



## **Lichen Survey at Sizewell Power Station**

Presented to Hyder / Arcadis

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## Lichen Survey at Sizewell Power Station

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### **1 Summary**

The diesel generators at the proposed Sizewell C Nuclear Power station will potentially have an impact on air quality in the vicinity. Lichens are widely acknowledged to be good indicators of air quality because many lichen species are sensitive to air-borne pollutants, especially sulphur dioxide (SO<sub>2</sub>) and atmospheric nitrogen compounds (e.g. Richardson, 1992). In 2015 Hyder / Arcadis commissioned Biocensus to conduct a lichen survey of an area that is most likely to be impacted by the operation of the diesel generators. The northern section of the study site lies within the Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC).

A range of habitats were surveyed in the study site. The main habitats with lichen interest were the dune grasslands, patches of dune heath and native broadleaved woodland. Additional interest was recorded on some patches of shingle, fence posts and the wartime coastal defences known as the 'dragon's teeth'.

The lichen flora was locally well-developed and adds significantly to the biodiversity of the study site with 69 lichen taxa recorded. No species of high conservation value were recorded. However the lichen assemblage of the dune system is of some conservation value at the local and possibly regional scale.

The operation of the diesel generators could potentially have a significant negative impact on the lichen flora. Potential impacts and advice on monitoring are given in a separate report: Lichen Survey at Sizewell Power Station: The Impacts of Changes in Air Quality, and Considerations For Monitoring.

## **2 Aims**

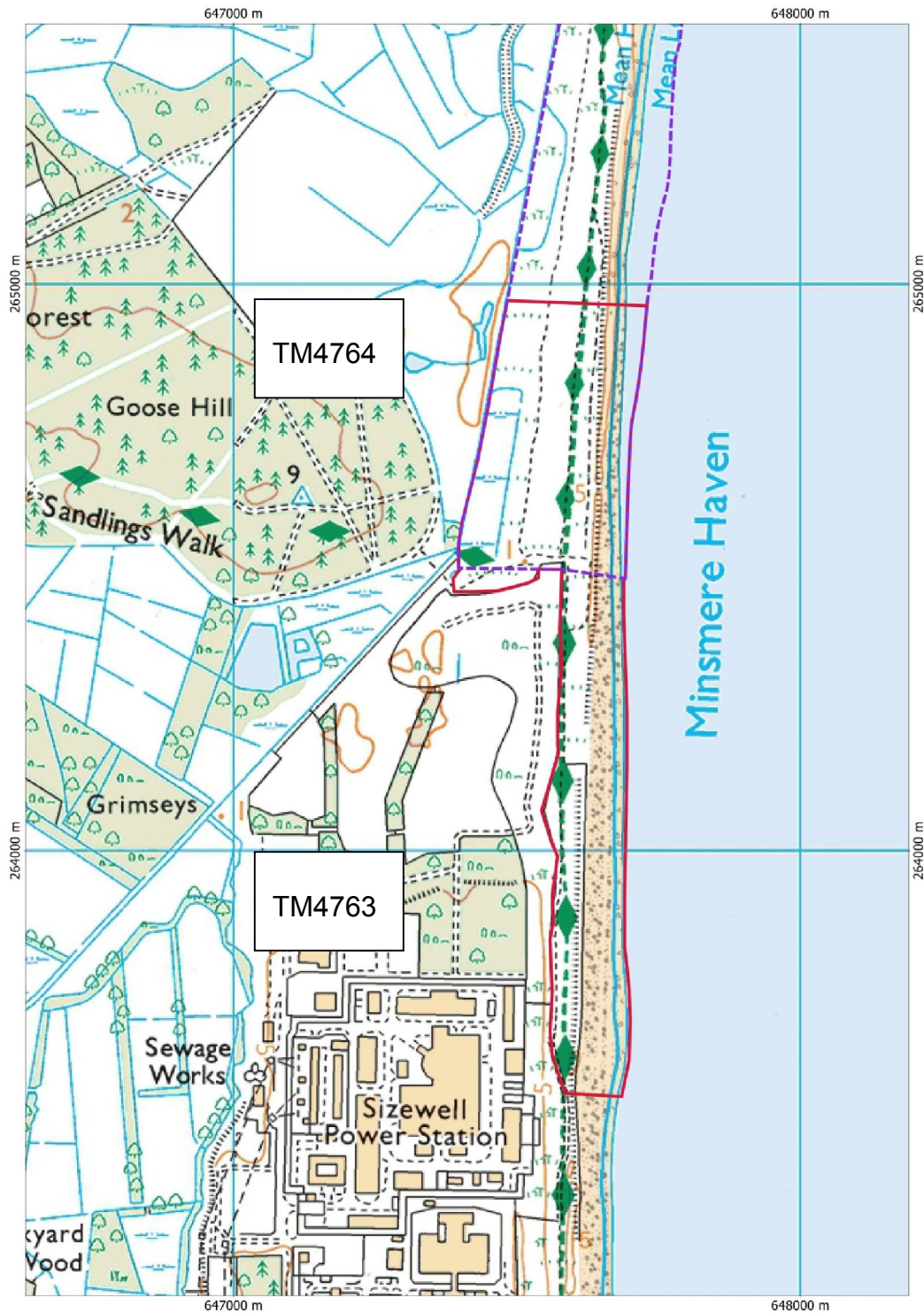
### **2.1 The project brief**

- Survey and assess the lichen flora within the study site (Figure 2.1).
- Assess the vulnerability of the lichen flora to any changes in air quality due to the operation of the diesel generators at the proposed Sizewell C Station.
- Advise on any long term monitoring that might be required by the Habitat Regulations Assessment (HRA)/Environmental Impact Assessment (EIA).

This report deals with the survey and assessment of the lichen flora. A separate report considers the impact of changes in air quality and gives consideration to lichen monitoring (Lichen Survey at Sizewell Power Station: The Impacts of Changes in Air Quality, and Considerations For Monitoring).

Figure 2.1 Map of the study site.

The red line indicates the boundary of the study site. The SAC boundary is indicated by the purple dotted line. Ordnance Survey © Crown Copyright 2015. All rights reserved. Licence number 100022432.



## 3 Methods

### 3.1 Field Methodology

The survey was carried out by Andy Acton (BA Hons. Oxon). The field survey took the form of a walkover survey of the study site. The site was surveyed over 2 days in dry weather (7-8 September 2015). Potential lichen habitats within the study site were briefly examined for conspicuous lichens, with a closer inspection where the lichen flora appeared particularly well developed. Survey effort concentrated on those habitats likely to support notable species and well-developed lichen communities (e.g. dune grassland, patches of lichen heath, old shrubs, and woodland/trees).

A list of lichen taxa was recorded and target notes were recorded to indicate the locations of well-developed lichen habitat, and species indicative of good quality lichen habitat etc. Locations of target notes were recorded with a Garmin eTrex H Global Positioning System (GPS).

Samples were collected of species that were not readily identifiable to species level in the field for subsequent identification in the laboratory using microscopes, chemical tests and the standard literature (e.g. Smith *et al.* 2009). Some samples were sent to Dr. Brian Coppins (formerly of the Royal Botanic Garden Edinburgh) for confirmation/identification.

### 3.2 Nomenclature

Nomenclature follows Smith *et al.* (2009). Conservation Status follows Woods & Coppins (2012). Conservation Status categories are LC = Least Concern (i.e. not threatened in GB though it may still be of conservation value), NE = not evaluated by Woods & Coppins, NS = Nationally Scarce and NR = Nationally Rare. Lichen taxa occurring in Britain are allocated a unique identifier by the British Lichen Society (BLS). This identifier is listed in tables in this report as the BLS number.

### 3.3 Constraints

Many lichens are very small and inconspicuous so easily overlooked without thorough searching which can be very time consuming. It is likely that species have been overlooked during this rapid survey, and this could possibly include notable lichens. This is most likely for inconspicuous species with 'look-a-likes', i.e. similar in appearance to other, less notable species; these require speculative sampling and critical examination in the laboratory (e.g. using microscopes).

Despite these potential constraints, the survey was considered sufficient to enable an assessment of lichen interest of the study site.

## 4 Results

### 4.1 General

Sixty nine lichen taxa were recorded during the survey (Table 4.1). These species were associated with dune grassland/heath and the associated scrub, coastal shingle, woodland, fence posts and concrete. The lichen interest of these habitats is described in sections 4.2-4.7.

Twenty one target notes were recorded to describe features of particular lichen interest. Target note (TN) locations are indicated on the map in Figure 4.1. Full details of the target notes are given in Appendix 1. Note that lichen interest is not confined to these target notes. Lichen interest occurs throughout much of the study site. The only areas where lichen flora is absent/negligible are along the disturbed ground of the sandy foreshore and mobile beach shingle, on very young shrubs, on very new fences, and in the area of reedbed.



Table 4.1 The sixty-nine lichen taxa recorded in the study site.

Conservation status follows Coppins & Coppins (2012) where LC = Least Concern (i.e. not threatened at the national scale), NS = Nationally Scarce and NR = Nationally Rare. BLS no. = British Lichen Society number.

BLS no.	Taxon name	Status	BLS no.	Taxon name	Status
0212	<i>Amandinea punctate</i>	LC	1996	<i>Lecanora compallens</i>	LC NS
0068	<i>Arthonia punctiformis</i>	LC	0646	<i>Lecanora dispersa</i>	LC
1742	<i>Arthonia ligniariella</i>	LC NS	0649	<i>Lecanora expallens</i>	LC
0069	<i>Arthonia radiate</i>	LC	0621	<i>Lecanora hagenii</i>	NE
	<i>Arthonia sp.</i>		0672	<i>Lecanora pulicaris</i>	LC
0140	<i>Bacidia chlorotricula</i>	LC NS	0688	<i>Lecanora symmicta</i>	LC
0130	<i>Bacidia neosquamulosa</i>	LC NS	0690	<i>Lecanora varia</i>	LC
0200	<i>Buellia aethalea</i>	LC	0797	<i>Lecidella elaeochroma</i> <i>f. elaeochroma</i>	LC
2442	<i>Caloplaca arcis</i>	LC NS	0820	<i>Lepraria incana s. lat.</i>	
2443	<i>Caloplaca dichroa</i>	LC NS	0998	<i>Melanelixia fuliginosa</i>	LC
2315	<i>Caloplaca flavocitrina</i>	LC	1020	<i>Melanelixia subaurifera</i>	LC
0267	<i>Caloplaca marina</i>	LC	0948	<i>Opegrapha herbarum</i>	LC
2461	<i>Caloplaca oasis</i>	LC	2542	<i>Opegrapha hochstetteri</i> in ed.	LC NR
0291	<i>Candelariella aurella f.</i> <i>aurella</i>	LC	1022	<i>Parmelia sulcata</i>	LC
0298	<i>Candelariella vitellina f.</i> <i>vitellina</i>	LC	1008	<i>Parmotrema perlatum</i>	LC
0306	<i>Catillaria chalybeia var.</i> <i>chalybeia</i>	LC	1039	<i>Peltigera canina</i>	LC
0430	<i>Cetraria aculeata</i>	LC	1053	<i>Peltigera didactyla</i>	LC
0371	<i>Cladonia chlorophaea s.</i> <i>lat.</i>	LC	1110	<i>Phlyctis argena</i>	LC
0372	<i>Cladonia ciliata var. ciliata</i>	LC	1112	<i>Physcia adscendens</i>	LC
0373	<i>Cladonia ciliata var. tenuis</i>	LC	1120	<i>Physcia tenella</i>	LC
0387	<i>Cladonia foliacea</i>	LC	0732	<i>Placynthiella icmalea</i>	LC
0389	<i>Cladonia furcata subsp.</i> <i>Furcate</i>	LC	2070	<i>Punctelia subrudecta s.</i> <i>str.</i>	LC
0376	<i>Cladonia humilis</i>	LC	1235	<i>Ramalina fastigiata</i>	LC
0396	<i>Cladonia macilenta</i>	LC	1289	<i>Rinodina oleae</i>	LC
0409	<i>Cladonia portentosa</i>	LC	1306	<i>Sarcogyne regularis</i>	LC
0359	<i>Cladonia ramulosa</i>	LC		<i>Trapelia sp.</i>	
0412	<i>Cladonia rangiformis</i>	LC		<i>Verrucaria aff. dolosa</i>	
0751	<i>Clauzadea monticola</i>	LC	1507	<i>Verrucaria muralis</i>	LC
0496	<i>Diplotomma alboatrum</i>	LC	1508	<i>Verrucaria murina</i>	LC NS
0511	<i>Evernia prunastri</i>	LC	1510	<i>Verrucaria nigrescens f.</i> <i>nigrescens</i>	LC
0987	<i>Flavoparmelia caperata</i>	LC		<i>Verrucaria sp.</i>	
0582	<i>Hypogymnia physodes</i>	LC	1526	<i>Xanthoria calcicola</i>	LC
0613	<i>Lecania cyrtella</i>	LC	1530	<i>Xanthoria parietina</i>	LC
0616	<i>Lecania erysibe s. str.</i>	LC	1531	<i>Xanthoria polycarpa</i>	LC
0159	<i>Lecania naegelii</i>	LC	1909	<i>Xanthoria ulophyllodes</i>	LC NS

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<b>BLS no.</b>	<b>Taxon name</b>	<b>Status</b>
0627	<i>Lecanora albescens</i>	LC
0636	<i>Lecanora carpinea</i>	LC
0639	<i>Lecanora chlarotera</i>	LC

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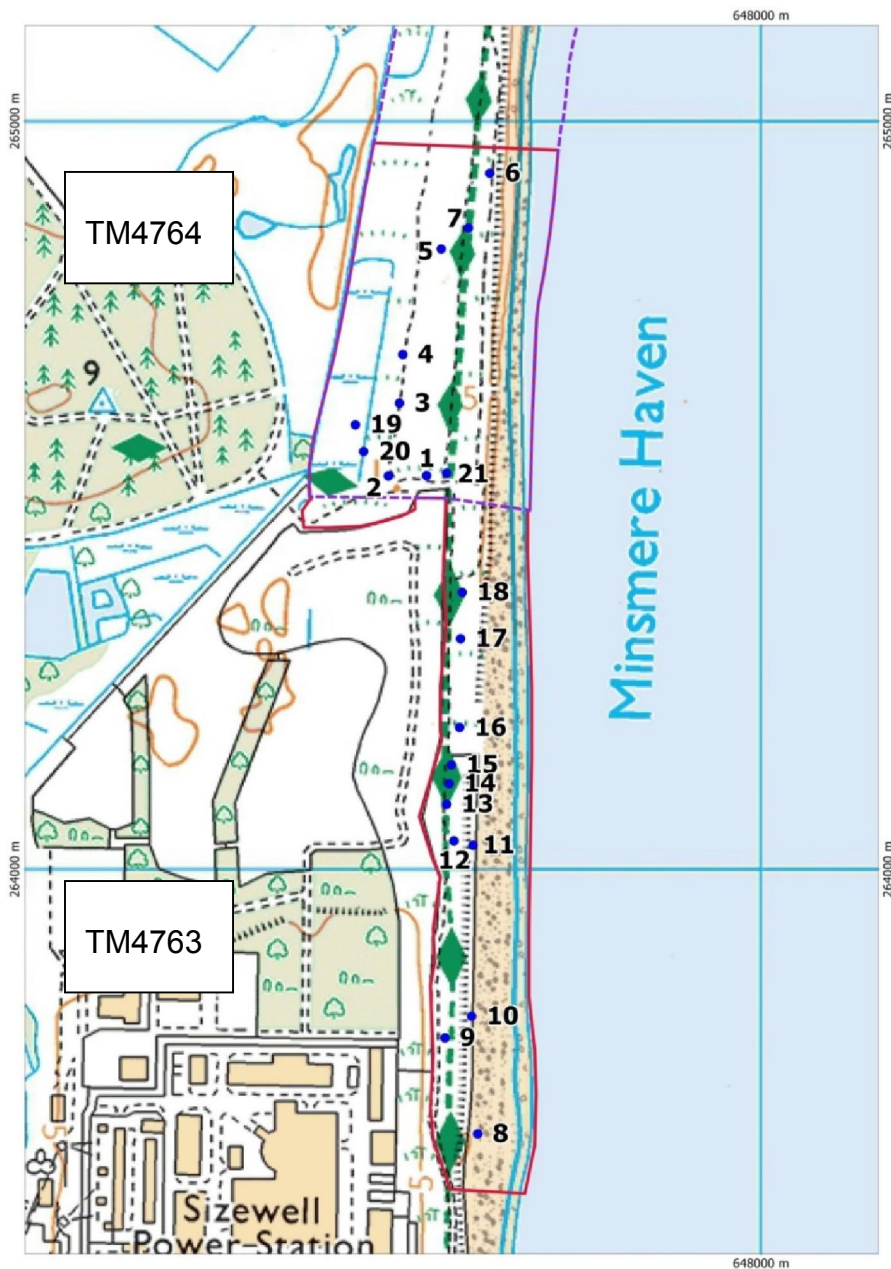
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<b>BLS no.</b>	<b>Taxon name</b>	<b>Status</b>
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Figure 4.1 Target note map.

The red line indicates the boundary of the study site, with numbered Target Notes. The SAC boundary is indicated by the purple dotted line. The Ordnance Survey 1km grid square numbers are shown. Ordnance Survey © Crown Copyright 2015. All rights reserved. Licence number 100022432.



## 4.2 Dune grassland

Dune grassland is the main semi-natural lichen habitat in the study site. Fixed dune grassland is an Annex 1 habitat, 2130 Fixed dunes with herbaceous vegetation (`grey dunes`) and lichens can be a prominent feature of dune grassland. Lichens are a prominent component of the flora of this habitat type in OS grid square TM4764. Fifteen species were recorded as terricolous (i.e. growing on soil or plant debris) in dune grassland (additional species were recorded on trees and scrub on the dune grassland). The lichen flora is generally dominated by *Cladonia* species with *Cladonia portentosa* and/or *Cladonia rangiformis* providing most of the cover. See *Table 4.2* and *Figures 4.2 – 4.5*.

Dune grassland is maintained in good condition for lichens by browsing. Where the vascular sward is suppressed the lichen cover can be high. Where the swards are tall and rank the lichen flora is much more species poor. The poorest area for dune grassland lichens is in the ranker swards that dominate in the south of the site (much of grid square TM4763). These ranker swards do support lichens but lichen cover is low and lichen diversity is low (e.g. TN9). It is important for the lichen flora that grazing (including rabbits) is maintained on site. The browsing is also important to help prevent the further encroachment of scrub onto the dune grassland.

Some areas of dune grassland in the southern section of the site (outwith the SAC) have some indicators of good quality fixed dune grassland habitat including locally abundant *Cetraria aculeate* (see TN13, 14, 15, 16) and *C. foliacea* (TN 13, 14, 17, 18). *C. aculeata* was not recorded within the SAC and *C. foliacea* was only noted once in the SAC (near TN2)

Table 4.2 Fifteen lichen taxa recorded growing on soil (i.e. terricolous) in dune grassland.

An additional sample collection of candidate *Placynthiella uliginosa* was unfortunately damaged in transit and so identification could not be confirmed. Conservation status follows Coppins & Coppins (2012) where LC = Least Concern (i.e. not threatened at the national scale) and NS = Nationally Scarce.

<b>BLS no.</b>	<b>Taxon name</b>	<b>Status</b>
1742	<i>Arthonia ligniariella</i>	LC NS
0430	<i>Cetraria aculeata</i>	LC
0371	<i>Cladonia chlorophaea</i> s. lat.	LC
0373	<i>Cladonia ciliata</i> var. <i>tenuis</i>	LC
0387	<i>Cladonia foliacea</i>	LC
0389	<i>Cladonia furcata</i> subsp. <i>furcata</i>	LC
0376	<i>Cladonia humilis</i>	LC
0396	<i>Cladonia macilenta</i>	LC
0409	<i>Cladonia portentosa</i>	LC
0359	<i>Cladonia ramulosa</i>	LC
0412	<i>Cladonia rangiformis</i>	LC
0511	<i>Evernia prunastri</i>	LC
1039	<i>Peltigera canina</i>	LC
1053	<i>Peltigera didactyla</i>	LC
0732	<i>Placynthiella icmalea</i>	LC

Figure 4.2 *Festuca-Cladina* dune grassland at TN1.



Figure 4.3 *Carex arenaria-Cladina* dune grassland at TN3.



Figure 4.4 Dune grassland at TN14 with locally abundant *Cladonia rangiformis* and some well-developed patches of *Cetraria aculeata* and *Cladonia foliacea*.



Figure 4.5 Dune grassland at TN16 with some exposed but stable shingly hollows and ridges. This area supported abundant *Cetraria aculeata*.



### 4.3 Costal lichen heath

Lichen heath is quite patchy across the site – often occurring as small patches within a matrix of dune grassland. Ericoids may have formerly been more widespread but have since been grazed out from large areas (e.g. those areas today without ericoids but with abundant *Cladonia portentosa* and *Cetraria aculeata*). If so, it is clear that patches of heath have persisted in the north of the site and here it appears that a recent relaxation in browsing has permitted ericoids to establish as quite dense (though usually still small) patches. Lichens are largely absent where the ericoid sward is very dense. Lichens can get a foothold where the ericoid sward is not so dense, often because it is suppressed or broken up by animal grazing/trampling (Figure 4.6). However, the lichens are generally best developed within the dune grassland matrix and the lichen flora of the heathy patches is species poor.

Table 4.3 Five lichen taxa recorded growing on soil (i.e. terricolous) in dune heath. Conservation status follows Coppins & Coppins (2012) where LC = Least Concern (i.e. not threatened at the national scale) and NS = Nationally Scarce.

<b>BLS no.</b>	<b>Taxon name</b>	<b>Status</b>
0409	<i>Cladonia portentosa</i>	LC
0389	<i>Cladonia furcata</i> subsp. <i>furcata</i>	LC
0732	<i>Placyntiella icmalea</i>	LC
0376	<i>Cladonia humilis</i>	LC
0372	<i>Cladonia ciliata</i> var. <i>ciliata</i>	LC



Figure 4.6 Coastal *Erica cinerea* heath at TN4.  
The lichens are best developed where the dense ericoid sward is broken by small tracks and depressions through the heathy patches caused by animal grazing/trampling.



#### 4.4 Shingle

Most of the shingle in the site is along the foreshore and is too mobile for lichen colonisation. However at one location the shingle is stable (TN8). This has a pioneer lichen flora of fifteen species that are common and widespread in Britain. The area is partially fenced, possibly to exclude trampling, and as the vascular flora becomes ranker many of the lichens are likely to be outcompeted. See Table 4.4 and Figures 4.7 – 4.9.

Table 4.4 Sixteen lichen taxa recorded on shingle or in the terricolous niche (either on soil or dead vascular plants) between the stones/pebbles.

Taxa listed were recorded on shingle unless the notes indicate otherwise. Conservation status follows Coppins & Coppins (2012) where LC = Least Concern (i.e. not threatened at the national scale) and NS = Nationally Scarce. The *Trapelia* sp. is possibly an undescribed species (Brian Coppins pers. comm.)

BLS no.	Taxon name	Status	Notes
0140	<i>Bacidia chlorotricula</i>	LC NS	
0212	<i>Amandinea punctata</i>	LC	
0613	<i>Lecania cyrtella</i>	LC	Terricolous on dead vascular stem
0627	<i>Lecanora albescens</i>	LC	
0646	<i>Lecanora dispersa</i>	LC	
0688	<i>Lecanora symmicta</i>	LC	Terricolous on dead vascular plant stem
0998	<i>Melanelixia fuliginosa</i>	LC	
1112	<i>Physcia adscendens</i>	LC	On shingle as well as terricolous on dead vascular plant stem
1120	<i>Physcia tenella</i>	LC	
1289	<i>Rinodina oleae</i>	LC	
	<i>Trapelia</i> sp.		Terricolous crust
	<i>Verrucaria</i> aff. <i>dolosa</i>		
1507	<i>Verrucaria muralis</i>	LC	
1508	<i>Verrucaria murina</i>	LC NS	
1530	<i>Xanthoria parietina</i>	LC	On shingle as well as terricolous on dead vascular plant stem
2315	<i>Caloplaca flavocitrina</i>	LC	

Figure 4.7 The shingle habitat at TN8.



Figure 4.8 Closer view of the shingle habitat (showing the distinctive yellow patches of *Xanthoria parietina*).



Figure 4.9 *Physcia adscendens* on shingle.



#### 4.5 Woodland

A belt of planted trees (mostly young birch) includes some older oaks (e.g. c. TN 19, 20). No notable species were recorded here but several epiphytes here were not recorded elsewhere so these trees add to the lichen biodiversity of the site (Table 4.5).

Table 4.5 Twenty two lichen taxa recorded on a belt of planted trees in the north of the site. All of these species were recorded on oak. Conservation status follows Coppins & Coppins (2012) where LC = Least Concern (i.e. not threatened at the national scale) and NS = Nationally Scarce.

<b>BLS no.</b>	<b>Taxon name</b>	<b>Status</b>
0212	<i>Amandinea punctata</i>	LC
0068	<i>Arthonia punctiformis</i>	LC
0069	<i>Arthonia radiata</i>	LC
0130	<i>Bacidia neosquamulosa</i>	LC NS
0511	<i>Evernia prunastri</i>	LC
0987	<i>Flavoparmelia caperata</i>	LC
0582	<i>Hypogymnia physodes</i>	LC
0639	<i>Lecanora chlarotera</i>	LC
0613	<i>Lecania cyrtella</i>	LC
0159	<i>Lecania naegelii</i>	LC
0797	<i>Lecidella elaeochroma</i> f. <i>elaeochroma</i>	LC
0820	<i>Lepraria incana</i> s. lat.	LC
0998	<i>Melanelixia fuliginosa</i>	LC
1020	<i>Melanelixia subaurifera</i>	LC
0948	<i>Opegrapha herbarum</i>	LC
1008	<i>Parmotrema perlatum</i>	LC
1022	<i>Parmelia sulcata</i>	LC
1110	<i>Phlyctis argena</i>	LC
1112	<i>Physcia adscendens</i>	LC
2070	<i>Punctelia subrudecta</i> s. str.	LC
1235	<i>Ramalina fastigiata</i>	LC
1530	<i>Xanthoria parietina</i>	LC

Additional species recorded on trees and scrub on dune grassland (including *Rosa* sp. *Ulex europaeus* and an unidentified tree) are listed in Table 4.6

Table 4.6 Additional epiphytes recorded on scrub and scattered trees growing on the dune grassland.

Conservation status follows Coppins & Coppins (2012) where LC = Least Concern (i.e. not threatened at the national scale) and NS = Nationally Scarce.

<b>BLS no.</b>	<b>Taxon name</b>	<b>Status</b>
0636	<i>Lecanora carpinea</i>	LC
1996	<i>Lecanora compallens</i>	LC NS
0621	<i>Lecanora hagenii</i>	NE
1120	<i>Physcia tenella</i>	LC
1531	<i>Xanthoria polycarpa</i>	LC
1909	<i>Xanthoria ulophyllodes</i>	LC NS

#### 4.6 Wooden fence posts and steps

The bare lignum of old wooden fencepost can often support a well-developed lichen flora. Most of the wooden structures seen on the site are relatively new and this is reflected in the poor lichen flora. Most surfaces were devoid of lichens with lichens just starting to colonise. Species recorded from wooden fence posts and steps are listed in Table 4.7.

Table 4.7 Six species recorded from wood in the study site (fence posts and wooden steps). Conservation status follows Coppins & Coppins (2012) where LC = Least Concern (i.e. not threatened at the national scale) and NS = Nationally Scarce.

<b>BLS no.</b>	<b>Taxon name</b>	<b>Status</b>
0212	<i>Amandinea punctata</i>	LC
0649	<i>Lecanora expallens</i>	LC
0621	<i>Lecanora hagenii</i>	NE
0672	<i>Lecanora pulicaris</i>	LC
0690	<i>Lecanora varia</i>	LC
0797	<i>Lecidella elaeochroma</i> f. <i>elaeochroma</i>	LC

## 4.7 Concrete

A number of species were recorded on concrete – mainly on the wartime tank defences known as ‘dragon’s teeth’ but also on small bits of concrete found scattered amongst the dune grassland/shingle. Table 4.8 lists the species recorded from concrete. All the Nationally Scarce species recorded are probably common and widespread in Britain and considered to be nationally under recorded and so listed in Woods & Coppins (2012) as Least Concern (LC). The Nationally Rare *Opegrapha* species is a lichenicolous fungus growing on the common lichen *Verrucaria muralis*.

Table 4.8 Twenty four species recorded from concrete. Conservation status follows Coppins & Coppins (2012) where LC = Least Concern (i.e. not threatened at the national scale), NS = Nationally Scarce and NR = Nationally Rare.

BLS no.	Taxon name	Status
0200	<i>Buellia aethalea</i>	LC
2442	<i>Caloplaca arcis</i>	LC NS
2443	<i>Caloplaca dichroa</i>	LC NS
2315	<i>Caloplaca flavocitrina</i>	LC
0267	<i>Caloplaca marina</i>	LC
2461	<i>Caloplaca oasis</i>	LC
0291	<i>Candelariella aurella f. aurella</i>	LC
0298	<i>Candelariella vitellina f. vitellina</i>	LC
0306	<i>Catillaria chalybeia var. chalybeia</i>	LC
0751	<i>Clauzadea monticola</i>	LC
0496	<i>Diplotomma alboatrum</i>	LC
0616	<i>Lecania erysibe s. str.</i>	LC
0627	<i>Lecanora albescens</i>	LC
0646	<i>Lecanora dispersa</i>	LC
2542	<i>Opegrapha hochstetteri</i> in ed.	LC NR
1112	<i>Physcia adscendens</i>	LC
1306	<i>Sarcogyne regularis</i>	LC
	<i>Verrucaria aff. dolosa</i>	
1507	<i>Verrucaria muralis</i>	LC
1508	<i>Verrucaria murina</i>	LC NS
1510	<i>Verrucaria nigrescens f. nigrescens</i>	LC
	<i>Verrucaria sp.</i>	
1526	<i>Xanthoria calcicola</i>	LC
1530	<i>Xanthoria parietina</i>	LC

Two additional notable species have been recorded from concrete tank traps at Sizewell (Chris Hitch, pers. comm.):

- *Opegrapha rupestris* (LC NS, at TM 475635) i.e. just south of the study site.
- *Caloplaca albolutescens* (LC, NS, grid reference unknown and not listed on NBN, 2015).

These two species were not recorded on the tank traps examined during this survey.

## **5 Discussion and assessment of the lichen flora**

Although the lichen flora within each habitat type was not particularly species rich, the lichen flora was locally well-developed and adds significantly to the biodiversity of the study site with 69 lichen taxa recorded (for comparison 26 bryophytes were recorded within the same study site by Pilkington, 2015). A number of lichens of interest were recorded including seven Nationally Scarce species. These Nationally Scarce species are all lichens that are generally accepted as under-recorded in Britain (Coppins & Woods, 2012). Although no species of particular conservation value at National or International scale were recorded, the lichens are an important component of the dune grassland habitat and add considerably to the biodiversity of the dune grassland. Fixed Dune grassland is an Annex 1 habitat and lichen are recognised as an important component of some types of dune systems. The lichen rich areas should be considered to be an important dune habitat quality indicator and an important early indicator of decline in dune habitat (there can be serious decline in biodiversity, due to decline in the lichen flora, before there is any significant impact on the vascular plant flora).

A separate report considers the impact of changes in air quality due to the operation of the diesel generators at the proposed Sizewell C Station, and discusses monitoring options (Lichen Survey at Sizewell Power Station: The Impacts of Changes in Air Quality, and Considerations For Monitoring).



## 6 References

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## 7 Appendices

Table 7.1 Target notes recorded during the survey.

TN	Easting	Northing	Other notes
1	647553	264526	Photo of <i>Festuca-Cladina</i> dune grassland (Figure 3).
2	647502	264526	Small patch of dune heath
3	647517	264623	Photo of <i>Cladina-Carex arenaria</i> dune grassland (Figure 4).
4	647521	264688	Photo of <i>Erica cinerea</i> dune heath (Figure 7). Best developed lichens associated with small animal tracks through dune heath.
5	647572	264829	Dune grassland with small patches of heath
6	647637	264930	Track through dune grassland
7	647609	264857	Most of the lichen interest is west of this track (both south and north of this location)
8	647621	263646	Photos of pioneer colonisation of stabilising shingle (Figures 8, 9 and 10).
9	647577	263775	Vascular plants dominate (c. 100%), lichens largely absent but includes <i>Cladonia furcata</i> and <i>Cladonia rangiformis</i> .
10	647613	263804	Dune grassland with some bare patches with Marram grass.
11	647615	264032	Dune grassland gets better for lichens at this grid and north of this grid including locally abundant <i>Cladonia rangiformis</i> . The Dune grassland is very poor for lichens in the area of the study site with TM 4763.
12	647590	264038	Dune grassland with locally abundant <i>Cladonia rangiformis</i>
13	647580	264087	Dune grassland with locally abundant <i>Cladonia rangiformis</i> , <i>Cladonia foliacea</i> , <i>Peltigera canina</i> and <i>Cetraria aculeata</i> .
14	647583	264115	Some well-developed patches of <i>Cetraria aculeata</i> amongst dune grassland with locally abundant <i>Cladonia rangiformis</i> . See Figure 5.
15	647586	264140	Dune grassland with locally abundant <i>Cladonia rangiformis</i> and <i>Cetraria aculeata</i> and also <i>Evernia prunastri</i> (rare).

TN	Easting	Northing	Other notes
16	647597	264189	Dune grassland with abundant <i>Cladonia portentosa</i> and <i>Cetraria aculeata</i> . Includes some exposed but stable shingly hollows and ridges (see Figure 6).
17	647598	264308	Dune grassland with abundant <i>Cladonia portentosa</i> .
18	647600	264370	Dune grassland with abundant <i>Cladonia portentosa</i> .
19	647458	264594	Oak-birch woodland with <i>Bacidia</i> sp. <b>tbc</b>
20	647469	264558	Oak-birch woodland
21	647579	264530	Concrete 'Dragon's teeth' tank traps