017). The dune system has therefore been influenced by the adjacent industries over many decades whilst still retaining its nature conservation interest.

1.2.3 Summary of Habitats and Vegetation Communities

Botanical surveys that have mapped vegetation communities at Coatham Dunes have been undertaken in 2015 and 2017 to support the T&CC SSSI designation (Natural England, 2018). These have been supplemented by surveys in June and July 2020 to clarify the presence and extent of British plant communities within the study site (AECOM, 2020) and it is this more recent work which is summarised below.

Within the study site, the entire dune sequence is present, though the strandline community was not well developed. The fore-dune and mobile dune community is characterised by structurally open vegetation dominated by marram (*Ammophila arenaria*) and sand couch (*Elymus junceiformis*) with areas of unstable sand. These grade into semi-fixed and fixed dune vegetation communities that are botanically species-rich with greater vegetation cover and include several nationally notable taxa. Throughout the dune vegetation communities are hollows and depressions (dune slacks) that support mosaics of wetland and grassland habitats, though these tend to be closer towards dune grassland than brackish wetland.

Associated with this sand dune system is a prominent landform created from base-rich slag, a waste product of the steelmaking industry. This forms either a relatively uniform plateau consisting of a hardened gravelly surface that has developed a sparse vegetation cover including calcicolous species, or a more complex localised topography where dumped slag has formed an isolated mound (known as a 'bing') and which has developed a more complex matrix of vegetation ranging from drought-stressed grassland to scrub. These have been evaluated to represent Open Mosaic Habitat on Previously Developed Land (OMH), and as such, complement the sand dune vegetation communities and are estimated to cover approximately 27 ha.

Elsewhere within the study site are areas of what were open water habitat, but which have become choked with stands of common reed (*Phragmites australis*), sea club-rush (*Bolboschoenus maritimus*) or grey club-rush (*Schoenoplectus tabernaemontanii*). To the rear of the dune system (in the stricter sense) are areas of neutral, species-poor tall grasslands which transitions towards wetland where common reed is present; or scrub.

The various habitat distinctions described above were all sampled for their invertebrate assemblages. Further details are provided in Section 3.2.

1.2.4 Context with Surrounding Landscape

The study site is defined by its location between the North Sea and Teesmouth, the industrial complex and residential areas. Within a wider setting, the sand dune system at Coatham is one of three near continuous systems that form a complex between Seaton Carew in the north and Marske in the south (the 'Tees Bay Dunes'). The dune system at Coatham represents the largest entity (c. 130 ha of sand dune vegetation communities) within the Tees Bay Dunes and forms a typical banded morphology with a highly heterogeneous topography, reflecting the succession of dune vegetation communities from the strandline and fore-dunes through to fixed dune grassland and dune slack communities as summarised in Section 1.2.3 and in detail by AECOM (2020).

The study site is situated within the ³Tees Lowlands National Character Area (NCA) which forms a generally flat, low lying landscape associated with the River Tees. The land use associated with the immediate River Tees corridor, including the estuary at Teesmouth, is characterised by an industrial landscape that is juxtaposed with coastal habitats, including internationally important sand dunes, saltmarshes and intertidal mudflats. There are 332 ha of sand dune within the NCA (the 'Tees Bay Dunes'); of which Coatham Dunes forms is discussed in greater detail in Section 5.

1.2.5 Proposed Development Footprint

The proposed development (Net Zero Teesside) includes a proposed a CO₂ export pipeline across Coatham Sands to connect to offshore facilities. Installation of this pipeline would require a construction corridor up to 30 m wide. The current option is to take the pipeline from the steelworks' north-east corner and head in an approximately north-east direction before dog-legging in a more east north-east direction out towards the coast. The precise construction details are not known, though it is assumed that the pipeline will descend beneath the surface at some point before Mean High Water.

1.3 Survey Limitations

1.3.1 Coronavirus Pandemic

In mid-March 2020, following the emergence of Coronavirus (Covid-19), the UK and devolved Governments announced a strict lockdown which extended through until late April 2020. This lockdown required all but essential workers to stay at home. As a consequence, and until the Chartered Institute of Ecology and Environmental Management (CIEEM) issued guidance following confirmation from Defra, it was uncertain whether ecology surveys (within the planning system) were included in the definition of 'essential worker'. This was resolved in early May 2020, and thus the first survey commenced at this time. The implications of this delayed start are discussed below.

1.3.2 Weather Limitations

The spring of 2020 was remarkable for its prolonged dry and hot weather. Weather conditions leading up to the first main visit (late May 2020) were generally warmer and substantially drier than the long-term average (Meteorological Office ⁴ website). This was followed by a generally average, in terms of warmth (temperature), but a wetter and cloudier early to mid-summer (Meteorological Office ⁵ website). This combination of an exceptionally warm and dry spring followed by a cloudier and wetter summer is considered likely to have affected invertebrate species, especially their larval stages. Spring and early summer faunas are considered to have emerged early, in response to the clement weather, or died before emerging as adults due to desiccation. This, in combination with the delayed start as a consequence of Government restrictions arising from the Coronavirus Pandemic (see Section 1.3.1) resulted in this initial spring emergence possibly being at least partially missed. Further, the effects of the exceptionally warm spring resulted in reduced vegetation cover on the OMH, although following the rainfall between the June and July visit this rapidly recovered. Consequently, it is considered that the results are likely to have been influenced by the conditions (weather and Pandemic) experienced in 2020. The evaluation of the nature conservation value of the Coatham Dunes for terrestrial invertebrates has taken this in to account (see Section 5.2).

³ Available on-line here: <http://publications.naturalengland.org.uk/publication/9860030?category=587130>; last accessed on the 22nd October 2020.

⁴ See https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/summaries/uk_monthly_climate_summary_spring_2020_may.pdf; accessed on 22nd September 2020.

⁵ See https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/summaries/uk_monthly_climate_summary_summer_2020_3.pdf; accessed on 22nd September 2020.

1.3.3 Survey Method Limitations

No static trapping using pitfall traps was undertaken after concluding that the potential for disturbance or vandalism (i.e. removal) was high given the likely increased frequency of walkers and other visitors due to the Coronavirus restrictions. Time spent installing and subsequent servicing of pitfall traps would take away from active surveying. Lack of pitfall trapping has reduced the number of large ground beetles (Coleoptera, Carabidae) recorded in 2020 though an attempt was made to mitigate this by searching under refuges and vacuum sampling. As the site has been studied in the past, which included the use of some pitfall trapping, it is considered reasonable to draw conclusions on likely presence of these faunas based on a combination of habitat, features such as vegetation structure and species/ invertebrate assemblages recorded in 2020. A similar explanation is given for not undertaking any nocturnal surveys, including light-trapping for moths.

2 Legislation

2.1 Legislation

Sixteen species of invertebrate present in the UK are protected through international law; largely arising from the European Union's Habitats Directive and transposed in to domestic legislation by The Conservation of Habitats and Species Regulations 2017 (as amended).

Approximately 50 species of invertebrate are included in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).

Section 40 of the Natural Environment and Rural Communities Act 2006 requires all local authorities to consider biodiversity when undertaking their public duty. In achieving this, the Government has published a list of Species of Principal Importance (SoPI) for nature conservation in England, which includes invertebrates. Twelve invertebrate species are referred to as Priority Species in a published update by the ⁶Tees Valley Nature Partnership (January 2012) and is relevant to this biodiversity duty. The document states that Coatham Dunes is a key site for two of these species: dingy skipper and grayling [butterfly].

A full list of all species covered by legislation and policy is available via the Buglife ⁷website.

As the study site is a SSSI, and invertebrate assemblages are named as an interest feature for its designation (Natural England, 2018; Section 3.5), the Wildlife and Countryside Act 1981 (as amended) is specifically relevant to the identification and assessment of potential constraints posed by the extension of the proposed Development Site into Coatham Sands, as part of a designated SSSI. Survey work to inform the designation, including Godfrey (2015) and earlier work, has recorded ⁸fourteen nationally scarce and threatened species which comprise the invertebrate assemblages feature which contributes towards the SSSI designation.

2.2 Policy

Paragraphs 170 to 177 inclusive of the National Planning Policy Framework (NPPF) conveys national policy on conserving and enhancing the natural environment including protecting habitats and biodiversity in the planning system (Ministry of Housing, Communities and Local Government, 2019). Guidance underpinning the NPPF is available ⁹on-line and provides a detailed narrative on considerations to protect and enhance biodiversity as part of the planning process. Relevant paragraphs are 009 to 035.

The National Pollinator Strategy is particularly relevant for invertebrate nature conservation and emphasises:

“The National Planning Policy Framework (2012) [subsequently updated] requires planning authorities to promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations. It prescribes that local plans should have a clear strategy for enhancing the natural, built and historic environment and supporting wider biodiversity networks, including planning at a landscape scale across local authority boundaries and supporting Nature Improvement Areas.” (Defra, 2014; Section 5).

⁶ See <https://teesvalleynaturepartnership.org.uk/wp-content/uploads/2012/11/Tees-Valley-priority-habitats-and-species-updated-5-jan-2012-pdf.pdf>; last accessed on the 22nd October 2020.

⁷ See https://www.buglife.org.uk/sites/default/files/Policy%20and%20legislation%20summary%20final%202014_0.pdf; last accessed on the 31st October 2016.

⁸ Six of these have been recorded from Coatham Dunes: *Medetera truncorum* (a fly), *Phthiria pulicaria* (a bee-fly), *Tetanops myopinus* (a fly), *Cercyon littoralis* (a beetle), cinnabar moth (*Tyria jacobaeae*) and striped snail (*Cerzuela virgata*). This is an incomplete list and makes no reference to two threatened and Nationally Rare spiders known to be present at Coatham Dunes. It has been derived from survey data reported by Godfrey (2015). See Section 4.1 for more information.

⁹ See <https://www.gov.uk/guidance/natural-environment#biodiversity-geodiversity-and-ecosystems>; last accessed on 23rd October 2020.

3 Methodology

3.1 Desk Study

Historical records of invertebrates were obtained by AECOM and passed on from the Industry Nature Conservation Association (INCA). However, and oddly, this dataset did not include any records from Coatham Dunes itself when it is widely known that the site has been studied since the 1970s to inform statutory designation. INCA also provided a general summary of the wider study area's Lepidoptera (butterfly and moth interest) which has been referred to (Woods, 2012). Further information sources have been referred to as necessary, including from the author's library and information received from a Freedom of Information request to Natural England to obtain relevant reports and survey data relating to the previous South Gare and Coatham Dunes SSSI designation. This data supported interpretation and provide a comprehensive assessment of the study site's nature conservation value.

Reference to previous survey work (referred to in Section 1.1.1) has been undertaken plus information available on-line, including supporting data for the T&C SSSI designation which is available (October 2020) on Defra's ¹⁰website.

3.2 Field Survey

The purpose of the work was to undertake an appraisal of the study site's nature conservation value for terrestrial invertebrates and this report is therefore not intended to provide an exhaustive list of invertebrate taxa present. In achieving this, the surveys followed the methodologies described in Drake *et al.* (2007) using a variety of techniques, including sweeping of vegetation and aerial netting for flying invertebrates using a light-weight butterfly net as well as a more heavy duty sweep-net. This was complemented by vacuum sampling (using a commercially available modified garden blow-vac), sieving leaf-litter, searching under refugia and direct observation.

Specimens collected were either identified in the field or retained for subsequent microscopic identification. Surveys paid particular attention to those groups most likely to include species of nature conservation interest, focussing on aculeate Hymenoptera (solitary bees and wasps), Diptera (flies), Araneae (spiders), Coleoptera (beetles) and Hemiptera (bugs). However, a wide range of invertebrate orders were recorded including day-flying Lepidoptera (butterflies and moths).

3.3 Evaluation Methodologies

There is currently no standard frame of reference to evaluate the nature conservation value of invertebrate assemblages for the purposes of EclA, though increasingly, in addition to placing reliance on professional judgement of the surveyor and associates, the use of Pantheon (Webb *et al.*, 2018) is being applied.

An initial indication of a study site's nature conservation value is the proportion of species with a nature conservation status (NCS) recorded. NCS species are those that are assigned a formal status based on three systems applied to British invertebrates since the late 1980s. Details are provided in Annex B but in summary, all NCS species are assigned a formal status which initially included Red Data Book (Shirt, 1987; Bratton, 1991), and Nationally Notable species (by various species status reviews administered by the Joint Nature Conservation Committee). Since 2001, consideration of a species threat to survival such as through habitat loss, based on the International Union for the Conservation of Nature's (IUCN) criteria (IUCN, 2012) has been adopted and this is gradually replacing the old Red Data Book categories. Running parallel with the IUCN criteria are two British rarity categories, which are based on the hectad system, which again are being defined by ¹¹updating species status reviews.

¹⁰ See consultation documents: <https://consult.defra.gov.uk/natural-england-marine/teesmouth-and-cleveland-coast-potential-sp/>; last accessed on 31st October 2020.

¹¹ Updated species status reviews are published on the JNCC website: <http://jncc.defra.gov.uk/page-3352>

Telfer (2017) provided a means of evaluating a study site's potential nature conservation value by considering the proportion of NCS species present within a study site, on the basis that the higher the percentage of NCS species, the more important the study site is. He refers to NCS species as 'Key Species' and splits this in to two groups: Rare Key Species, which are those taxa assigned Red Data, IUCN Threatened and Data Deficient, and Nationally Rare status; and Scarce Key Species, which are those assigned IUCN Near Threatened, Least Concern, and Nationally Scarce/ Notable status. As a rule of thumb, if close to 10 % of the species recorded are Key Species; and more than 1 % are Rare Key Species, it is suggestive that the study site is potentially of national significance for its invertebrate fauna.

The Joint Nature Conservation Committee has recently updated and ¹²published its guidance on invertebrates for the selection of biological SSSIs (Curson *et al.*, 2019). This document has been useful in considering the study site's nature conservation value based on the presence of, for example, Key Species, edge of range species or species assemblages, and placing this in context with the Area of Search, which for the purpose of this approach, is taken to be the relevant NCA (or NCAs where the study site straddles or is close to boundaries). The relevant NCA profile to the study site is the Tees Lowlands NCA (Natural England, 2013).

In considering species assemblages, the taxa recorded within the study site have been entered into Pantheon, a database tool developed by Natural England and the Centre for Ecology & Hydrology to analyse invertebrate sample data (Webb *et al.*, 2018). Pantheon has incorporated the Invertebrate Species-habitat Information System (ISIS) developed by Derek Lott and referenced in Drake *et al.*, (2007) but takes the analysis further by attaching associated habitats and resources, habitat fidelity scores and other ecological information against each species. This is currently based on approximately 13,000 invertebrate species out of an estimated 37,000 species known from the UK. The taxa primarily used for this analysis are Coleoptera, Diptera, Hemiptera, Lepidoptera, aculeate Hymenoptera and Araneae; hence the focus on these groups for survey. As for the original ISIS, some caution must be applied as strictly speaking, survey effort would normally require standardisation such as timed sweeps.

For the purposes of EclA, the methods have allowed what ¹³Webb *et al.* (2018) describe as a semi-ISIS approach, stated to include some standardised methods such as timed vacuum sampling, static trapping such as pitfall or Malaise trapping; but extending to include more freeform sampling such as focussed searches for pollinators in a non-standardised way. Nevertheless, Pantheon can at least inform which invertebrate assemblages recorded are of particular importance within a site, such as those associated with wood decay, floristically rich habitats or both. A positive aspect of this approach is that attention is given to assemblages rather than solely relying on the national status of individual species, though the latter can also be indicative, especially as a proportion of the total species recorded.

Pantheon interrogates the composition of the terrestrial invertebrate assemblage in terms of biotopes, habitats, and the distribution of stenotopic species i.e. those terrestrial invertebrates with very specific and restricted habitat requirements and have an intrinsic nature conservation value; referred to as ¹⁴Specific Assemblage Types (SAT) (Webb *et al.*, 2018). In doing so, the limitations of Pantheon as a tool have been recognised based on the semi-ISIS compliant approach and confidence in the reported condition is therefore medium. To mitigate this confidence level, professional judgement has been applied where necessary to assist robust valuation.

Pantheon can only identify whether a site is in favourable or unfavourable condition expected for SSSIs, and condition is not strictly analogous with value. However, if favourable condition is concluded then this can, taking into account other factors, provide evidence that objectives for sites of national value (SSSIs) are being met and this seems a reasonable proxy in this instance for national value. However, use of unfavourable condition to argue against national value is more problematic and requires a degree of caution and application of professional judgement to determine the appropriate geographic scale of nature conservation value. In addition, as the survey did not strictly comply with methods described in Drake *et al.* (2007), such as timed sweeps, a degree of

¹² Guidance is available via their website: <https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/>; last accessed on 29th October 2020.

¹³ See <http://www.brc.ac.uk/pantheon/lexicon/reported-condition>; last accessed on the 16th January 2019

¹⁴ SATs are characterised by species restricted to certain features within habitats (= stenotopic species) such as types of decaying wood (e.g. sapwood, or heartwood), fluctuating marsh or rich flower resource. Some SATs such as rich flower resource are cross-cutting, i.e. can be present in more than one habitat.

caution and professional judgement is likewise necessary to accommodate for any bias (detracting or enhancing) within the analysis that might introduce subjectivity into the evaluation.

In an attempt to inject some objectivity into the use of Pantheon SATs to inform evaluation of nature conservation value and to counteract some of the caveats given above, the threshold limits for each of the SATs has been noted with the intention of providing a reasonable judgement. This can be made in terms of the Proportion to Threshold (PtT) achieved for each SAT identified. The threshold referred to is the number of species within a SAT expected to be present if a site is considered to be in favourable condition (FC). Thus, if a SAT records or exceeds the expected threshold, the PtT will be 100 % or greater and this is taken as the basis for considering assigning national value. In the absence of other guidance, where the PtT is < 100 %, professional judgement is used to assist with the rationale for assessing a nature conservation value of the invertebrate assemblage in a sub-national context (i.e. regional, county, district, local). The further away from the threshold, the lower the nature conservation value the SAT. Other factors considered when determining the value include species-richness, proportion of Key Species in the assemblage, proportion of county rarities or significant records (where known), and site context within the landscape (i.e. availability and connectivity to similar semi-natural habitat, whether statutorily protected or not). Thus, whilst Pantheon remains a useful guide when assessing the nature conservation value for each of the land parcels for terrestrial invertebrates, professional judgement incorporating other evidence is necessary to come to a defensible evaluation.

3.4 Personnel

The invertebrate survey (field visits) was undertaken by Richard Wilson CEnv MCIEEM Mem.RES MSc; an experienced field entomologist. He is a ¹⁵recognised arachnid (spiders and harvestmen) specialist though he is familiar with a wider range of taxonomic groups. In addition to the arachnids, Richard identified some Diptera families such as the hoverflies (Syrphidae) and larger Brachycera (e.g. robberflies (Asilidae)) and aculeate Hymenoptera in addition to groups readily identifiable in the field such as the Lepidoptera (butterflies and moths) and Odonata (dragonflies and damselflies). Steven Falk FRES, who is a recognised specialist in pollinators identified other Diptera families (e.g. Muscidae) and verified some of the aculeate Hymenoptera (e.g. *Lasioglossum* spp.). Bob Marsh (Yorkshire Naturalists' Union beetle recorder) and Steve Lane identified most of the Coleoptera and Hemiptera collected.

¹⁵ Richard is the YNU's spider recorder, the Yorkshire, County Durham and Northumberland recorder for the national spider recording scheme; and sits on the conservation committee of the British Arachnological Society.

4 Results and Interpretation

4.1 Desk Study

Coatham Dunes has been studied and documented by entomologists through informal forays or commissioned surveys over several decades. This data is useful to provide the geospatial evidence within which the study site can be put in context.

Data received from Natural England included a list of 542 species recorded from surveys undertaken in the early 1990s from the original South Gare and Coatham Dunes SSSI. This included fifteen taxa identified as being 'rare', of which ten retain a nature conservation status (see [Table 1](#)).

Table 1: Published taxa recorded within the Coatham Dune system in the early 1990s as supplied by Natural England.

Group	Species & Status	Comment
Centipede	<i>Craspedosoma rawlinsii</i> (Nationally Scarce)	A species associated with woodlands and could be confused with other taxa that have recently been discovered in Britain such as <i>Ceratosphys amoena confusa</i> or <i>Anthogona britannica</i> . This record is considered doubtful unless the specimen can be located.
Spiders	<i>Gnaphosa leporina</i> (Nationally Scarce) <i>Hypselistes jacksoni</i> (Nationally Scarce) <i>Oedothorax apicatus</i> <i>Porrhomma microphthalmum</i> * <i>Silometopus incurvatus</i>	<i>G. leporina</i> is generally associated with wet or damp heathland though it is conceivable that it could occur in damp dune slacks. There is a record from Redcar Dunes further south a long the coast from 1991. <i>H. jacksoni</i> is another species associated with wetlands but is predominantly a species of western Britain and southern England heathlands. There are no records on the national spider recording scheme database and in the absence of any specimens, this record must be considered suspect. Neither <i>O. apicatus</i> or <i>P. microphthalmum</i> are considered scarce or rare (nationally) though the latter is only known from very old records in north-east England. * <i>S. incurvatus</i> was recorded in these surveys but was not identified, presumably erroneously, as a rare species.
Beetles	<i>Dryops nitidulus</i> (Near Threatened; Nationally Rare) <i>Atheta depressicollis</i>	<i>D. nitidulus</i> is associated with wetland habitats and was presumably recorded in damp hollows or dune slacks. <i>A. depressicollis</i> is considered an error as the latest checklist (Duff, 2012) confirms it is not, and has never been, a valid name. There is only one beetle in Britain (a weevil) with the specific epithet <i>depressicollis</i> but as <i>Atheta</i> is a genus of rove beetles, this cannot be the confusion. The only logical conclusion is that the species is actually <i>A. aeneicollis</i> , but this does not have a nature conservation status.
Bees	Great yellow bumblebee (<i>Bombus distinguendus</i>) (Endangered; SoPI)	Now known only from the northern coast of Scotland, Outer Hebrides and Orkney, thus even if this record is genuine, the species is no longer extant in England.

Group	Species & Status	Comment
Flies	<i>Thereva valida</i> (Nationally Rare) <i>Azona anomala</i> (Nationally Scarce) <i>Minilimosina baculum</i> <i>Orellia falcata</i> ([Notable]) <i>Campiglossa</i> (= <i>Paroxyna</i>) <i>absinthii</i> ([Notable]) <i>Campiglossa misella</i> <i>Colobaena bifasciella</i> ([Notable])	<i>T. valida</i> : most records are from Speyside and the Cairngorms area of Scotland, though there are outliers in north-east Yorkshire. However, it is associated with floodplains, marshes and streams so sand dunes are not considered to be the correct habitat. <i>O. falcata</i> , <i>C. absinthii</i> , <i>C. misella</i> and <i>C. bifasciella</i> are no longer considered to be of nature conservation concern.

A survey of various Cleveland sites for spiders by Horsfield (1980) recorded a total of 88 species at Coatham Dunes including a number of rarities such as ¹⁶*Silometopus incurvatus*, *Leptothyryx hardyi*, *Trichopternoides thorelli* (all Linyphiidae) and *Rhysodromus fallax* (Philodromidae), in addition to a number of rare county species such as *Erigone arctica*. His description of the dunes was brief but nevertheless states that the major habitats were pioneer dunes, fore-dunes, dry dune meadow and dune slacks which is broadly similar to that described by AECOM (2020).

A review of moth species associated with Teesside's brownfield sites refers to three nationally notable species: lyme grass (*Longalatedes elymi*), shore wainscot (*Mythimna littoralis*) and *Evergestes extimalis*; and six regionally scarce taxa including *Agriphila geniculea*, *A. latistria* and *Phycitodes maritima* (Woods, 2012). Lyme grass and shore wainscot are no longer considered to be nationally notable; the former has increased in the short-term (2000 – 2016) and whilst the latter continues to decline, it remains sparsely distributed throughout Britain on sandy coastlines and is possibly under-recorded (Randle *et al.*, 2019). *E. extimalis* is an occasional immigrant to Britain though it may temporarily establish a population such as the case at Teesside in the early 2000s (Yorkshire Naturalists' Union, 2020).

The study site is also known to support several beetles with a nature conservation status, including species that are rare in Yorkshire. This includes the Near Threatened and Nationally Rare ground beetle *Amara spreata* and the Nationally Scarce *Amara lucida* (Marsh, 2009); the Red Data Book leiodid *Sogda suturalis* and the Nationally Scarce *Leiodes ciliaris* (Marsh, 2012); and the Nationally Scarce rove beetles *Diglotta mersa*, *Mycetoporus piceolus* and *Gabrius osseticus* (Denton and Marsh, 2016; Marsh, 2016). These taxa are generally only known in Yorkshire from Coatham Dunes and/ or Spurn Point (vice-county 61: South-east Yorkshire).

A survey of several sites within Teesside, including Coatham Dunes, was undertaken by Godfrey (2015) to inform the designation of the T&CC SSSI. This survey recorded four species of note at Coatham Dunes: the Nationally Scarce ground beetle *Amara praetermissa* and the bee-fly *Phthiria pulicaria*. It also recorded a frit-fly *Eutropha fulvifrons* and a picture-winged fly *Tetanops myopinus* which at the time were Notable. However, in a recent review, Falk, Ismay and Chandler (2016) have provisionally downgraded the frit-fly as no longer warranting a nature conservation status, as although it is restricted to sand dunes it is widespread. The picture-winged fly has been assigned a provisional Nationally Scarce species.

¹⁶ Due to subsequent taxonomic changes, Horsfield (1980) recorded *L. hardyi* as *Hilaira hardyi*; *T. thorelli* as *Trichopterna thorelli*; and *R. fallax* as *Philodromus fallax*.

4.2 Field Survey

4.2.1 Survey Conditions

Seven survey visits were completed during reasonable to optimal weather conditions for the time of year. Details are conveyed in Table 2, including activities undertaken for each visit.

Table 2: Weather conditions for survey visits.

Date	Weather	Notes
5 th March 2020	Cloud: 5/8; Temperature: 7°C; Wind Speed: 1 (2) onshore. Sunny but cold.	Targeted survey for <i>Silometopus incurvatus</i> in marram dunes.
6 th March 2020	Cloud: 1/8; Temperature: 7°C; Wind Speed: 1 (2) onshore.	Targeted survey for <i>Silometopus incurvatus</i> in marram dunes.
27 th May 2020	Cloud: 7/8; Temperature: 16°C; Wind Speed: 1 (2) onshore	Surveys in dunes. Scoped land parcels elsewhere.
4 th June 2020	Cloud: 8/8 clearing to 6/8; Temperature: 12°C warming to 15°C; Wind Speed: 1 (2) onshore	Surveying in sand dunes.
25 th June 2020	Cloud: 0/8; Temperature: 18°C warming to 21°C; Wind Speed: 2 (3) S	Surveying in sand dunes.
17 th July 2020	Cloud: 3/8; Temperature: 21°C; Wind Speed: 2 (3-4) NW	Surveying in sand dunes.
29 th September 2020	Cloud: 1/8; Temperature: 13°C; Wind Speed: 0 (1) NW	Surveying in sand dunes.

4.2.2 Summary of Survey Results and Notable Species

A total of 322 species have been identified from the study site, and a complete list is provided in Table 8 (Annex C). The following discussion focuses on the distribution of Key Species (as defined by Telfer, 2017).

Table 3: Distribution of main taxonomic groups studied. Red numbers in parentheses equate to Key Species (excluding Research Only – see text for explanation).

Taxonomic Group	Number of Species
Araneae (Spiders)	51 (3) species
Coleoptera (Beetles)	120 (5) species
Diptera (Flies)	54 (1) species
Hemiptera (bugs, including 'hoppers')	48 (1) species
Hymenoptera (Bees, wasps, ants etc.)	28 (1) species
Lepidoptera (Butterflies & moths)	14 (4) species

A total of 15 Key Species were recorded at Coatham Dunes, of which nine are Rare Key Species, including taxa that subject to a formal status review will likely be downgraded. These 15 Key Species represent approximately 4.7 % of the total number of species recorded, of which Rare Key Species are 2.8 % of the fauna. A number of these Key Species are also either new to the county (Yorkshire), vice-county or are rare/ scarce, having been recorded less than five times previously or almost restricted to Coatham Dunes. Details, including their ecology and occurrence at Coatham Dunes is conveyed in Table 4. Data relating to Yorkshire was received from the county beetle recorder (Bob Marsh, e-mail correspondence dated 29th October 2020).

Table 4: Selection of species recorded with an NCS (nationally and within Yorkshire).

Species	Status	Ecology
<i>Silometopus incurvatus</i> Araneae, Linyphiidae	Vulnerable; Nationally Rare; SoPI	A money-spider restricted to sand dunes in northern Britain and within England, the only modern records are from the Yorkshire coast (VC 62) and County Durham (VC 66). It occurs in marram leaf-litter between about 80 mm and 200 mm above ground level within the fore-dunes. Coatham Dunes almost represents the southern most locality in Britain, with two records in a dune system about 10 km further south (Spider Recording Scheme, 2020a). The spider was recorded in numbers (26♂ & 29♀) at seven locations throughout the fore-dunes following a surveys in early March 2020 (see Figure 1; Annexe A) suggesting it is widespread in suitable habitat.
<i>Styloctetor compar</i> (= <i>Ceratinella scabrosa</i>) Araneae, Linyphiidae	Nationally Scarce	A small money-spider associated with dry (often calcareous) unimproved grasslands. Relatively widespread in south-east England but becoming scarce in the Midlands. North of a line between the Humber and the Mersey, there are a handful of older records (Spider Recording Scheme, 2020b). A single male recorded in the fixed dunes in June 2020 represents the first vice-county record and the first in Yorkshire for a decade.
<i>Rhysodromus fallax</i> (= <i>Philodromus fallax</i>) Araneae, Philodromidae	Vulnerable; Nationally Rare; SoPI	A specialist ambush predator of sand dunes where marram is the dominant component. Records are scattered around the coasts of England and Wales but nowhere is it frequent (Spider Recording Scheme, 2020c). A single subadult female was recorded in March 2020 from marram leaf-litter where it is presumed to over-winter, which represented the first record in northern England for forty years.
<i>Atomaria scutellaris</i> Coleoptera, Cryptophagidae	Nationally Rare	This is a diminutive yellow-brown silken fungus beetle which usually has distinctive but diffuse pale patterning on the wing cases. It was first recorded in Britain from the Scilly Isles in 1968 and has since expanded its range to include extensive swathes of the southern and eastern coastlines of England along with smaller coastal stretches in Cornwall and south Wales. There are also inland records from North Norfolk into the Breckland region, and from the Thames gateway. The beetle is typically found in grassland and disturbed ground where the soil is free-draining and sandy. It is particularly frequent on dune systems. This record represents the first for VC 62 and only the fourth record for Yorkshire; thus it is a rare species in the county.
<i>Orthochaetes setiger</i> (Coleoptera, Curculionidae)	[Nationally Scarce (Nb)]	A small elongate weevil with outstanding setae on the elytra. Distributed throughout Britain and found almost exclusively in dry, sparsely vegetated habitats with free-draining soils. Such sites include post-industrial waste ground (e.g. quarries and railway sidings), calcareous short-turf grassland and sand dunes. A polyphagous species feeding on a variety of plants. Adults have been recorded in most months of the year.

Species	Status	Ecology
<i>Glucianus punctiger</i> Coleoptera, Curculionidae	[Nationally Scarce (Nb)]	A medium-sized weevil that is found on its food-plant dandelion (<i>Taraxacum</i> agg.) in grassland and waste places such as road verges tracks and open rough ground. The eggs are laid in the stem of the plant and the larvae feed inside the flower-heads. Locally distributed throughout England and Wales. The record represents the first record for VC 62.
<i>Trichosirocalus barnevillei</i> Coleoptera, Curculionidae	Nationally Scarce (Nb)	An attractive small brown weevil with white-scale patterning. Found in grassland habitats, typically at verges of disturbed and sparsely-vegetated sites, including Breck grassland, where it feeds on yarrow (<i>Achillea millefolium</i>). Found mainly in the eastern half of southern England; the Coatham record represents a significant northward extension of the species range in Britain and the first for Yorkshire.
<i>Isochnus sequensi</i> Coleoptera, Curculionidae	[RDB K]	This small brown weevil with partly pale legs was until recently a rare species in Britain. First recorded in 1952 in Canterbury, Kent, it has since spread, being recorded in Sussex, Surrey, Essex, Middlesex, Norfolk, Cambridge and Huntingdonshire by 2012 and since then, appearing in Hampshire, Staffordshire, Nottinghamshire, Derbyshire and is now widespread throughout England at least. It was first recorded in Yorkshire in 2011 and is now widespread in VC 61 (South-east Yorkshire). As this is a species which is rapidly colonising northwards its status of RDB K is no longer justified. The species inhabits the drier part of wetlands such as at track sides, usually on <i>Salix x fragilis</i> but it may also feed on other willow species. The larvae feed in blotch mines in the leaves of the host tree and pupate inside them.
<i>Tephritis matricariae</i> Diptera, Tephritidae	RDB K	This gall-forming fly, associated with hawksbeards (<i>Crepis</i> spp.) was first recorded from Kent sand dunes in April 2000 (Clemons, 2000) and quickly spread throughout the county by 2002 (Clemons, 2003). In the intervening two decades, the species has become relatively widespread in south-east England, with scattered records in western regions plus eastern and north-west Wales, though only three published records north of a line connecting the Rivers Humber and Mersey (Clemons, 2020). Given its now widespread presence throughout England, it probably no longer deserves a nature conservation status. A single specimen was vacuum sampled from hawksbeard on the slag deposit within the Dunes in July 2020; and represents the first record for VC 62.
<i>Agallia brachyptera</i> Hemiptera, Cicadellidae	Nationally Scarce (Nb)	An unmistakable leafhopper usually associated with dry, sparsely vegetated habitats, but also known from wetland. It is scarce and local in distribution, being confined largely to the east of England. There is some evidence that it prefers calcareous substrates, but its precise ecological requirements are unknown. Adults are recorded between June and September.
<i>Argogorytes fargei</i> Hymenoptera, Crabronidae	Nationally Scarce (Na)	A solitary wasp associated with open habitats on light soils including sand dunes, heaths and sandy riverbanks. It requires vertical banks for nesting and taller grasslands for foraging froghopper nymphs which it preys upon. It is a sparsely distributed species with populations known

Species	Status	Ecology
		from the East Anglian Brecks and coast, central England and Yorkshire. A single female was collected in May 2020 and there is an unpublished record from Teesside Steelworks. These would appear to represent new records for VC 62.
Dingy skipper (<i>Erynnis tages</i>) Lepidoptera, Hesperidae	Vulnerable; SoPI	A declining butterfly which is generally associated with brownfield sites and similar places where habitats supporting short swards where its food plant, bird's-foot trefoil (<i>Lotus</i> spp.) occurs. Several individuals were recorded in late May 2020 at various locations within the Dunes, including the OMH.
Wall (<i>Lasiommata megera</i>) Lepidoptera, Nymphalidae	Near Threatened; SoPI	A declining butterfly associated with dry grasslands and previously known from the immediate vicinity of the study site.
Small heath (<i>Coenonympha pamphilus</i>) Lepidoptera, Nymphalidae	Near Threatened; SoPI	Although a widespread species in the UK, this otherwise common species has experienced a substantial decline in both abundance and occurrence (Fox <i>et al.</i> , 2015), hence its classification as Near Threatened. Individuals were observed in late May across the dunes.
Grayling (<i>Hipparchia semele</i>) Lepidoptera, Nymphalidae	Vulnerable; SoPI	Within Yorkshire, this is virtually confined to the coast where it is associated with a range of open habitats. It has experienced a significant decline. Individuals were observed in late June and mid-July across the dunes.
<i>Brachypterus linariae</i> ; <i>Brachypterolus pulicarius</i> Coleoptera, Kateretidae <i>Micrambe woodroffeii</i> Coleoptera, Cryptophagidae <i>Olibrus affinis</i> Coleoptera, Phalacridae <i>Hypera venusta</i> ; <i>Rhinusa antirrhini</i> Coleoptera, Curculionidae	New to VC 62	The two short-winged flower-beetles (Kateretidae), the silken fungus-beetle (Cryptophagidae), the shining flower-beetle and the two weevils (Curculionidae) are all new to VC 62; <i>M. woodroffeii</i> is also an entirely new species for all of Yorkshire.
A further ten beetle species (<i>Calathus cinctus</i> , <i>Ceratopion gibbirostre</i> , <i>Longitarsus exoletus</i> , <i>Meligethes planiusculus</i> , <i>Othius laeviusculus</i> , <i>Otiorhynchus atroapterus</i> , <i>Stenopterapion meliloti</i> , <i>Tychius meliloti</i> , <i>Colon serripes</i> and <i>Romualdius angustisetulus</i>) are all rare in VC 62. The record of <i>Stenopterapion meliloti</i> is the first post-1950 record and whilst there are 17 records of <i>Otiorhynchus atroapterus</i> , they are almost all from Coatham.		

4.3 Baseline Invertebrate Assemblage Analysis

The following section describes the invertebrate assemblages recorded at Coatham Dunes. The species list has been analysed using Pantheon to identify the habitat associations and dependencies of the terrestrial invertebrate assemblage associated with Coatham Dunes. The analysis first considers stenotopic species i.e. those terrestrial invertebrates with very specific and ¹⁷restricted habitat requirements. They are considered to have an intrinsic nature conservation value as stenotopic species are generally only recorded on sites that are of nature conservation value. The analysis then considers the habitat affinities of the wider assemblage.

A total of 58 stenotopic species were recorded, representing just under one-fifth of the total terrestrial invertebrate fauna identified from Coatham Dunes (see Table 9; Annex C). Of these, 57 stenotopic species are associated with the open habitat biotopes (SAT codes prefixed with an 'F' in Table 9), of which 21 species are intrinsically associated with the bare sand and chalk SAT (F111), conditions that are analogous to the sand dunes. The bare sand and chalk assemblages contain species associated with dry conditions in early successional habitat, which at Coatham Dunes is represented by the fore-dune and mobile dune communities, or slightly further inland (i.e. within the fixed dune vegetation community) where blow-outs expose bare sand. Four of the Key Species

¹⁷ Referred to as Species Assemblage Types (SAT) in Pantheon (Webb *et al.* 2018).

recorded at Coatham Dunes are stenotopic to this SAT: the spiders *Silometopus incurvatus* and *Rhysodromus fallax*, the weevil *Trichosirocalus barnevillei* and the grayling (butterfly). A further dozen stenotopic species are associated with open short swards analogous to the fixed dune and dune grassland vegetation communities. This includes the wall and small heath (butterflies), both of which are Near Threatened and SoPI. The rich flower resource, which can occur in a more than one SAT, reflects the dune system's importance for pollinators, with 13 stenotopic species (just under a quarter of all taxa) dependent on the flower-rich dune grasslands that are located to the rear of the fore-dunes.

This importance of the rich flower resource SAT is emphasised by the 29 species (see Table 5) that have a degree of ¹⁸fidelity to calcareous grasslands, which can include dune grasslands (Alexander, 2003; page 9). One species of leafhopper recorded at Coatham, *Eupteryx notata*, is dependent on the dune grasslands, and a further nine invertebrate species have a moderate fidelity. Three Key Species (*Styloctetor compar*, *Orthochaetes setiger* and *Agallia bipunctata*) are also strongly associated with these aspects of the dune system. This analysis further points to the importance of the dune grassland vegetation communities present at Coatham Dunes.

Table 5: Invertebrates scoring high, moderate or low fidelity to calcareous grassland recorded at Coatham Dunes in 2020 (after Alexander, 2003).

Order	Family	Species	Conservation status	Habitat score
Hemiptera	Cicadellidae	<i>Eupteryx notata</i>		High
Araneae	Linyphiidae	<i>Styloctetor compar</i>	Nationally Scarce	Moderate
Coleoptera	Apionidae	<i>Holotrichapion ononis</i>		Moderate
Coleoptera	Chrysomelidae	<i>Longitarsus exoletus</i>		Moderate
Coleoptera	Chrysomelidae	<i>Sermylassa halensis</i>		Moderate
Coleoptera	Curculionidae	<i>Orthochaetes setiger</i>	[Nationally Scarce (Nb)]	Moderate
Coleoptera	Nitidulidae	<i>Meligethes planiusculus</i>		Moderate
Hemiptera	Cicadellidae	<i>Agallia brachyptera</i>	Nationally Scarce (Nb)	Moderate
Hemiptera	Lygaeidae	<i>Scolopostethus puberulus</i>		Moderate
Hemiptera	Miridae	<i>Charagochilus gyllenhalii</i>		Moderate
Hemiptera	Cicadellidae	<i>Mocycdia crocea</i>		Moderate to low
Araneae	Linyphiidae	<i>Tapinocyba praecox</i>		Low
Araneae	Salticidae	<i>Heliophanus flavipes</i>		Low
Araneae	Salticidae	<i>Talavera aequipes</i>		Low
Araneae	Thomisidae	<i>Ozyptila brevipes</i>		Low
Coleoptera	Carabidae	<i>Olisthopus rotundatus</i>		Low
Coleoptera	Curculionidae	<i>Hypera plantaginis</i>		Low
Coleoptera	Curculionidae	<i>Hypera venusta</i>		Low
Coleoptera	Curculionidae	<i>Mecinus pascuorum</i>		Low
Coleoptera	Curculionidae	<i>Phyllobius roboretanus</i>		Low
Coleoptera	Curculionidae	<i>Sitona sulcifrons</i>		Low
Coleoptera	Curculionidae	<i>Trachyploeus angustisetulus</i>		Low
Coleoptera	Curculionidae	<i>Tychius meliloti</i>		Low
Hemiptera	Berytidae	<i>Gampsocoris punctipes</i>		Low

¹⁸ **High:** Species routinely recorded from calcareous grasslands. They may also be recorded to a greater or lesser degree from other open habitats on freelydraining soils, but it is likely that they are mainly dependent on calcareous grasslands to sustain viable populations.

Moderate: species routinely recorded from calcareous grasslands, but also from semi-natural open habitats on freely-draining soils over all or part of their geographical area of distribution. **Low:** species frequently recorded in numbers from calcareous grasslands, but predominantly associated with other types of open habitats over all their British area of distribution.

Order	Family	Species	Conservation status	Habitat score
Hemiptera	Cicadellidae	<i>Eupteryx atropunctata</i>		Low
Hemiptera	Lygaeidae	<i>Cymus glandicolor</i>		Low
Hemiptera	Miridae	<i>Dicyphus annulatus</i>		Low
Hemiptera	Miridae	<i>Macrotylus paykulli</i>		Low
Hemiptera	Tingidae	<i>Acalypta parvula</i>		Low

The dune slacks at Coatham are typically located within topographic hollows in the fixed dunes and are all described as tending towards dune grassland (AECOM, 2020). These dune slacks are considered to represent the older dry slack vegetation community that Rodwell (2000) describes as the SD16 *Salix repens* – *Holcus lanatus* dune-slack community and which has been mapped as such by AECOM (2020). Pantheon identifies only a small number of taxa with an affinity to brackish dune slacks of which only one species, a widespread and common wetland money-spider (*Hypomma bituberculatum*) has been recorded in the 2020 study. Further, Godfrey (2015) did not record any dune slack species in his survey of Teesside sites, though his sampling at Coatham was approximately 1 km further north towards the South Gare breakwater and outwith the current study area. Consequently, the survey work at Coatham has not distinguished a dune slack invertebrate assemblage, suggesting that any difference in vegetation communities is possibly not that important from an invertebrate ecology perspective. This doesn't diminish the vegetation community's nature conservation value, more that it contributes to the overall resource of the habitat that includes the fixed dune habitats.

The mosaics of habitat, including the scrub and scrub edge habitat, in combination with the topographical heterogeneity within Coatham Dunes has resulted in a diverse landscape within localised areas of the study site. Any mitigation proposals would need to reflect this complex relationship, or allow this to occur through natural processes, to ensure retention of the existing baseline post-disturbance. This is reiterated in Section 6.

The area of OMH which is associated with the deposits of slag supports a short perennial vegetation community that is structurally and botanically different to the semi-natural dunes. In the May and June visits, the vegetation had become desiccated owing to the dry spring, which suppressed pollinator activity. The OMH was included within the transects covering the wider dune system whilst undertaking aerial netting targeting flying insects such as Diptera and aculeate Hymenoptera, so the material collected was aggregated. Thus material collected from the bings was not discriminated with those specimens collected in the dune system proper. Material from vacuum sampling has been able to be discriminated against, based on eight-figure grid references for each sample and so, based on this material and direct observations, it can be said that a minimum of 87 invertebrate species were specifically recorded on the OMH.

Three SoPI (small heath, wall and grayling (all butterflies)), and a further three Key Species: the Nationally Rare silken fungus-beetle *Atomaria scutellaris*, the gall-forming fly *Tephritis matricariae* and the Nationally Scarce leafhopper *Agallia brachyptera*) were recorded from the OMH. However, only two Key Species (*A. scutellaris* and *T. matricariae*) were only recorded on the OMH (and one of the new beetle species for VC 62 (*Rhinusa antirrhini*)), but it is considered probable that they are also present in the dunes proper given that suitable foodplants have also been recorded in the semi-fixed dunes (AECOM, 2020; paragraph 12.4.14) and dune grasslands. The evidence available supports a conclusion that whilst the invertebrate assemblage present on the OMH is subordinate to that within the dunes, it nevertheless contributes to its value as they share similar edaphic features such as free draining substrates which support a dry calcareous-type vegetation community. It was observed that once the vegetation community recovered from the drought conditions, there was a similar floristic diversity including a profusion of viper's bugloss (*Echium vulgare*) and a diverse pollinator resource which is described in AECOM (2020; paragraphs 12.4.32 to 12.4.35) and can be interpreted as linking the sand dune habitat with the brownfield sites within the former steelworks. It would support the case for further survey within the Seal Sands Compound (refer to Section 1.2.1 and Annex E) if the scale and nature of any future development justified its consideration.

5 Nature Conservation Evaluation

As stated in Section 3.3, there is no standard frame of reference to evaluate a study site's invertebrate assemblages' nature conservation value. Instead, reliance is placed on various sources, including proportion of Key Species recorded, and analysis using Pantheon (Webb *et al.*, 2018). Added to this is recent guidance published by the Joint Nature Conservation Committee (JNCC) which considers how Key Species can best be represented in protected sites (SSSIs) (Curson *et al.*, 2019). Whilst the presence of Key Species in themselves is not a sole indication of national value, it is considered a useful guide as to where a particular site may sit in a geographical hierarchy. This underlying principle has been of value for the purposes of informing the evaluation at Coatham Dunes.

Curson *et al.* (2019) suggests that sites can be valued based on:

- individual species that are considered to be threatened species (IUCN and British rarity, see this Annex B for details), species of country conservation priority (i.e. SoPI), species with restricted or disjunct ranges, and edge of range species; and
- assemblages of specialised habitats and habitat-based assemblages such as sand dune faunas, and habitat heterogeneity/ mosaics.

In addition to the above, it remains relevant to assess the invertebrate assemblage recorded against non-statutory site guidelines, if applicable. The ¹⁹Tees Valley administrative region guidelines includes reference to terrestrial invertebrates (Tees Valley Biodiversity Partnership, 2010) and their criteria are referred to in Section 5.3.

This approach forms the basis for the following evaluation and in doing so, takes into consideration the criteria referred to above and more general points such as the relative value of how terrestrial invertebrate assemblages relate to both the importance and uniqueness of the habitats present, and the characteristics of the assemblage itself. The assessment first considers the presence of individual species recorded, also taking in to account the likelihood of continued presence of historically recorded taxa such as some of the ground beetles, followed by the assemblages recorded (i.e. not just the rarer taxa).

Following assessment of this, as explained in more detail below, Coatham Dunes is considered to support an assemblage of terrestrial invertebrates of **national nature conservation value**.

5.1 Individual Species

A total of 15 Key Species were recorded, of which nine are Rare Key Species based on Telfer (2017), out of a total species list of 322. Whilst the 15 Key Species represents just under 5 % of the total assemblage, the nine Rare Key Species represent 2.8 % of the invertebrate assemblage, which substantially exceeds a proposed threshold for national importance (1 %). Whilst the percentage of all Key Species falls below the proposed threshold of 10 %, Rare Key Species exceeds its threshold, suggesting that the invertebrate assemblages at Coatham Dunes is skewed towards the rarer taxa.

Curson *et al.* (2019) provides some further guidance on considering a site's nature conservation value based on individual species that are assessed against IUCN criteria for Britain; or British rarity status. They state that any species which are Critically Endangered, Endangered or Vulnerable (IUCN), or Nationally Rare or Nationally Scarce (British rarity status) should be represented in SSSIs. The presence of any such designated species at a site is not in itself sufficient for that site to be formally designated, but it would reach a threshold for it to be considered. Therefore, the presence of any species with the above designations at a site can be viewed as a proxy for considering national importance.

¹⁹ Covers Cleveland and Redcar within which Coatham is located.

Five species (see Table 4 for details) are either Vulnerable and/ or Nationally Rare (*Silometopus incurvatus*, *Rhysodromus fallax*, *Atomaria scutellaris*, dingy skipper and grayling (butterfly)) and four (all except *A. scutellaris*) are also SoPI. There are only three other records for *A. scutellaris* in Yorkshire and Coatham Dunes is the only known location in VC 62.

The survey work in 2020 has also identified a further sixteen beetle species that are either new to VC 62 (six species; one new to Yorkshire) or rare in VC 62 (10 species). The presence of several rare invertebrates, including taxa that are new to the county/ vice-county and region (Tees Lowlands NCA) is supportive of the view that the study site is of national importance and that there is a nationally important assemblage of terrestrial invertebrates associated with the sand dune vegetation communities in the T&CC SSSI (Natural England, 2018). That its predecessor (South Gare and Coatham Sands SSSI), which specifically mentioned *S. incurvatus* on its citation (English Nature, 1988) was of comparable value suggests that the dune system's invertebrate assemblage has remained broadly consistent across time. This therefore implies that the habitats within the study site remain suitable for some of those taxa recorded historically, including a number of rare beetles such as *Amara praetermissa*, *Amara spreata*, *Amara lucida*, and *Leiodes ciliaris* which may have been recorded, if pitfall trapping had been used (as discussed in Section 1.3.3). In addition, the bee-fly *Phthiria pulicaria* (see Section 4.1) remain relevant. Of the taxa included in Table 1 and which are still of nature conservation interest and likely to have been correctly identified, only *D. nitidulus* is considered likely to be present within the remaining waterbodies.

5.2 Habitat Assemblages

The relative value of the terrestrial invertebrate assemblages relates to both the importance and uniqueness of the habitats present, and the characteristics of the assemblage itself. Following assessment of this, as explained in more detail below, Coatham Dunes is considered to support an assemblage of terrestrial invertebrates of national nature conservation value; and is of national (England) significance for one species of spider (*Silometopus incurvatus*).

5.2.1 Landscape context

The study site is located within the Tees Lowlands NCA in north-east England. Coastal sand dunes occupy 332 ha within the NCA (Natural England, 2013) and taking a wider regional approach (north-east England coast), there are c. 1,411 ha, of which the significant majority (1,164 ha (82.5 %)) are in Northumberland (Dargie, 1995). The sand dune vegetation communities within Coatham Dunes, which extend for c. 130 ha (including the small area around Marske), which represents just under 40 % of the resource within the NCA and 9 % of the regional resource.

The OMH habitat is estimated to extend over about 27 ha, which when compared to what is present within the wider Teesside industrial landscape, represents an insubstantial area, likely to be less than 1 % of the total resource. As discussed in the final paragraph of Section 4.3, the OMH within the study site is considered to be a poor relation of the sand dune vegetation communities and whilst several Key Species, including three SoPI were recorded within this habitat, they are all likely to be present within the wider dune system. Thus, as a feature, the OMH is justifiably of lower nature conservation value, but nevertheless contributes to the totality of the resource available to invertebrate assemblages associated with the sand dunes.

It is evident that the sand dune vegetation communities within Coatham Dunes represents a significant resource within the NCA and a not insubstantial one regionally, emphasising the value for terrestrial invertebrates. The dune system supports a number of rare species, including five species that are vulnerable to extinction or Nationally Rare and are only known from this stretch of the coast in the region. Furthermore, Coatham Dunes is one of just three known locations (all within the NCA) for one of these species (*Silometopus incurvatus*) in England. Of these location, the study site is known to support the largest population.

5.2.2 Stenotopic Species

The relative value of the notable habitats present for terrestrial invertebrate species can be interrogated in more detail regarding the stenotopic species recorded by the survey. As explained in Section 3.3, stenotopic species are dependent on quite specific and restricted habitat conditions that are rarely encountered in the wider landscape. Therefore, stenotopic species are considered to have an intrinsic nature conservation value and generally only occur in association with sites of relatively high nature conservation importance.

Pantheon has been used to investigate this further by interrogating the composition of the terrestrial invertebrate assemblage in terms of biotopes, habitats, and the distribution of stenotopic species recorded. In doing so, the limitations of Pantheon as a tool have been considered, and professional judgement has been applied where necessary to assist robust valuation.

Table 6: Invertebrate assemblage assessment for Coatham Dunes from 2020 survey data.

Broad biotope	Habitat	SAT	No. of species	FC Threshold	Proportion to Threshold	Species with conservation status
Open habitats	Short sward & bare ground	F111: Bare sand & chalk	21	19	111 %	4
		F112: Open short sward	12	13	92 %	2
	Cross-cutting	F002: Rich flower resource	13	15	87 %	0
		F001: Scrub edge	8	11	73 %	0
		F003: Scrub-heath & moorland	3	9	33 %	0
Tree-associated	decaying wood	A212: Bark & sapwood decay	4	19	21 %	0
Wetland	marshland	W221: Undisturbed fluctuating marsh	1	4	25 %	0

Following review of the number of stenotopic species recorded and the thresholds published in Drake *et al.* (2007), as conveyed in Table 6, it is evident that the invertebrate assemblage associated with the bare sand and chalk (F111) has exceeded the threshold considered to represent FC status. This includes three species which are IUCN Vulnerable and SoPI: the grayling, *Rhysodromus fallax* and *Silometopus incurvatus*. Further, the open short sward (F112) has a high PtT score (92 %) and supports the Near Threatened and SoPI small heath and wall butterflies; and the rich flower resource (F002) has a PtT score of 87 %.

The rich flower resource SAT (F002) is a resource-based assemblage that occurs across several habitats but is frequently present in open short swards (F112). Given that it is a cross-cutting SAT, it has a poor discriminatory value in conservation terms (i.e. exceeding the threshold is not sufficient on its own to conclude national significance) (Webb *et al.*, 2018). However, in this instance, as the bare sand and chalk (F111) SAT (analogous to the fore-dune and mobile dune vegetation communities) and the open short sward (F112) SAT (equivalent to the fixed dune grasslands), are floristically species-rich (AECOM, 2020), the F002 SAT's exceedence is considered to be genuinely discriminatory when considering the nature conservation value of the sand dunes.

It is noted that the F112 and F002 SATs have just fallen short of the FC status threshold (by one or two species respectively) and, strictly speaking, it could be concluded that they are not in favourable condition. However, there are two reasons, in the author's professional judgement, why this may be an inappropriate conclusion. The very dry spring was observed to have had a negative effect on insect activity, particularly pollinators, as the ground flora suffered from desiccation. This is considered to have reduced activity and possibly resulted in increased species mortality at the pre-adult stage (larvae or pupae), or more rapid adult mortality, resulting in lower species-richness than otherwise may have been the case – for example, only six species of hoverfly (Diptera, Syrphidae) were recorded. Secondly, both SATs' threshold are possibly more influenced towards assemblages in the southern half of England, which are typically more species-rich. In the absence of any published regional thresholds to reflect genuine ecological differences in latitude, it may be more accurate to adjust the threshold to reflect these natural declines in species-richness which are expressed in many different invertebrate taxa. Professional judgement has been applied and given the high PtT scores, these are evaluated to have achieved FC status for an assemblage in coastal north-east England.

Supporting the SATs attributed to the dune habitats, geospatially and in terms of the analysis, is the scrub edge (F112) SAT (PtT = 73 %). The scattered scrub contributes to the functional integrity of the study site and whilst falling short of the FC threshold, does indicate that the terrestrial invertebrate assemblage associated with this habitat are of nature conservation value, but subordinate to the dune habitats.

5.3 Taxonomic Assemblages

In addition to the guidelines for statutory site designation (refer back to Section 5.1), there are published guidelines for non-statutory site designation (Local Wildlife Sites) in Teesside are available but these only include criteria for Lepidoptera (butterflies and moths) and Odonata (dragonflies and damselflies) (Tees Valley Biodiversity Partnership (TVBP), 2010; Section 3.6). There is no consideration for other invertebrate groups or assemblages. Table 7 lists the relevant criteria and their applicability to Coatham Dunes.

Table 7: Relevant Local Wildlife Site Selection criteria and attributes for the identification of sites of county nature conservation value for invertebrates.

Criterion & Attribute	Applicability to Coatham Dunes
Butterflies	All sites that regularly support green hairstreak (<i>Callophrys rubi</i>) or white-letter hairstreak (<i>Satyrion w-album</i>) or a significant population (i.e. 10 or more individuals) of dingy skipper. All sites that regularly support 15 or more species of butterfly.
Moths	All sites that support the following species: forester (<i>Adscita statices</i>), Blomer's rivulet (<i>Discoloxia blomeri</i>), crescent striped (<i>Apamea oblonga</i>), large red-belted clearwing (<i>Synanthedon culiciformis</i>), lyme grass, or shore wainscot.
Odonata	All sites that support the following species of dragonfly, which are currently rare in the Tees Valley: banded demoiselle (<i>Calopteryx splendens</i>), emperor dragonfly (<i>Anax imperator</i>), or black-tailed skimmer (<i>Orthetrum cancellatum</i>). All sites with assemblages of 7 or more species of dragonfly.

The guidelines provide limited means to designate sites based on their invertebrate assemblages or species and provides very limited background or justification for the inclusion of certain species or exclusion of others. Applying the criteria, Coatham Dunes would meet the guidelines for Local Wildlife Site (LWS) designation on the basis of dingy skipper presence, which is likely to exceed ten individuals, though no formal butterfly transect was completed to say for certain. Black-tailed skimmer was recorded on two occasions but 'support' is not defined; i.e. confirmed breeding or including foraging. Whilst no moth trapping was undertaken Wood (2012) states that lyme grass and shore wainscot are known to be present at Coatham Dunes.

Referencing TVBP (2010) provides a minimum threshold and has been a useful reference point for considering the OMH's value within the context of the wider dune system, particularly given the presence of dingy skipper here.

5.4 Conclusion

The invertebrate assemblage recorded at Coatham Dunes in 2020 includes 15 Key Species, of which nine are Rare Key Species. An additional 16 species of beetle are either new to, or rare in Yorkshire (or the vice-county). The study site supports 58 stenotopic species, of which 21 are intrinsically linked to the sand dune vegetation communities. Coatham's sand dunes are of regional significance within north-east England and represent the largest system within the NCA. One of the three SATs attributable to the sand dunes are in favourable conservation status and two, if there were regional adjustments, would likely be so. The dunes support five species considered to be vulnerable to extinction based on IUCN criteria and are functionally dependent on the presence of the dune system at Coatham. One, the money-spider *Silometopus incurvatus*, is only known in England from the dune systems within the Tees Lowlands NCA, of which Coatham supports the largest known population.

The Dunes have been studied over several decades and were first designated in the 1980s for their invertebrate assemblages. The two IUCN Vulnerable, Nationally Rare, and SoPI spiders (*S. incurvatus* and *R. fallax*) were first recorded in these dunes in the 1970s and they both remain present, over forty years later. The continuity of habitat is such that it is considered likely that species recorded during previous surveys remain present.

All of the Key Species have been recorded within the sand dune vegetation communities and whilst five Vulnerable species and three SoPI (all butterflies) have been recorded within the OMH, none are restricted to this habitat.

For all the reasons summarised above, it is justifiable to conclude that the sand dunes within the study site at Coatham are of **national nature conservation value** for its terrestrial invertebrate assemblage; and confirms, as well as justifying being designated as a SSSI on this basis alone. The OMH, given the presence of dingy skipper is evaluated to be of **county nature conservation value** (North Yorkshire).

6 Mitigation

6.1 Proposed Mitigation

The key sensitive habitat from an invertebrate ecology perspective are the fore-dunes, mobile dunes and floristically species-rich dune grasslands. The fore-dunes and mobile dunes, particularly where marram leaf-litter accumulates, are the core habitat for *Silometopus incurvatus* and where the specimen of *Rhysodromus fallax* was observed and collected in March 2020. Likewise, the floristically species-rich dune grasslands support a range of Key Species and rare species for the vice-county/ county. These highly sensitive habitats occupy the dune system between approximately 100 m and 220 m landward of Mean High Water.

Mitigation should in the first instance focus on avoidance. The sensitive dune system habitats should be avoided through burying (tunnelling) the pipeline under the surface without disturbing the vegetation. Likewise, the proposed route should also avoid the associated dune slack (see Annex A, Figure 2) to further minimise the disturbance from an invertebrate ecology perspective. This would take it through a corridor between the slack and the reedbed.

Any restoration work should aim to replicate the heterogeneous topography as this would reflect the existing system's character. Given the natural processes occurring, this may be the ultimate outcome, subject to any engineering works necessary to protect the pipeline's integrity. It is worth reiterating that the dunes accreted as a consequence of the South Gare construction in the 1860s, so the system has its genesis in industry-led activity. This doesn't diminish the value or importance of the habitat in 2020, but it suggests that a dune system would return but within an unknown timeframe. There is also the opportunity to carefully re-wet a proportion of the existing reedbed (see Figure 2) which is currently believed to be drying out due to build up of leaf litter.

It is also worth noting that there has been a continuity of quality habitat over a forty year period which has included three previous pipelines (constructed in 1991, 2011 and 2013), so it would appear that there is some resilience to development pressures. However, caution needs to be applied as the 2020 study has not compared the footprints of these pipelines with those areas undisturbed by such activity. If pipelines cannot be buried under the sensitive dunes, but instead, there is a need to restore disturbed habitats, focussed surveys within the footprint of these pipelines would be a useful exercise to determine the presence of Key Species, particularly those taxa that are stenotopic to the fore-dune and mobile dune communities (see Table 9 in Annex C).

7 References

- AECOM. (2020) *Supplementary Habitat Information Report: Coatham Sands (Teessmouth and Cleveland Coast SSSI)*. Annex 12H: Supplementary Habitat Information. Technical document supporting Net Zero Teesside Environmental Statement. Unpublished draft document. AECOM, Leeds
- Alexander, K.N.A. (2003) *A review of the invertebrates associated with lowland calcareous grassland*. English Nature Research Reports No. 512. English Nature, Peterborough
- Bratton, J.H. (1991) *British Red Data Books: 3. Invertebrates other than insects*. Joint Nature Conservation Committee, Peterborough
- Clemons, L. (2000) *Tephritis matricariae* (Loew, 1844) (Dip.: Tephritidae) new to Britain and breeding in East Kent. *The Entomologist's Record and Journal of Variation*, **112(5)**: 225 – 230
- Clemons, L. (2003) Further records of *Tephritis matricariae*(Loew, 1844) (Dip.: Tephritidae) in Kent. *The Entomologist's Record and Journal of Variation*, **115(2)**: 71
- Clemons, L. (2020) Tephritid fly recording scheme June 2020. *Bulletin of the Dipterists Forum*, **90**: 48 – 52
- Curson J., Howe, M., Webb, J., Heaver D. and Tonhasca, A. (2019) *Guidelines for the Selection of Biological SSSIs Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 20 Invertebrates*. Joint Nature Conservation Committee, Peterborough.
- Dargie, T.C.D. (1995) Chapter 3.2 Sand dunes. In: Barne, J.H., Robson, C.F., Kaznowska, S.S., Doody, J.P., and Davidson, N.C. (eds). *Coasts and seas of the United Kingdom. Region 5 North-east England: Berwick-upon-Tweed to Filey Bay*. Peterborough, Joint Nature Conservation Committee. [Available on-line: <https://data.jncc.gov.uk/data/6473ed35-d1cb-428e-ad69-eb81d6c52045/pubs-csuk-region-05.pdf>; last accessed on 30th October 2020]
- Defra. (2014) *Supporting document to the National Pollinator Strategy: for bees and other pollinators in England*. November 2014. Document Reference: PB14222. Available on-line: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/370121/pb-14222-pollinator-strategy-supporting-doc.pdf; last accessed on 14th October 2017
- Denning, L. (2017) *Vegetation recovery of saltmarsh and sand dune habitat following cable and pipeline installation*. Thesis for the Doctor of Philosophy, University of Reading. University of Reading, Reading.
- Denton, M.L. and Marsh, R.J. (2016) *Atlas of Yorkshire Coleoptera (VCs 61-65) Part 5a – Staphylinidae: Aleocharinae*. Yorkshire Naturalists' Union, York. <https://www.ynu.org.uk/insects/beetles>
- Drake, C.M., Lott, D.A., Alexander, K.N.A. and Webb, J. (2007) *Surveying terrestrial and freshwater invertebrates for conservation evaluation*. Natural England Research Report (NERR005). Natural England, Sheffield. 132pp
- Duff, A.G. (2012) *Checklist of Beetles of the British Isles*. Second Edition. Pemberley Books, Iver.
- English Nature. (1988) *South Gare and Coatham Sands SSSI citation*. English Nature, Peterborough.
- Falk, S.J., Ismay, J.W. and Chandler, P.J. (2016) *Provisional Assessment of the Status of Acalypratae flies in the UK*. Natural England Commissioned Reports, Number 217. Natural England, Sheffield.
- Fox, R., Brereton, T.M., Asher, J., August, T.A., Botham, M.S., Bourn, N.A.D., Cruickshanks, K.L., Bulman, C.R., Ellis, S., Harrower, C.A., Middlebrook, I., Noble, D.G., Powney, G.D., Randle, Z., Warren, M.S. & Roy, D.B. (2015) *The State of the UK's Butterflies 2015*. Butterfly Conservation and the Centre for Ecology & Hydrology, Wareham, Dorset

- Godfrey, A. (2015) *Invertebrate Survey of Sites around Teesside. Report to Natural England: 2015*. Unpublished report to Natural England.
- Horsfield, D. (1980) Cleveland spiders 1978 – 79. *The Vasculum*, **65(3)**: 17 – 25
- IUCN. (2012) *IUCN Red List Categories and Criteria*. Version 3.1, 2nd Edition. Gland, Switzerland. Available on-line: <https://portals.iucn.org/library/sites/library/files/documents/RL-2001-001-2nd.pdf>.
- Marsh, R.J. (2009) *A Provisional Atlas of the Coleoptera of Yorkshire (Vice Counties 61 –65). Part 1 – Suborder Adephaga: Family Carabidae*. Yorkshire Naturalists' Union, York. <https://www.ynu.org.uk/insects/beetles>
- Marsh, R.J. (2012) *A Provisional Atlas of the Coleoptera of Yorkshire (Vice Counties 61 –65) Part 4 – Suborder Polyphaga: Families Sphaeritidae, Histeridae, Ptiliidae, Leioididae, Scydmaenidae, Silphidae*. Yorkshire Naturalists' Union, York. <https://www.ynu.org.uk/insects/beetles>
- Marsh, R.J. (2016) *A Provisional Atlas of the Coleoptera of Yorkshire (Vice Counties 61 –65). Part 5 - Staphylinidae - groups other than Aleocharinae*. Yorkshire Naturalists' Union, York. <https://www.ynu.org.uk/insects/beetles>
- Ministry of Housing, Communities and Local Government. (2019) *National Planning Policy Framework*. Version: February 2019. MHCLG, London.
- Natural England. (2013) *National Character Area Profile: 23. Tees Lowlands*. Natural England, Sheffield.
- Natural England. (2018) *Teesmouth & Cleveland Coast SSSI citation*. Natural England, Sheffield.
- Randle, Z., Evans-Hill, L.J., Parsons, M.S., Tyner, A., Bourn, N.A.D., Davis, T., Dennis, E.B., O'Donnell, M., Prescott, T., Tordoff, G.M. and Fox, R. (2019) *Atlas of Britain and Ireland's Larger Moths*. Pisces Publications, Newbury.
- Rodwell, J.S. (Ed.). (2000) *British Plant Communities Volume 5: Maritime communities and vegetation of open habitats*. Cambridge University Press, Cambridge.
- Shirt, D. (1987) *British Red Data Books 2: Insects*. Joint Nature Conservation Committee, Peterborough.
- Spider Recording Scheme. (2020a) *Summary for Silometopus incurvatus (Araneae)*. Spider and Harvestman Recording Scheme website. <http://srs.britishspiders.org.uk/portal.php/p/Summary/s/Silometopus+incurvatus>; last accessed on 3rd November 2020.
- Spider Recording Scheme. (2020b) *Summary for Styloctetor compar (Araneae)*. Spider and Harvestman Recording Scheme website. <http://srs.britishspiders.org.uk/portal.php/p/Summary/s/Styloctetor+compar>; last accessed on 3rd November 2020.
- Spider Recording Scheme. (2020c) *Summary for Rhysodromus fallax (Araneae)*. Spider and Harvestman Recording Scheme website. <http://srs.britishspiders.org.uk/portal.php/p/Summary/s/Rhysodromus+fallax>; last accessed on 3rd November 2020.
- Tees Valley Biodiversity Partnership. (2010) *Guidelines for the Selection of Local Wildlife Sites in the Tees Valley*. Version 7: June 2020. Available online: <https://teesvalleynaturepartnership.org.uk/wp-content/uploads/2012/11/LWS-Guidelines-V7.pdf>; last accessed 1st November 2020
- Telfer, M.G. (2017) *Invertebrate survey of Tilbury2*. Report to Bioscan (UK) Ltd. Available on-line: [https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030003/TR030003-000239-ES%20Annexe%2010.L%20Invertebrate%20Survey%20of%20Tilbury2%20\(2017\).pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030003/TR030003-000239-ES%20Annexe%2010.L%20Invertebrate%20Survey%20of%20Tilbury2%20(2017).pdf); last accessed on 3rd November 2020.

Webb, J., Heaver, D., Lott, D., Dean, H.J., van Breda, J., Curson, J., Harvey, M., Gurney, M., Roy, D.B., van Breda, A., Drake, M., Alexander, K.N.A. and Foster, G. (2018) *Pantheon - database version 3.7.6*. [online] Available at: <http://www.brc.ac.uk/pantheon/> accessed October 2020.

Woods, R. (2012) Brownfield sites and moth diversity in the Tees Estuary. *Entomologist's Record and Journal of Variation*, **124**: 89 – 100

Yorkshire Naturalists' Union. (2020) *Yorkshire Moths. A guide to the moths of VC61-65*. On-line database: <http://www.yorkshiremoths.info/>; last accessed on 23rd October 2020.

A. **Annex A: Figures.**



AECOM

PROJECT

Net Zero Teesside

CLIENT

NZT POWER AND NZNS STORAGE

KEY

- Site Boundary
- Power, Capture and Compressor Site
- Record of *Silometopus incurvatus* collected in March, June and September 2020
- Historical Record of *Silometopus incurvatus* (2002 and 2005)

Richard Wilson Ecology Ltd

TITLE

FIGURE 12I.1
DISTRIBUTION OF THE SPIDER
SILOMETOPUS INCURVATUS AT COATHAM
DUNES

REFERENCE

NZT_210114_GCN_12I.1_v1

SHEET NUMBER

1 of 1

DATE

14/01/21

This drawing has been produced for the use of AECOM's client. It may not be used, modified or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, for any party that uses or relies upon this drawing without AECOM's express written consent. All dimensions are indicative and in metres unless otherwise noted. Do not scale this document.

Project Management Initials: RL Designer: LC Checked: AR Approved: DB

Scale @ A3 1:2,000



CLIENT
 NZT POWER AND NZNS STORAGE

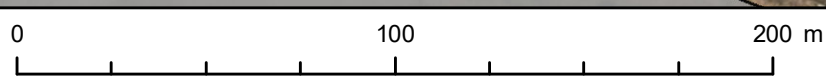
- KEY
- Site Boundary
 - Power, Capture and Compressor Site
 - Sensitive Terrestrial Invertebrate Habitat to be Avoided (Dune Slack)
 - Area of Dry Reedbed with Potential to be Enhanced during Construction Activities to Re-instate Open Water

TITLE
 FIGURE 121.2
 LOCATION OF SENSITIVE HABITATS TO BE AVOIDED WHEN FIXING THE LAYOUT FOR THE PROPOSED DEVELOPMENT

REFERENCE
 NZT_210114_GCN_121.2_v1

SHEET NUMBER
 1 of 1

DATE
 14/01/21



This drawing has been produced for the use of AECOM's client. It may not be used, modified or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies upon this drawing without AECOM's express written consent. All dimensions are indicative and in metres unless otherwise noted. Do not scale this document.

B. Annex B: Nature Conservation Status Categories (Definitions)

Introduction

The up to date status of species of conservation concern have been taken from Pantheon, the web-based analytical package maintained by the national biological records centre and developed by Webb *et al.* (2018) but reference to the various published Species Status Reviews; and the ²⁰Joint Nature Conservation Committee database of species designations has been undertaken where the author is aware there might be a discrepancy. However, no guarantee is given that this has been entirely comprehensive and reliance has largely been placed on Pantheon's accuracy.

Great Britain Rarity Status

Nationally Rare (NR) species are those that have been recently reassessed and are roughly equivalent to the old Red Data Book categories. These are defined as occurring in 15 or fewer hectads (10 km Ordnance Survey grid squares) and where there is reasonable confidence that intensive recording effort won't increase the number of hectads above 15.

Nationally Scarce (NS) species are those that are not NR and which have not been recorded in more than 100 hectads, and where there is reasonable confidence that intensive recording effort won't increase the number of hectads above 100.

Where taxa have yet to be reassessed under the Species Status Reviews, they formally retain their status based on historical reviews, which may date back to the late 1980s or early 1990s. These status' should be treated with caution as it is likely a significant proportion are no longer accurate, either due to a better understanding of their ecology, or have subsequently spread due to climate change or other amenable factors (e.g. they are more frequent and no longer deserve a nature conservation status); or they have declined; and may merit upgrading to a threat category.

Nationally Notable - species recorded, or likely to be restricted to 16 - 100 hectads in Britain. Historically, for some better recorded invertebrate taxa, they were further divided between Notable-A (Na) for species thought to occur in 30 or fewer hectads, and Notable-B (Nb) for those thought to occur between 31-100 hectads. These are referred to as Nationally Scarce (Na), or Nationally Scarce (Nb). Within Pantheon, some status' have been placed in square brackets, e.g. [Nationally Scarce (Nb)]. This denotes that in the professional judgement of the specialists (Webb *et al.*, 2018), this status is unreliable, but they have not been formally assessed against up to date criteria. The species are included in the relevant table in this report for the avoidance of doubt.

Red Data Book (RDB) species –species occurring in fewer than 16 10-km squares of the National Grid, divided as:

RDB 1: Endangered - for species known from a single population or in continuous recent decline and now known from five or fewer 10-km squares;

RDB 2: Vulnerable - likely to become endangered (RDB 1) if causal factors continue;

RDB 3: Rare: - species at risk but not qualifying as vulnerable; and

RDB K: Insufficiently Known - species likely to qualify at least as rare.

UK Biodiversity Action Planning

Species of Principal Importance as listed in Section 41 of the National Environment and Rural Communities Act, 2006. These are abbreviated as NERC-S41. Approximately 70 species of moth have been included in a list which proposes 'for Research only'; a frequently encountered example is the cinnabar (*Tyria jacobaeae*). These are widespread species which are believed to have experienced a decline and have been included to enable funding to be allocated for research. These species have not been included in Table 4.

²⁰ Joint Nature Conservation Committee, <http://jncc.defra.gov.uk/page-3408>

UK Legal Protection

Approximately 50 species of invertebrate species in Britain receive legal protection through Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). About half receive limited protection; for example it is illegal to sell, or advertise for sale, a number of butterfly species. The remaining 28 species are more strictly protected, for example it is an offence to take or kill specimens without an appropriate licence. These species are generally extremely rare, restricted to a few, or a single site and none are likely to occur anywhere in the region.

IUCN Threat Categories

In recent years, invertebrate taxa in Great Britain have been assessed against the International Union for the Conservation of Nature's (IUCN) threat criteria that considers factors influencing a species survival. These include population decline or geographic contraction through habitat loss. These assessments are ongoing as part of the Species Status Reviews, overseen by the Joint Nature Conservation Committee and mostly published by Natural England. The criteria are defined by the IUCN, which places an assessed taxon in one of seven categories from Extinct down to Least Concern, based on one of the five main criteria. The following categories are defined as Threatened (Red List):

Critically Endangered (CR): A taxon is Critically Endangered when the best available evidence indicates that it is considered to be facing an extremely high risk of extinction in the wild.

Endangered (EN): A taxon is Endangered when the best available evidence indicates that it is considered to be facing a very high risk of extinction in the wild.

Vulnerable (VU): A taxon is Vulnerable when the best available evidence indicates that it is considered to be facing a high risk of extinction in the wild.

A further category, Near Threatened (NT), is applied to a taxon, which following assessment, came close to, but failed to qualify as a Threatened species. However, it is considered that if the factors influencing its assessment continue, it is likely to move in to one of the threat categories; and thus it acts as a watching brief.

C. **Annex C: Species Lists**

Table 8: Species recorded at Coatham Dunes, near Redcar during 2020.

Class	Order	Family	Taxon	Vernacular	National Status
Arachnida	Araneae	Mimetidae	<i>Ero cambridgei</i>		
Arachnida	Araneae	Theridiidae	<i>Episinus angulatus</i>		
Arachnida	Araneae	Theridiidae	<i>Neottiura bimaculata</i>		
Arachnida	Araneae	Theridiidae	<i>Enoplognatha thoracica</i>		
Arachnida	Araneae	Theridiidae	<i>Pholcomma gibbum</i>		
Arachnida	Araneae	Linyphiidae	<i>Walckenaeria acuminata</i>		
Arachnida	Araneae	Linyphiidae	<i>Walckenaeria antica</i>		
Arachnida	Araneae	Linyphiidae	<i>Walckenaeria unicornis</i>		
Arachnida	Araneae	Linyphiidae	<i>Walckenaeria vigilax</i>		
Arachnida	Araneae	Linyphiidae	<i>Dismodicus bifrons</i>		
Arachnida	Araneae	Linyphiidae	<i>Hypomma bituberculatum</i>		
Arachnida	Araneae	Linyphiidae	<i>Baryphyma trifrons</i>		
Arachnida	Araneae	Linyphiidae	<i>Gonatium rubens</i>		
Arachnida	Araneae	Linyphiidae	<i>Maso sundevalli</i>		
Arachnida	Araneae	Linyphiidae	<i>Pocadicnemis pumila sens. str.</i>		
Arachnida	Araneae	Linyphiidae	<i>Trichopternoides thorelli</i>	formerly Trichopterna thorelli	
Arachnida	Araneae	Linyphiidae	<i>Silometopus elegans</i>		
Arachnida	Araneae	Linyphiidae	<i>Silometopus incurvatus</i>		Vulnerable; Nationally Rare; SoPI
Arachnida	Araneae	Linyphiidae	<i>Cnephalocotes obscurus</i>		
Arachnida	Araneae	Linyphiidae	<i>Styloctetor compar</i>	formerly Ceratinopsis stativa	Nationally Scarce
Arachnida	Araneae	Linyphiidae	<i>Tiso vagans</i>		
Arachnida	Araneae	Linyphiidae	<i>Tapinocyba praecox</i>		
Arachnida	Araneae	Linyphiidae	<i>Erigone dentipalpis</i>		

Class	Order	Family	Taxon	Vernacular	National Status
Arachnida	Araneae	Linyphiidae	<i>Ostearius melanopygius</i>		
Arachnida	Araneae	Linyphiidae	<i>Agyneta saxatilis sens. str.</i>	formerly Meioneta saxatilis sens. str.	
Arachnida	Araneae	Linyphiidae	<i>Centromerita concinna</i>		
Arachnida	Araneae	Linyphiidae	<i>Bathypantes gracilis</i>		
Arachnida	Araneae	Linyphiidae	<i>Kaestneria pullata</i>		
Arachnida	Araneae	Linyphiidae	<i>Stemonyphantes lineatus</i>		
Arachnida	Araneae	Linyphiidae	<i>Tenuiphantes tenuis</i>	Lepthyphantes tenuis	
Arachnida	Araneae	Linyphiidae	<i>Tenuiphantes zimmermanni</i>	formerly Lepthyphantes zimmermanni	
Arachnida	Araneae	Linyphiidae	<i>Tenuiphantes mengei</i>	formerly Lepthyphantes mengei	
Arachnida	Araneae	Linyphiidae	<i>Palliduphantes ericaeus</i>	formerly Lepthyphantes ericaeus	
Arachnida	Araneae	Linyphiidae	<i>Microlinyphia pusilla</i>		
Arachnida	Araneae	Tetragnathidae	<i>Pachygnatha degeeri</i>		
Arachnida	Araneae	Lycosidae	<i>Pardosa pullata</i>		
Arachnida	Araneae	Lycosidae	<i>Pardosa nigriceps</i>		
Arachnida	Araneae	Lycosidae	<i>Trochosa terricola</i>		
Arachnida	Araneae	Pisauridae	<i>Pisaura mirabilis</i>		
Arachnida	Araneae	Dictynidae	<i>Dictyna arundinacea</i>		
Arachnida	Araneae	Clubionidae	<i>Clubiona reclusa</i>		
Arachnida	Araneae	Clubionidae	<i>Clubiona neglecta sens. str.</i>		
Arachnida	Araneae	Clubionidae	<i>Clubiona diversa</i>		
Arachnida	Araneae	Philodromidae	<i>Philodromus cespitum</i>		
Arachnida	Araneae	Philodromidae	<i>Rhysodromus fallax</i>	formerly Philodromus fallax	Vulnerable; Nationally Rare; SoPI
Arachnida	Araneae	Thomisidae	<i>Xysticus cristatus</i>		
Arachnida	Araneae	Thomisidae	<i>Ozyptila trux</i>		

Class	Order	Family	Taxon	Vernacular	National Status
Arachnida	Araneae	Thomisidae	<i>Ozyptila brevipes</i>		
Arachnida	Araneae	Salticidae	<i>Heliophanus flavipes</i>		
Arachnida	Araneae	Salticidae	<i>Euophrys frontalis</i>		
Arachnida	Araneae	Salticidae	<i>Talavera aequipes</i>		
Arachnida	Opiliones	Phalangidae	<i>Lacinius ephippiatus</i>		
Gastropoda	Pulmonata	Helicidae	<i>Cepaea nemoralis</i>	Brown-lipped Snail	
Gastropoda	Pulmonata	Helicidae	<i>Cornu aspersum</i>	Garden Snail	
Insecta	Coleoptera	Carabidae	<i>Notiophilus aquaticus</i>		
Insecta	Coleoptera	Carabidae	<i>Notiophilus palustris</i>		
Insecta	Coleoptera	Carabidae	<i>Trechus obtusus</i>		
Insecta	Coleoptera	Carabidae	<i>Bembidion clarkii</i>		
Insecta	Coleoptera	Carabidae	<i>Calathus cinctus</i>		
Insecta	Coleoptera	Carabidae	<i>Calathus melanocephalus</i>		
Insecta	Coleoptera	Carabidae	<i>Olisthopus rotundatus</i>		
Insecta	Coleoptera	Carabidae	<i>Amara aenea</i>		
Insecta	Coleoptera	Carabidae	<i>Amara lunicollis</i>		
Insecta	Coleoptera	Carabidae	<i>Amara tibialis</i>		
Insecta	Coleoptera	Carabidae	<i>Bradycellus verbasci</i>		
Insecta	Coleoptera	Carabidae	<i>Trichocellus placidus</i>		
Insecta	Coleoptera	Carabidae	<i>Acupalpus dubius</i>		
Insecta	Coleoptera	Carabidae	<i>Badister bullatus</i>		
Insecta	Coleoptera	Carabidae	<i>Demetrias atricapillus</i>		
Insecta	Coleoptera	Carabidae	<i>Paradromius linearis</i>		
Insecta	Coleoptera	Carabidae	<i>Philorhizus melanocephalus</i>		

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Coleoptera	Carabidae	<i>Philorhizus notatus</i>		
Insecta	Coleoptera	Carabidae	<i>Syntomus foveatus</i>		
Insecta	Coleoptera	Ptiliidae	<i>Ptenidium fuscicorne</i>		
Insecta	Coleoptera	Leiodidae	<i>Colon serripes</i>		
Insecta	Coleoptera	Staphylinidae	<i>Anthobium unicolor</i>		
Insecta	Coleoptera	Staphylinidae	<i>Metopsia clypeata</i>		
Insecta	Coleoptera	Staphylinidae	<i>Sepedophilus nigripennis</i>		
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus dispar</i>		
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus nitidulus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus obtusus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus pusillus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus solutus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Tachyporus tersus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Ischnosoma splendidum</i>		
Insecta	Coleoptera	Staphylinidae	<i>Lordithon thoracicus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Amischa analis</i>		
Insecta	Coleoptera	Staphylinidae	<i>Liogluta microptera</i>		
Insecta	Coleoptera	Staphylinidae	<i>Mocyta fungi agg.</i>		
Insecta	Coleoptera	Staphylinidae	<i>Aleochara bipustulata</i>		
Insecta	Coleoptera	Staphylinidae	<i>Cypha longicornis</i>		
Insecta	Coleoptera	Staphylinidae	<i>Stenus bimaculatus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Stenus clavicornis</i>		
Insecta	Coleoptera	Staphylinidae	<i>Stenus junco</i>		
Insecta	Coleoptera	Staphylinidae	<i>Stenus brunripes</i>		

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Coleoptera	Staphylinidae	<i>Stenus fulvicornis</i>		
Insecta	Coleoptera	Staphylinidae	<i>Stenus latifrons</i>		
Insecta	Coleoptera	Staphylinidae	<i>Stenus impressus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Stenus ossium</i>		
Insecta	Coleoptera	Staphylinidae	<i>Quedius semiobscurus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Othius laeviusculus</i>		
Insecta	Coleoptera	Staphylinidae	<i>Xantholinus linearis</i>		
Insecta	Coleoptera	Elateridae	<i>Hypnoidus riparius</i>		
Insecta	Coleoptera	Cantharidae	<i>Cantharis cryptica</i>		
Insecta	Coleoptera	Cantharidae	<i>Cantharis lateralis</i>		
Insecta	Coleoptera	Cantharidae	<i>Cantharis pallida</i>		
Insecta	Coleoptera	Cantharidae	<i>Rhagonycha fulva</i>		
Insecta	Coleoptera	Kateretidae	<i>Brachypterolus linariae</i>		
Insecta	Coleoptera	Kateretidae	<i>Brachypterolus pulicarius</i>		
Insecta	Coleoptera	Nitidulidae	<i>Eपुरaea aestiva</i>		
Insecta	Coleoptera	Nitidulidae	<i>Meligethes aeneus</i>	Common Pollen Beetle	
Insecta	Coleoptera	Nitidulidae	<i>Meligethes planiusculus</i>		
Insecta	Coleoptera	Phalacridae	<i>Olibrus aeneus</i>		
Insecta	Coleoptera	Phalacridae	<i>Olibrus affinis</i>		
Insecta	Coleoptera	Phalacridae	<i>Olibrus liquidus</i>		
Insecta	Coleoptera	Cryptophagidae	<i>Micrambe woodroffeii</i>		
Insecta	Coleoptera	Cryptophagidae	<i>Micrambe ulicis</i>		
Insecta	Coleoptera	Cryptophagidae	<i>Atomaria scutellaris</i>		RDB K
Insecta	Coleoptera	Coccinellidae	<i>Rhyzobius litura</i>		

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Coleoptera	Coccinellidae	<i>Coccidula rufa</i>		
Insecta	Coleoptera	Coccinellidae	<i>Nephus redtenbacheri</i>		
Insecta	Coleoptera	Coccinellidae	<i>Psyllobora vigintiduopunctata</i>	22-spot Ladybird	
Insecta	Coleoptera	Coccinellidae	<i>Adalia decempunctata</i>	10-spot Ladybird	
Insecta	Coleoptera	Latridiidae	<i>Corticaria impressa</i>		
Insecta	Coleoptera	Latridiidae	<i>Corticarina minuta</i>		
Insecta	Coleoptera	Tenebrionidae	<i>Lagria hirta</i>		
Insecta	Coleoptera	Oedemeridae	<i>Oedemera lurida</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Bruchus loti</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Cassida rubiginosa</i>	Thistle Tortoise Beetle	
Insecta	Coleoptera	Chrysomelidae	<i>Galerucella lineola</i>	Brown Willow Beetle	
Insecta	Coleoptera	Chrysomelidae	<i>Sermylassa halensis</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Aphthona euphorbiae</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Aphthona nonstriata</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Longitarsus exoletus</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Longitarsus gracilis</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Longitarsus jacobaeae</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Longitarsus pratensis</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Longitarsus suturellus</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Altica lythri</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Neocrepidodera ferruginea</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Neocrepidodera transversa</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Sphaeroderma testaceum</i>		
Insecta	Coleoptera	Chrysomelidae	<i>Psylliodes chrysocephala</i>		

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Coleoptera	Apionidae	<i>Ceratapion gibbirostre</i>		
Insecta	Coleoptera	Apionidae	<i>Protapion apricans</i>		
Insecta	Coleoptera	Apionidae	<i>Protapion assimile</i>		
Insecta	Coleoptera	Apionidae	<i>Protapion nigrirtarse</i>		
Insecta	Coleoptera	Apionidae	<i>Perapion violaceum</i>		
Insecta	Coleoptera	Apionidae	<i>Stenopterapion meliloti</i>		
Insecta	Coleoptera	Apionidae	<i>Ischnopterapion loti</i>		
Insecta	Coleoptera	Apionidae	<i>Holotrichapion ononis</i>		
Insecta	Coleoptera	Apionidae	<i>Holotrichapion pisi</i>		
Insecta	Coleoptera	Curculionidae	<i>Otiorhynchus atroapterus</i>	Black Marram Weevil	
Insecta	Coleoptera	Curculionidae	<i>Romualdius angustisetulus</i>		
Insecta	Coleoptera	Curculionidae	<i>Phyllobius roboretanus</i>	Small Green Nettle Weevil	
Insecta	Coleoptera	Curculionidae	<i>Philopodon plagiatum</i>	Marram Weevil	
Insecta	Coleoptera	Curculionidae	<i>Sitona lepidus</i>		
Insecta	Coleoptera	Curculionidae	<i>Sitona lineatus</i>		
Insecta	Coleoptera	Curculionidae	<i>Sitona lineellus</i>		
Insecta	Coleoptera	Curculionidae	<i>Sitona sulcifrons</i>		
Insecta	Coleoptera	Curculionidae	<i>Hypera plantaginis</i>		
Insecta	Coleoptera	Curculionidae	<i>Hypera venusta</i>		
Insecta	Coleoptera	Curculionidae	<i>Orthochaetes setiger</i>		[Nationally Scarce (Nb)]
Insecta	Coleoptera	Curculionidae	<i>Micrelus ericae</i>	Small Heather Weevil	
Insecta	Coleoptera	Curculionidae	<i>Glocianus punctiger</i>		[Nationally Scarce (Nb)]
Insecta	Coleoptera	Curculionidae	<i>Ceutorhynchus obstrictus</i>		
Insecta	Coleoptera	Curculionidae	<i>Trichosirocalus barnevillei</i>		Nationally Scarce (Nb)

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Coleoptera	Curculionidae	<i>Trichosirocalus troglodytes</i>		
Insecta	Coleoptera	Curculionidae	<i>Nedyus quadrimaculatus</i>	Small Nettle Weevil	
Insecta	Coleoptera	Curculionidae	<i>Anthonomus rubi</i>	Strawberry Blossom Weevil	
Insecta	Coleoptera	Curculionidae	<i>Tychius melliloti</i>		
Insecta	Coleoptera	Curculionidae	<i>Mecinus pascuorum</i>		
Insecta	Coleoptera	Curculionidae	<i>Rhinusa antirrhini</i>		
Insecta	Coleoptera	Curculionidae	<i>Isochnus sequensi</i>		[RDB K]
Insecta	Diptera	Tipulidae	<i>Nephrotoma submaculosa</i>		
Insecta	Diptera	Rhagionidae	<i>Chrysopilus cristatus</i>		
Insecta	Diptera	Rhagionidae	<i>Rhagio lineola</i>		
Insecta	Diptera	Rhagionidae	<i>Rhagio scolopaceus</i>		
Insecta	Diptera	Rhagionidae	<i>Rhagio tringarius</i>		
Insecta	Diptera	Stratiomyidae	<i>Chloromyia formosa</i>		
Insecta	Diptera	Therevidae	<i>Acrosathe annulata</i>		
Insecta	Diptera	Therevidae	<i>Thereva bipunctata</i>		
Insecta	Diptera	Therevidae	<i>Thereva nobilitata</i>		
Insecta	Diptera	Asilidae	<i>Dysmachus trigonus</i>		
Insecta	Diptera	Asilidae	<i>Philonicus albiceps</i>		
Insecta	Diptera	Asilidae	<i>Leptogaster cylindrica</i>		
Insecta	Diptera	Asilidae	<i>Dioctria rufipes</i>		
Insecta	Diptera	Hybotidae	<i>Hybos culiciformis</i>		
Insecta	Diptera	Hybotidae	<i>Tachydromia umbrarum</i>		
Insecta	Diptera	Dolichopodidae	<i>Dolichopus unguatus</i>		
Insecta	Diptera	Syrphidae	<i>Melanostoma mellinum</i>	a hoverfly	

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Diptera	Syrphidae	<i>Paragus haemorrhous</i>	a hoverfly	
Insecta	Diptera	Syrphidae	<i>Eupeodes corollae</i>	a hoverfly	
Insecta	Diptera	Syrphidae	<i>Eupeodes luniger</i>	a hoverfly	
Insecta	Diptera	Syrphidae	<i>Sphaerophoria scripta</i>	a hoverfly	
Insecta	Diptera	Syrphidae	<i>Eristalis tenax</i>	a hoverfly	
Insecta	Diptera	Ulidiidae	<i>Herina frondescentiae</i>	a picture-winged fly	
Insecta	Diptera	Tephritidae	<i>Noeeta pupillata</i>		
Insecta	Diptera	Tephritidae	<i>Tephritis matricariae</i>		RDB K
Insecta	Diptera	Tephritidae	<i>Tephritis vespertina</i>		
Insecta	Diptera	Lauxaniidae	<i>Sapromyza quadripunctata</i>		
Insecta	Diptera	Chamaemyiidae	<i>Chamaemyia herbarum</i>		
Insecta	Diptera	Heterocheilidae	<i>Heterocheila buccata</i>		
Insecta	Diptera	Sciomyzidae	<i>Pherbellia cinerella</i>		
Insecta	Diptera	Sciomyzidae	<i>Coremacera marginata</i>		
Insecta	Diptera	Sciomyzidae	<i>Limnia unguicornis</i>		
Insecta	Diptera	Sciomyzidae	<i>Trypetoptera punctulata</i>		
Insecta	Diptera	Anthomyiidae	<i>Botanophila gnava</i>		
Insecta	Diptera	Anthomyiidae	<i>Botanophila seneciella</i>		
Insecta	Diptera	Anthomyiidae	<i>Delia platura</i>		
Insecta	Diptera	Anthomyiidae	<i>Pegoplata infirma</i>		
Insecta	Diptera	Muscidae	<i>Coenosia mollicula</i>		
Insecta	Diptera	Muscidae	<i>Coenosia pedella</i>		
Insecta	Diptera	Muscidae	<i>Coenosia testacea</i>		
Insecta	Diptera	Muscidae	<i>Coenosia tigrina</i>		

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Diptera	Muscidae	<i>Schoenomyza litorella</i>		
Insecta	Diptera	Muscidae	<i>Helina evecta</i>		
Insecta	Diptera	Muscidae	<i>Helina protuberans</i>		
Insecta	Diptera	Muscidae	<i>Helina reversio</i>		
Insecta	Diptera	Muscidae	<i>Helina setiventris</i>		
Insecta	Diptera	Calliphoridae	<i>Bellardia viarum</i>		
Insecta	Diptera	Calliphoridae	<i>Calliphora vicina</i>		
Insecta	Diptera	Rhinophoridae	<i>Phyto melanocephala</i>		
Insecta	Diptera	Rhinophoridae	<i>Rhinophora lepida</i>		
Insecta	Diptera	Sarcophagidae	<i>Senotainia conica</i>		
Insecta	Diptera	Sarcophagidae	<i>Sarcophaga vagans</i>		
Insecta	Diptera	Sarcophagidae	<i>Sarcophaga nigriventris</i>		
Insecta	Diptera	Tachinidae	<i>Lypha dubia</i>		
Insecta	Hemiptera, Auchenorrhyncha	Aphrophoridae	<i>Philaenus spumarius</i>		
Insecta	Hemiptera, Auchenorrhyncha	Aphrophoridae	<i>Neophilaenus lineatus</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Megophthalmus scanicus</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Macropsis fuscula</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Agallia brachyptera</i>		Nationally Scarce (Nb)
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Agallia consobrina</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Eupelix cuspidata</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Anoscopus albifrons</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Adarrus ocellaris</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Conosanus obsoletus</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Macustus grisescens</i>		

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Mocydia crocea</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Dikraneura variata</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Eupteryx atropunctata</i>		
Insecta	Hemiptera, Auchenorrhyncha	Cicadellidae	<i>Eupteryx notata</i>		
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	<i>Kelisia sabulicola</i>		
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	<i>Stenocranus major</i>		
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	<i>Stenocranus minutus</i>		
Insecta	Hemiptera, Auchenorrhyncha	Delphacidae	<i>Delphacodes venosus</i>		
Insecta	Hemiptera, Heteroptera	Pentatomidae	<i>Dolycoris baccarum</i>	Hairy Shieldbug	
Insecta	Hemiptera, Heteroptera	Pentatomidae	<i>Palomena prasina</i>	Common Green Shieldbug	
Insecta	Hemiptera, Heteroptera	Pentatomidae	<i>Picromerus bidens</i>	Spiked Shieldbug	
Insecta	Hemiptera, Heteroptera	Rhopalidae	<i>Corizus hyoscyami</i>		
Insecta	Hemiptera, Heteroptera	Rhopalidae	<i>Myrmus miriformis</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Cymus glandicolor</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Ischnodemus sabuleti</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Kleidocerys resedae</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Peritrechus geniculatus</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Scolopostethus decoratus</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Scolopostethus grandis</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Scolopostethus puberulus</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Scolopostethus thomsoni</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Stygnocoris fuliginus</i>		
Insecta	Hemiptera, Heteroptera	Lygaeidae	<i>Stygnocoris sabulosus</i>		
Insecta	Hemiptera, Heteroptera	Berytidae	<i>Gampsocoris punctipes</i>		

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Hemiptera, Heteroptera	Tingidae	<i>Acalypta parvula</i>		
Insecta	Hemiptera, Heteroptera	Tingidae	<i>Tingis ampliata</i>		
Insecta	Hemiptera, Heteroptera	Nabidae	<i>Himacerus major</i>		
Insecta	Hemiptera, Heteroptera	Nabidae	<i>Nabis ferus</i>		
Insecta	Hemiptera, Heteroptera	Miridae	<i>Capsus ater</i>		
Insecta	Hemiptera, Heteroptera	Miridae	<i>Charagochilus gyllenhalii</i>		
Insecta	Hemiptera, Heteroptera	Miridae	<i>Dicyphus annulatus</i>		
Insecta	Hemiptera, Heteroptera	Miridae	<i>Leptopterna ferrugata</i>		
Insecta	Hemiptera, Heteroptera	Miridae	<i>Macrotylus paykullii</i>		
Insecta	Hemiptera, Heteroptera	Miridae	<i>Notostira elongata</i>		
Insecta	Hemiptera, Heteroptera	Miridae	<i>Phytocoris varipes</i>		
Insecta	Hemiptera, Heteroptera	Miridae	<i>Stenodema calcarata</i>		
Insecta	Hemiptera, Heteroptera	Miridae	<i>Stenodema laevigata</i>		
Insecta	Hymenoptera	Formicidae	<i>Formica fusca</i>	an ant	
Insecta	Hymenoptera	Formicidae	<i>Formica lemani</i>	an ant	
Insecta	Hymenoptera	Formicidae	<i>Lasius flavus</i>	an ant	
Insecta	Hymenoptera	Formicidae	<i>Myrmica ruginodis</i>	an ant	
Insecta	Hymenoptera	Pompilidae	<i>Episyron rufipes</i>	Red Legged Spider Wasp	
Insecta	Hymenoptera	Pompilidae	<i>Pompilus cinereus</i>	Leaden Spider Wasp	
Insecta	Hymenoptera	Sphecidae	<i>Ammophila sabulosa</i>	Red Banded Sand Wasp	
Insecta	Hymenoptera	Crabronidae	<i>Argogorytes fargei</i>	a digger wasp	Nationally Scarce (Na)
Insecta	Hymenoptera	Crabronidae	<i>Crabro cribrarius</i>	Slender Bodied Digger Wasp	
Insecta	Hymenoptera	Crabronidae	<i>Ectemnius continuus</i>	a digger wasp	
Insecta	Hymenoptera	Crabronidae	<i>Gorytes quadrifasciatus</i>	4-banded Digger Wasp	

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Hymenoptera	Crabronidae	<i>Trypoxylon medium</i>	a digger wasp	
Insecta	Hymenoptera	Apidae	<i>Bombus lapidarius</i>	Large Red Tailed Bumble Bee	
Insecta	Hymenoptera	Apidae	<i>Bombus pascuorum</i>	Common Carder Bee	
Insecta	Hymenoptera	Apidae	<i>Bombus pratorum</i>	Early Bumble Bee	
Insecta	Hymenoptera	Apidae	<i>Bombus terrestris</i>	Buff-tailed Bumble Bee	
Insecta	Hymenoptera	Apidae	<i>Coelioxys elongata</i>	a cuckoo bee	
Insecta	Hymenoptera	Halictidae	<i>Halictus tumulorum</i>	a mining bee	
Insecta	Hymenoptera	Colletidae	<i>Hylaeus hyalinatus</i>	a solitary bee	
Insecta	Hymenoptera	Halictidae	<i>Lasioglossum albipes</i>	a mining bee	
Insecta	Hymenoptera	Halictidae	<i>Lasioglossum cupromicans</i>	a mining bee	
Insecta	Hymenoptera	Halictidae	<i>Lasioglossum lativentre</i>	a mining bee	
Insecta	Hymenoptera	Halictidae	<i>Lasioglossum leucozonium</i>	a mining bee	
Insecta	Hymenoptera	Halictidae	<i>Lasioglossum villosulum</i>	Shaggy Mining Bee	
Insecta	Hymenoptera	Megachilidae	<i>Megachile circumcincta</i>	a leaf-cutter bee	
Insecta	Hymenoptera	Megachilidae	<i>Megachile willughbiella</i>	Willughby's Leaf-cutter Bee	
Insecta	Hymenoptera	Cynipidae	<i>Phanacis hypochoeridis</i>	a gall wasp	
Insecta	Hymenoptera	Tenthredinidae	<i>Dolerus aericeps</i>	a sawfly	
Insecta	Lepidoptera	Zygaenidae	<i>Zygaena lonicerae</i>	Narrow-bordered Five-spot Burnet	
Insecta	Lepidoptera	Hesperiidae	<i>Erynnis tages</i>	Dingy Skipper	Vulnerable; SoPI
Insecta	Lepidoptera	Hesperiidae	<i>Thymelicus sylvestris</i>	Small Skipper	
Insecta	Lepidoptera	Pieridae	<i>Pieris brassicae</i>	Large White	
Insecta	Lepidoptera	Nymphalidae	<i>Lasiommata megera</i>	Wall	Near Threatened; SoPI
Insecta	Lepidoptera	Nymphalidae	<i>Coenonympha pamphilus</i>	Small Heath	Near Threatened; SoPI
Insecta	Lepidoptera	Nymphalidae	<i>Aphantopus hyperantus</i>	Ringlet	

Class	Order	Family	Taxon	Vernacular	National Status
Insecta	Lepidoptera	Nymphalidae	<i>Maniola jurtina</i>	Meadow Brown	
Insecta	Lepidoptera	Nymphalidae	<i>Hipparchia semele</i>	Grayling	Vulnerable; SoPI
Insecta	Lepidoptera	Nymphalidae	<i>Speyeria aglaja</i>	Dark Green Fritillary	
Insecta	Lepidoptera	Lycaenidae	<i>Polyommatus icarus</i>	Common Blue	
Insecta	Lepidoptera	Geometridae	<i>Camptogramma bilineata</i>	Yellow Shell	
Insecta	Lepidoptera	Erebidae	<i>Phragmatobia fuliginosa</i>	Ruby Tiger	
Insecta	Lepidoptera	Erebidae	<i>Tyria jacobaeae</i>	Cinnabar	SoPI - Research Only
Insecta	Odonata	Libellulidae	<i>Orthetrum cancellatum</i>	Black-tailed Skimmer	
Insecta	Psocoptera	Elipsocidae	<i>Protopsocus pulchripennis</i>		
Malacostraca	Isopoda	Philosciidae	<i>Philoscia muscorum</i>	Common Striped Woodlouse	
Malacostraca	Isopoda	Oniscidae	<i>Oniscus asellus</i>	Common Shiny Woodlouse	

Table 9: Stenotopic species recorded within Coatham Dunes in 2020.

Order	Family	Species	Conservation status	SAT Code and Title	
Hymenoptera	Crabronidae	<i>Ectemnius continuus</i>		A212, F001: Bark & sapwood decay, Scrub edge	
Hymenoptera	Megachilidae	<i>Coelioxys elongata</i>		A212, F002: Bark & sapwood decay, Rich flower resource	
Hymenoptera	Colletidae	<i>Hylaeus hyalinatus</i>			
Hymenoptera	Megachilidae	<i>Megachile willughbiella</i>			
Coleoptera	Curculionidae	<i>Anthonomus rubi</i>			
Diptera	Asilidae	<i>Dioctria rufipes</i>		F001: Scrub edge	
Hymenoptera	Formicidae	<i>Formica fusca</i>			
Hymenoptera	Formicidae	<i>Formica lemani</i>			
Araneae	Salticidae	<i>Heliophanus flavipes</i>			
Araneae	Lycosidae	<i>Pardosa nigriceps</i>			
Hymenoptera	Crabronidae	<i>Trypoxylon medium</i>			
Hymenoptera	Apidae	<i>Bombus lapidarius</i>			F002: Rich flower resource
Hymenoptera	Apidae	<i>Bombus pascuorum</i>			
Hymenoptera	Apidae	<i>Bombus pratorum</i>			
Hymenoptera	Apidae	<i>Bombus terrestris</i>			
Hymenoptera	Halictidae	<i>Halictus tumulorum</i>			
Hymenoptera	Halictidae	<i>Lasioglossum albipes</i>			
Hymenoptera	Halictidae	<i>Lasioglossum cupromicans</i>			
Hymenoptera	Halictidae	<i>Lasioglossum lativentre</i>			
Hymenoptera	Halictidae	<i>Lasioglossum leucozonium</i>			
Hymenoptera	Halictidae	<i>Lasioglossum villosulum</i>			
Hymenoptera	Megachilidae	<i>Megachile circumcincta</i>		F002, F111: Rich flower resource, Bare sand & chalk	
Coleoptera	Curculionidae	<i>Micrelus ericae</i>		F003: Scrub-heath & moorland	

Order	Family	Species	Conservation status	SAT Code and Title
Coleoptera	Carabidae	<i>Notiophilus aquaticus</i>		F111: Bare sand & chalk
Hemiptera	Lygaeidae	<i>Scolopostethus decoratus</i>		
Diptera	Therevidae	<i>Acrosathe annulata</i>		
Coleoptera	Carabidae	<i>Calathus cinctus</i>		
Hemiptera	Rhopalidae	<i>Corizus hyoscyami</i>		
Hymenoptera	Crabronidae	<i>Crabro cribrarius</i>		
Diptera	Asilidae	<i>Dysmachus trigonus</i>		
Hymenoptera	Pompilidae	<i>Episyron rufipes</i>		
Lepidoptera	Nymphalidae	<i>Hipparchia semele</i>	Section 41 Priority Species; VU	
Hemiptera	Delphacidae	<i>Kelisia sabulicola</i>		
Diptera	Tipulidae	<i>Nephrotoma submaculosa</i>		
Coleoptera	Curculionidae	<i>Otiorhynchus atroapterus</i>		
Araneae	Philodromidae	<i>Philodromus fallax</i>	NR; Section 41 Priority Species; VU	
Diptera	Asilidae	<i>Philonicus albiceps</i>		
Coleoptera	Curculionidae	<i>Philopodon plagiatum</i>		
Hymenoptera	Pompilidae	<i>Pompilus cinereus</i>		
Diptera	Sarcophagidae	<i>Senotainia conica</i>		
Araneae	Linyphiidae	<i>Silometopus incurvatus</i>	NR; Section 41 Priority Species; VU	
Araneae	Salticidae	<i>Talavera aequipes</i>		
Diptera	Therevidae	<i>Thereva bipunctata</i>		
Coleoptera	Curculionidae	<i>Trachyphloeus angustisetulus</i>		
Coleoptera	Curculionidae	<i>Trichosirocalus barnevillei</i>	Nb	
Hemiptera	Tingidae	<i>Acalypta parvula</i>		F112: Open short sward
Hemiptera	Miridae	<i>Charagochilus gyllenhalii</i>		

Order	Family	Species	Conservation status	SAT Code and Title
Lepidoptera	Nymphalidae	<i>Coenonympha pamphilus</i>	NT; Section 41 Priority Species	
Hemiptera	Miridae	<i>Dicyphus annulatus</i>		
Hemiptera	Cicadellidae	<i>Eupteryx notata</i>		
Hemiptera	Berytidae	<i>Gampsocoris punctipes</i>		
Coleoptera	Apionidae	<i>Holotrichapion ononis</i>		
Lepidoptera	Nymphalidae	<i>Lasiommata megera</i>	NT; Section 41 Priority Species	
Hymenoptera	Formicidae	<i>Lasius flavus</i>		
Coleoptera	Chrysomelidae	<i>Longitarsus exoletus</i>		
Hemiptera	Miridae	<i>Macrotylus paykulli</i>		
Coleoptera	Curculionidae	<i>Tychius meliloti</i>		
Coleoptera	Carabidae	<i>Bembidion clarkii</i>		
				W221: Undisturbed fluctuating marsh

D. Annex D: Site Photographs

Photograph 1: General view of flower-rich dune grasslands Coatham Dunes (June 2020).



Photograph 2: General view of sand dunes and flower-rich grasslands at Coatham. Photo: June 2020



Photograph 3: Example of bare ground and dunes, through to flower-rich grasslands. Photo: June 2020



Photograph 4: *Dysmachus trigonus* with prey at Coatham Dunes. Photo: June 2020.



Photograph 5: The stiletto fly, *Acrosathe annulata*, a dune specialist.



Photograph 6: General view looking inland illustrating the typical topography within the dune system.



Photograph 7: Taller grassland with abundant angelica, a superb pollinator resource in this vegetation community.



E. Annex E: Sites Scoped for Further Survey

Introduction

As stated in the main report (Section 1.2.1), four additional land parcels were scoped to determine if further terrestrial invertebrate surveys would be required. The four sites, for ease of reference, are listed again:

- Main Dike Corridor (NZ 576 235 to NZ 586 211);
- Grangetown Woodland (NZ 559 198);
- Lazenby Woodlands (NZ 569 199); and
- Seal Sands Compound (NZ 526 244).

The sites were walked over in late May 2020 and notes taken to describe features and habitats which are considered likely to support invertebrate assemblages or species of nature conservation value. Photographs were also taken to inform the consideration.

The site walkover was restricted to public rights of way or the public highway and so for the larger sites, the scoping was restricted to the viewshed available from these positions. The relevant constraints are discussed in the separate headings below.

Main Dike Corridor

The Main Dike Corridor is a narrow strip of land linking the Lord McGowan Bridge roundabout to the Mains Dike Bridge roundabout to the south, on the eastern side of the Wilton Works. The corridor follows the channel of the Mains Dike, a straight linear watercourse for a distance of approximately 2.2 km. Access was on the public footpath off Hobson Avenue, Dormanstown.

The first 200 m (from the north) followed the western edge of Foxrush Farm Community Woodland, an immature deciduous plantation woodland which based on the ²¹Redcar & Cleveland Borough Council website, was planted in December 1997 on former agricultural land. To the south of this woodland and for the remaining length of the corridor, are arable fields. The Mains Dike is a narrow channel, which abuts the former Wilton Works, and there is a very narrow footpath with rank, tall grassland and vegetation such as common nettle (*Urtica dioica*) that typically occurs on nutrient enriched soils. In this instance, it is interpreted that whenever the Dike is maintained, the material that is cleared from the watercourse is deposited onto the embankment adjacent to the footpath.

Grangetown Woodland & Lazenby Woodlands

These two sites are dealt with together as they have similar origins, being planted as screening from the adjacent residential developments. The woodlands, known locally as Greystone Community and Lazenby Community Woodlands, are located to the west of the Wilton Works and on the eastern outskirts of Middlesbrough in the district of Eston (Greystone) or the village of Lazenby. The woodlands are immature plantations comprising stands of a mix of native species including cherries (*Prunus* spp.), rowan (*Sorbus aucuparia*), willows (*Salix* spp.) and sycamore (*Acer pseudoplatanus*).

The woodlands form a hard edge against amenity grasslands or arable land.

Again, none of the woodlands support habitats or contain features that are likely to support anything other than widespread and ubiquitous invertebrates associated with managed urban greenspace and no further survey is considered appropriate.

Seal Sands Compound

The Seal Sands compound is located on the north bank of Teesmouth within the borough of Stockton-on-Tees and vice-county 66: County Durham. Access to the site was only visible from the access road leading east from the Swiss Cottage roundabout and was largely obscured by existing infrastructure. At ground level, habitats were

²¹ Archived website (dated 2012) accessed: <http://web.archive.org/web/20120305173329/http://www.redcar-cleveland.gov.uk/main.nsf/Web+Full+List/10B84ADB4C00F87F80256CC3004A2634?OpenDocument>

observed looking east from approximately NZ 5223 2434 and comprised a mosaic of what is very likely to be Open Mosaic Habitat. Common bird's-foot trefoil (*Lotus corniculatus*) was abundant and given the known presence of dingy skipper (*Erynnis tages*), a Species of Principle Importance (SoPI) and IUCN Vulnerable species elsewhere including Coatham Dunes and brownfield land within the former Redcar Steelworks, it is considered very likely to be present within the compound.

Elsewhere and visible from the road are stands of common reed (*Phragmites australis*), scattered scrub, taller dry grassland and short perennial vegetation communities; all of which are considered to be likely to support invertebrate assemblages of interest. Based on the author's existing knowledge of the area, the compound is possibly of up to county nature conservation value for terrestrial invertebrates, though whether this applies uniformly, or there are relatively lower value habitat patches is not possible to say with any confidence in the absence of field survey.

Conclusions

The habitats within the Main Dike Corridor and the two woodland land parcels do not support habitats or features likely to support anything other than widespread and ubiquitous invertebrates associated with tall, rank vegetation, arable field margins, or plantation woodland as part of urban greenspace. No further invertebrate survey is considered appropriate or necessary to inform a planning application or Development Consent Order.

The habitats within the Seal Sands Compound are of relatively high value and are very likely to support at least one SoPI and quite possibly others such as wall (*Lasiommata megera*), a butterfly. In the absence of survey, it is not possible to provide with sufficient certainty an understanding of the distribution of ecological sensitive areas within this land parcel and which could inform appropriate levels of mitigation or biodiversity net gain to meet policy and legal obligations. It is therefore recommended, subject to further understanding of any development proposals, that further terrestrial invertebrate survey visits (up to four) is undertaken between April and September inclusive covering a range of suitable groups, of which pollinators (Diptera & aculeate Hymenoptera) and phytophagous beetles (Coleoptera) would be a priority.

Richard Wilson Ecology Limited
Parkhill Studio
Walton Road
Wetherby
LS22 5DZ

Email: [REDACTED]@yahoo.co.uk

Telephone: [REDACTED]

Company Registration No.: 11265028