Haycock & Jay Associates Ltd

CONSULTANT ECOLOGISTS

Durham Coast Special Area of Conservation

South Tyneside and Sunderland

Phase 1 and National Vegetation Classification Survey

Submitted to:

South Tyneside Council
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1.0 EXECUTIVE SUMMARY

1.1 Review and Survey

1.1.1 Haycock and Jay Associates Ltd. was commissioned by South Tyneside Council to undertake Phase 1 habitat and National Vegetation Classification (NVC) surveys of the Durham Coast Special Area of Conservation (SAC) within the administrative areas of South Tyneside, Sunderland and a section of County Durham south of Ryhope Denemouth.

1.1.2 Phase 1 habitat and NVC surveys were carried out during July and August 2019, and July 2020. Vegetation survey results reflect a complex interplay of factors which were found to be influencing grassland and maritime vegetation communities. These include soils and underlying geology, aspect, slope, amount of input from salt-spray, drainage, and locally on hard cliffs – enrichment by sea birds. The major influence is the dynamic nature of the hard and soft cliffs with natural processes causing slipping and erosion at varying rates in different parts of the site.

1.1.3 The following communities were recorded in the study area:

NVC Community	**South Tyneside**	**Sunderland & Durham**
CG2c *Festuca ovina – Helictotrichloa pratensis* grassland; *Holcus lanatus – Trifolium repens* sub-community	Yes	Yes
CG4a *Brachypodium pinnatum* grassland; *Helictotrichloa pratensis – Thymus drucei* sub-community	Yes	
MC6 *Atriplex prostrata – Beta vulgaris ssp. maritima*; sea-bird cliff community	Yes	
MC8a *Festuca rubra – Armeria maritima* grassland; Typical sub-community	Yes	Yes
MC8e *Festuca rubra – Armeria maritima* grassland; *Plantago coronopus* sub-community	Yes	
MC8f *Festuca rubra – Armeria maritima* grassland; *Anthyllis vulneraria* sub-community	Yes	
MC9a *Festuca rubra – Holcus lanatus* maritime grassland; *Plantago maritima* sub-community	Yes	
MC9c *Festuca rubra – Holcus lanatus* maritime grassland; *Achillea millefolium* sub-community	Yes	
MC10b *Festuca rubra – Plantago* spp. maritime grassland; *Carex panicea* sub-community	Yes	Yes
MC11b *Festuca rubra – Daucus carota* ssp. *gummifer* maritime grassland; *Ononis repens* sub-community	Yes	
MG1a *Arrhenatherum elatius* grassland; *Festuca rubra* sub-community	Yes	
MG1d *Arrhenatherum elatius* grassland; *Pastinaca sativa* sub-community	Yes	Yes

NVC Community	South Tyneside	Sunderland & Durham
MG1e *Arrhenatherum elatius* grassland; *Centaurea nigra* sub-community	Yes	
MG5b *Cynosurus cristatus – Centaurea nigra* grassland; *Galium verum* sub-community	Yes	Yes
MG6a *Lolium perenne-Cynosurus cristatus* grassland; Typical sub-community	Yes	
MG11b *Festuca rubra – Agrostis stolonifera – Potentilla anserina* grassland; *Atriplex prostrata* sub-community	Yes	Yes
MG12a – *Festuca arundinacea* grassland *Lolium perenne – Holcus lanatus* sub-community	Yes	Yes
OV24a *Urtica dioica – Galium aparine* community; Typical sub-community	Yes	
OV25b *Urtica dioica-Cirsium arvense* community; *Rumex obtusifolius – Artemisia vulgaris* sub-community	Yes	Yes
OV26d (Wetland 2) *Epilobium hirsutum* community; *Arrhenatherum elatius- Heracluem sphondylium* sub-community		Yes
OV26 (Wetlands 3, 4 & 5) *Epilobium hirsutum* community		Yes
OV27b *Chamerion angustifolium* community; *Urtica dioica-Cirsium arvense* sub-community	Yes	
W21c *Crataegus monogyna – Hedera helix* scrub; *Brachypodium sylvaticum* sub-community	Yes	
W22c *Prunus spinosa – Rubus fruticosus* agg. scrub; *Dactylis glomerata* sub-community	Yes	
W24a *Rubus fruticosus – Holcus lanatus* underscrub; *Cirsium arvense – Cirsium vulgare* sub-community	Yes	
W24b *Rubus fruticosus – Holcus lanatus* underscrub; *Arrhenatherum elatius – Heracleum sphondylium* sub-community	Yes	
W25a *Pteridium aquilinum – Rubus fruticosus* agg. underscrub; *Hyacinthoides non-scripta* sub-community		Yes
S12 (Wetland 1) *Typha latifolia* swamp		Yes
S25 (Wetland 6 & 7) *Phragmites australis – Eupatorium cannabinum* fen		Yes
M10 (Wetland 8) *Carex dioica – Pinguicula vulgaris* mire	Yes	
SD2 *Honkenya peploides – Cakile maritima* strandline community	Yes	Yes
SD3 *Matricaria maritima – Galium aparine* strandline community	Yes	
SD5b *Leymus arenarius* mobile dune community; *Elymus farctus* sub-community	Yes	
SD8a *Festuca rubra – Galium verum* fixed dune grassland; Typical sub-community	Yes	

Summary of Results and Recommendations – South Tyneside

1.1.4 The South Tyneside section of the Durham Coast SAC has the qualifying feature H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts, and a rich resource of maritime and para-maritime grassland has been identified and mapped as a result of this study.

This will allow monitoring to ensure that the quality and extent of this biodiversity resource is maintained, and where possible augmented.

1.1.5 The qualifying feature and supporting habitat is bordered by a combination of: residential areas with grassland buffers; pastoral farmland at the former rifle ranges; Whitburn Point Nature Reserve and Whitburn Coastal Park. The proximity of densely populated areas presents the possibility of pressures on quality and extent which requires management. These pressures and recommendations are tabulated below.

Pressure identified in NE Jan 2019	**Pressure in STC?**	**Action points**
Extent and spatial distribution	Yes	Maintain extent of qualifying feature into the future through maintenance of a buffer of species-rich grassland inland. Buffer width should be 20 times erosion rate or 50m whichever is the larger (Whitehouse 2007). Creating a wider buffer at the former rifle ranges is an urgent priority to protect the qualifying feature. Now that the extent of qualifying feature is known this should be monitored regularly to ensure the resource is maintained.
Drainage	Yes – where land drains are severed	Severed land drains are accelerating erosion on the soft cliff. Block land drains inland where this occurs.
Eutrophication	Dog fouling Garden waste Agricultural inputs	Fouling by dogs is not considered significant. Eutrophication due to dumping of garden waste is a significant impact and should be curtailed. Fertiliser and herbicide use should never take place in the SAC. Fertiliser and herbicide use in designated buffer areas should be strictly controlled to minimise drift into the SAC.
Invasive Non-Native Species (INNS)	Yes	Work with local residents to stop accidental introductions via garden waste. Discourage deliberate introductions. Remove established Schedule 9 INNS (in particular Japanese knotweed (*Reynoutria japonica*) at Trow Point and Japanese rose (*Rosa rugosa*) at Whitburn Beach and Whitburn Bents and Whitburn Steel).

Pressure identified in NE Jan 2019	Pressure in STC?	Action points
Air quality	Yes. Critical loads for Nitrogen and Acid deposition being exceeded.	It is recommended that land-use planning and consideration of planning applications takes into account sources of these air pollutants and their potential to impact features of Durham Coast SAC. Airborne NH3 inputs from fertiliser and herbicide use should never take place in the SAC. Fertiliser and herbicide use in designated buffer areas should be strictly controlled to minimise drift into the SAC. Need to consider NOx from traffic and other sources.
Access	Yes	Consider steps to reduce trampling pressure at Whitburn Bents and Whitburn Steel to allow strandline vegetation to thrive.

Summary of Results and Recommendations - Sunderland

1.1.6 The Sunderland section of Durham Coast SAC does not contain the qualifying feature H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts and as the land within the SAC boundary does not include any suitable habitat for the qualifying feature to develop, the extent is unlikely to change. However, the sea-cliffs outside the SAC boundary are capable of supporting maritime and para-maritime vegetation and, as such, development of this vegetation should be promoted as supporting habitat for the SAC.

Pressure identified in NE Jan 2019	Pressure in Sunderland?	Options
Extent and spatial distribution of supporting maritime and para-maritime grassland	Yes	Rapid rates of erosion coupled with species-poor grassland inland are compromising development of maritime cliff vegetation. Ensure buffer of species-rich grassland is established. 20 times erosion rate or 50m whichever is the larger (Whitehouse 2007)
Drainage impact on supporting maritime and para-maritime grassland	Yes – where land drains are severed	Severed land drains are accelerating erosion on the soft cliff. Block land drains inland where this occurs.
Eutrophication of	Dog fouling	Dog fouling is not considered a pressure.

Pressure identified in NE Jan 2019	Pressure in Sunderland?	Options
supporting maritime and para-maritime grassland	Garden waste Agricultural inputs	Dumping of garden waste is limited by the lack of proximity to habitation, however, vigilance is necessary. Ensure no fertiliser / herbicide use in designated buffer areas.
INNS in supporting maritime and para-maritime grassland	Yes	Work with local residents to stop accidental introductions via garden waste. Discourage deliberate introductions. Remove established INNS. Particular targets should be: Schedule 9 Japanese rose and Japanese knotweed in the dunes at Whitburn Bents. Schedule 9 Himalayan balsam (*Impatiens glandulifera*) needs catchment wide approach in Ryhope Denemouth.
Air quality impacts on supporting maritime and para-maritime grassland	Yes. Critical loads for Nitrogen and Acid deposition being exceeded.	Airborne NH3 inputs from fertiliser and herbicide use should never take place in the SAC. Fertiliser and herbicide use in designated buffer areas should be strictly controlled to minimise drift into the SAC. Need to consider NOx from traffic and other sources.
Access	Yes	Consider steps to reduce trampling pressure at Whitburn Bents and Whitburn Steel to allow strandline vegetation to thrive.

1.2 Monitoring

1.2.1 Key structural, influential and distinctive species are identified by Natural England (January 2019) and include narrow-leaved marsh orchid (*Dactylorhiza traunsteinerioides*) which was recorded during the current survey. It is recommended that populations of this species are monitored annually along with search for further populations (which may not have been apparent in 2019).

1.2.2 Monitoring of maritime and para-maritime vegetation using the NVC methodology should take place regularly (at least every 5 years). Due to the dynamic nature of the soft cliff habitat, future monitoring surveys on soft cliffs should aim to record vegetation

communities with the characteristics of those recorded on this occasion rather than attempt to record the same communities in the same places.

1.2.3 In order to monitor cliff erosion processes, use of fixed-point photography is recommended. A reference set of fixed-point monitoring locations photographs is attached to this document.

2.0 INTRODUCTION

2.1 The Brief

2.1.1 Haycock and Jay Associates Ltd. was commissioned in July 2019 to undertake survey and assessment of Durham Coast SAC. The commission comprised the following elements:

- Phase 1 survey of the SAC to highlight where qualifying habitats / features occur;
- NVC survey of all qualifying habitats;
- Location of notable plant species;
- Mapping of habitats and vegetation communities;
- Mapping of target notes to record pressures on SAC vegetation;
- Management recommendations;
- Identification of fixed-point photography locations for future monitoring; and
- Data and information delivered in a final report with associated shapefile layer.

2.1.2 Following review of the data collected in 2019, further survey was commissioned in April 2020 comprising:

- NVC survey and mapping of non-priority habitats and sub-communities within Durham Coast SAC, including a 50m inland buffer zone;
- Recording NVC quadrat data for Durham Coast SAC priority habitats which are not qualifying features, where this was not gathered in 2019, including strandline and sand dune communities and wetlands where accessible;
- As with the 2019 surveys, recording of Target Notes to highlight notable species, pressures on SAC vegetation and management recommendations;
- Delivery of data and information in a report with associated mapping summarising 2020 findings; and,
- Final report, mapping and shapefiles combining data and findings from the 2019 and 2020 surveys.

2.1.3 The main aim was to undertake a comprehensive vegetation survey of the Durham Coast SAC within the administrative areas of South Tyneside Council and Sunderland Council and to include the small section in County Durham just south of Ryhope Denemouth.

2.1.4 These surveys are required to map the location and extent of the qualifying feature (H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts) within the SAC and record observable pressures on the qualifying feature and supporting habitat. Based on the survey, recommendations for management have been made aiming to maintain and enhance the qualifying feature. This study is intended to form a baseline for future monitoring of the vegetation, pressures and to inform mitigation measures.

2.1.5 The Phase 1 habitat and NVC surveys were carried out in the South Tyneside section of the coast, between approximate OS Grid References NZ3820266654 and NZ4076460984, on 1st- 4th July 2019 and subsequently on 10th and 13th July 2020; and the Durham and Sunderland sections, located between NZ4123754726 and NZ4198851545 on 1st August 2019 and the following year on 14th July 2020.

2.2 Durham Coast SAC

2.2.1 The citation for Durham Coast SAC describes the site as follows:

'Durham Coast is the only example of vegetated sea cliffs on Magnesian Limestone exposures in the UK. These cliffs extend along the North Sea coast for over 20 km from South Shields southwards to Blackhall Rocks. Their vegetation is unique in the British Isles and consists of a complex mosaic of maritime-influenced, calcareous and species-rich-neutral grasslands, tall-herb fen, seepage flushes and wind-pruned scrub. Within these habitats, rare species with varied ecological requirements often grow together, forming unusual and species-rich communities of high scientific interest. The communities present on the sea cliffs are largely maintained by natural processes including exposure to sea spray, erosion and slippage of the soft Magnesian Limestone bedrock and overlying glacial drifts, as well as localised flushing by calcareous water.'

2.2.2 Annex 1 lists qualifying habitat for which the site is designated under article 4(4) of the Directive (92/43/EEC) is H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts.

2.2.3 In the Draft supplementary advice on conserving and restoring site features in Durham Coast SAC (Natural England 2019), one of the targets is to ensure the component vegetation communities of the H1230 feature are broadly referable to and characterised by the following NVC type (s):

- CG2 *Festuca ovina – Avenula pratensis* grassland;
- CG6 *Avenula pubescens* grassland;
- CG8 *Sesleria albicans – Scabiosa columbaria* grassland;
- MG1 *Arrhenatherum elatius* grassland;
- MG5 *Cynosurus cristatus – Centaurea nigra* grassland;
- MC8 *Festuca rubra – Armeria maritima* maritime grassland;

- MC9 *Festuca rubra – Holcus lanatus* maritime grassland;
- MC10 *Festuca rubra – Plantago* species maritime grassland;
- MC11 *Festuca rubra – Daucus carota* maritime grassland;
- M10 *Carex dioica – Pinguicula vulgaris* mire;
- M22 *Juncus subnodulosus – Cirsium palustre* fen meadow;
- M27 *Filipendula ulmaria – Angelica sylvestris* mire;
- M37 *Cratoneuron commutatum – Festuca rubra* spring;
- S25 *Phragmites australis – Eupatorium cannabinum* tall-herb fen;
- W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland;
- W21 *Crataegus monogyna – Hedera helix* scrub;
- W22 *Prunus spinosa – Rubus fruticosus* scrub;
- W23 *Ulex europaeus – Rubus fruticosus* scrub;
- W24 *Rubus fruticosus – Holcus lanatus* underscrub;
- W25 *Pteridium aquilinum – Rubus fruticosus* underscrub.

2.2.4 Whilst these vegetation communities represent the qualifying features for the SAC, a suite of maritime, para-maritime and non-maritime vegetation communities should be recognised as supporting habitat. The coastal cliffs are a dynamic system where the future resilience and quality of the qualifying feature is dependent on semi-natural habitat inland supported by other maritime communities such as dunes and strandline vegetation.

3.0 SITE DESCRIPTION

3.1 Coastal description

3.1.1 In order to understand coastal vegetation, it is necessary to have an appreciation of the geology of the coast and consider erosion and other physical processes which shape the coastal habitat.

3.1.2 The boundary of Durham Coast SAC follows the boundary of Durham Coast Site of Special Scientific Interest (SSSI) and, as such, encompasses nationally important geological features. These consist of Magnesian limestone exposed as coastal hard cliffs and wave-cut platforms. There are also significant areas of 'soft cliff' where glacial till (boulder clay) overlies bedrock and forms a rapidly eroding cliff. These soft cliffs may be 'perched', where both bedrock and glacial till are exposed to form a soft cliff on top of a hard cliff.

3.1.3 The importance of soft cliff vegetation for biodiversity is widely recognised as being high both for invertebrates and its semi-natural vegetation. England is recognised as having a significant proportion of the European resource of soft cliff habitat (Hill *et al* 2001).

<u>South Tyneside</u>

3.1.4 Magnesian limestone hard coastal cliffs feature in the north of the study area starting at Trow Point, rising to some 25m in height at Marsden Bay south to Lizard Point (at Souter Lighthouse). From Lizard Point south the Magnesian limestone bedding plane dips continuously with a varying burden of glacial clays and tills above forming a perched soft cliff. North of Whitburn Bents and Whitburn Steel soft cliffs are present which gradually give way to the dune and beach complex.

3.1.5 The hard cliffs and perched soft cliff generally lie within the Durham Coast SAC boundary and appear to be eroding relatively slowly. Consequently, there is a stable substrate in many places allowing development of species-rich para-maritime and maritime communities which are qualifying features of the SAC.

3.1.6 The picture is complicated by the industrial history of the coast. At the former open cast coal mine in Whitburn (now the site of Whitburn Coastal Park) there are well developed coastal cliffs and associated vegetation, however, where the open cast mine has been in-filled, erosion by the sea is creating sink holes inland. At the former quarry / landfill site at Trow Point the site is being managed to prevent seepage of toxic waste into the

sea with sea defences in place. This compromises natural processes necessary to maintain dynamic maritime and para-maritime vegetation.

Sunderland and Durham

3.1.7 In the area covered by the current study, the SAC boundary in Sunderland and Durham does not include the cliffs themselves, but defines the Magnesian limestone wave-cut platform in the intertidal zone. Consequently, no NVC community representing a qualifying feature of the SAC is present within the SAC.

3.1.8 Cliffs occur all the way along the coast adjacent to the SAC landward boundary. The cliffs are relatively high and steep soft cliffs which appear to be eroding rapidly. Typically, the beach at the base of the cliff is inundated at high tide, and consequently no strand-line vegetation is present. The rapid rate of erosion militates against well developed maritime and para-maritime vegetation as cliffs are unstable and there is little time for community development.

3.2 Physical Processes and Community Development

3.2.1 This section sets out to give an overview of how physical processes create a range of habitat suitable for colonisation by maritime and para-maritime vegetation and is designed to give context to the subsequent community descriptions.

3.2.2 In such dynamic situations, it is accepted that plant communities present are derived primarily due to geomorphological processes tempered by a suite of other physical factors, with communities representing opportunistic associations of plants dependent on the proximity of vegetative propagules, seed sources, stochastic erosion and random events (including anthropogenic factors). Consequently, communities are not readily described and pigeon-holed, and it is the physical processes allowing the ecological opportunity for these communities to form which is key. The species present in each community will continue to depend on seed sources and vegetative propagules, and future supply of these will also need to be monitored and maintained.

3.2.3 Hard cliffs erode relatively slowly and suitable habitat can be stable in the maritime zone for many years between erosion events, presenting relatively static and manageable vegetation patches. However, cognisance should be taken of the fact that when hard cliffs collapse much established vegetation can be lost instantaneously and it is necessary to maintain an abundance of each type of cliff top vegetation to ensure local extinction of species and communities does not result from stochastic erosion events.

3.2.4 Erosion on soft cliffs was observed to be taking place primarily in two ways; catastrophic slope failure and incremental erosion. These two processes occur in conjunction with

each other and formed a continuum which geomorphologists could no doubt describe with more clarity. These are dealt with below based on observations during the survey. Clearly more in-depth study would allow a more coherent picture to evolve.

3.2.5 Catastrophic slope failure leads to mass movement of substrate and slumping. This creates large areas of nutrient and humus poor sub-soil usually with a bench of clayey, more fertile soils at the base. This contrast is increased as the 'bench' soils have the debris of the vegetation extant prior to slumping within it. This will rot rapidly and further increase the nutrient status of the soil. Colonisation of bare ground commences immediately in a number of ways, but dominated by vegetative reproduction from existing plants, and by seed. Clearly the former will be influenced by the vegetative structures capable of propagation remaining from the extant vegetation and the latter by the abundance of seed locally and time of year.

3.2.6 Observations during the surveys indicated that vegetative reproduction is the most important factor on the sub-soil slopes favouring creeping bent (*Agrostis stolonifera*) in particular, but also colt's-foot (*Tussilago farfara*), and deep-rooted perennials such as field horsetail (*Equisetum arvense*). The latter is not as prevalent in these early successional communities, although the roots were often evident with a few poorly grown specimens; it is considered likely that the low nutrient status of the soil was a factor in this. Larger plants also survive as occasionals from the previous turf with clumps of red fescue (*Festuca rubra*) and ribwort plantain (*Plantago lanceolata*) often distributed sparsely within this community. Where these survive, they continue to grow, though growth is often observed to be poor. Seeding into this matrix is common, although only kidney vetch (*Anthyllis vulneraria*) was consistently present. Other species can be prominent depending on seed sources locally. Where maritime influences are high (i.e. north-east facing and proximal to the sea), sea plantain (*Plantago maritima*) is present. The steepness of slope and poor substrate makes establishment by seed challenging as seed is easily washed away, and the subsoil tends to be clayey and hostile to the establishment of young plants.

3.2.7 In contrast, the slumped material is nutrient rich, with abundant vegetative structures and seed germination opportunities. These areas show rapid colonisation by deep rooted perennials extant in the former vegetation or growing through from the vegetation covered by the slump, such as field horsetail and creeping thistle (*Cirsium arvense*). It was notable that species not tolerant of maritime conditions, which were prevalent in the cliff top communities (for example false oat-grass (*Arrhenatherum elatius*)), were absent or poorly grown where slumping carried their root stocks seaward. This appeared to allow species which are present but not prominent on the cliff top (e.g. tall fescue (*Schedonorus arundinaceus* (old name used in NVC - *Festuca arundinacea*)) to gain prominence. Once established the latter appears highly effective in maintaining dominance in the soft cliff community, with tussocks surviving and re-establishing in

subsequent slippage events. In addition, seeds germinate readily, and these areas are typically characterised by well-grown tall ruderal vegetation.

3.2.8 Catastrophic slippage events where large areas of bare soil are made available appeared to favour establishment by invasive non-native species, often deposited at the cliff top by local gardeners.

3.2.9 Incremental erosion occurs on soft cliff in the periods between catastrophic slope failure events. Vegetation recorded on the slumping cliffs often has its origin on the cliff top, with large turfs falling from the cliff top and then making their way downslope to the beach over time. During this period turfs often fragment and there can be much bare ground allowing some species to regenerate by seed.

3.2.10 This process means that there are at least three elements to the cliff slope flora:

- A group of species which are present as they have fallen with their substrate from the cliff top and are persisting but not expanding ('persisters');
- A group of species which are present in cliff top turfs, but which then increase their coverage considerably either vegetatively or by seed due to disturbance (opportunists); and,
- A group of species which are present only on the cliff slope, re-generating vegetatively or by seed onto bare ground (soft cliff species).

3.2.11 The first group are dependent for persistence as part of the cliff slope habitat on constantly being eroded on turfs from the top of the cliff. Clearly, if these habitats do not contain these species, then over time they will be lost to the maritime cliff slope habitat.

4.0 METHODOLOGY

4.1 Phase 1 Habitat Survey

4.1.1 Phase 1 habitat survey was carried out between 1st- 5th July and 1st August 2019 by Assistant Ecologist Clare Cashon BSc (Hons) GradCIEEM. The survey area comprised habitats within Durham Coast SAC along the coast present between the high tide line, including cliff vegetation, and semi-natural vegetation immediately inland of the designated site.

4.1.2 The survey method was based on Phase 1 habitat survey methodology (JNCC 2010), a technique for categorising habitats where a standard set of habitat definitions are used for classifying the land on the basis of the vegetation present.

4.1.3 As the Phase 1 habitat survey is concerned only with habitat classifications, the methodology was extended to include use of target notes to record issues noted such as invasive non-native plant species, recreational pressures, historic landfill, fly-tipping and outfalls. Suggested monitoring locations were also recorded and fixed-point photography of these locations for future monitoring taken.

4.2 National Vegetation Classification Survey

4.2.1 NVC surveys were undertaken between 1st- 5th July and 1st August 2019 by Gordon Haycock MSc, CEcol CEnv MCIEEM, with assistance from Clare Cashon BSc (Hons) GradCIEEM. The subsequent survey was carried out on 10th, 13th and 14th July 2020 by Clare Cashon BSc (Hons) ACIEEM. The method used for this survey followed the approach for NVC survey as described by Rodwell *et al* (1992) and Rodwell (2006). This allows the vegetation communities identified to be classified in accordance with the accounts published in British Plant Communities (Rodwell *et al* 1991 *et seq*).

4.2.2 In accordance with Rodwell (2006), survey was undertaken across the site to determine variation in vegetation and delimit homogenous stands. Where there was a readily observable boundary between homogenous stands this was mapped accordingly, however, where there was a diffuse boundary between vegetation types this was mapped at a mid-point in the transition from one vegetation type to another. Taking into account the width of a line representing a vegetation boundary on the map as it would appear on the ground, this was rarely necessary. Genuine mosaics of different NVC sub-communities were mapped as single polygons and a note taken of the percentage of each sub-community recorded in the polygon.

4.2.3 For each homogenous stand of vegetation identified, five or more vegetation samples were taken by laying out a 2 x 2m quadrat to record the abundance and frequency of all species of flora present. Where the sward was short and species densely packed, a 1m x 1m quadrat was used. The number of quadrats taken for each homogenous stand was dependent on the extent of the stand, and the variation within it. Small stands of homogenous vegetation had fewer quadrat samples than large stands where the flora was more variable.

4.2.4 Within each quadrat/sample, all species of vascular plant and bryophytes (mosses and liverworts) were identified and, for each species, the percentage cover of the quadrat was estimated. In addition, a full species list for each community was made including species not featuring in the quadrats, and an indication of abundance throughout the community recorded using the DAFOR scale. Each species was classified as either Dominant, Abundant, Frequent, Occasional or Rare for the community.

4.2.5 The figure for percentage cover for each species in each quadrat was recorded as a Domin value. Domin values are as follows:

Cover (%)	**DOMIN**
91 -100	10
76-90	9
51-75	8
34-50	7
26-33	6
11-25	5
4-10	4
<4 with many individuals	3
<4 with several individuals	2
<4 with few individuals	1

4.2.6 Following field survey and for the purposes of assigning a community in the NVC, the frequency of each species in each homogenous stand was calculated where:

I = 1-20% of quadrats
II = 21-40%
III = 41-60%
IV = 61-80%
V = 81-100%

4.2.7 Finally, the NVC community type was determined by comparing the results of the field survey, using both keys and the experience of the field surveyors, with the published

accounts and floristic tables given in British Plant Communities (Rodwell *et al* 1991 *et seq*).

4.2.8 It is widely acknowledged that applying software to NVC data-sets does not provide a more 'robust' assessment of results and placement of vegetation within the NVC. The various software applications available rely on data input and interpretation of the output, both of which are based on professional judgement (placement of quadrats and then interpretation of results). Experience of applying Modular Analysis of Vegetation Information System (MAVIS) and other software indicates that it is imperative that the practioner knows what the sub-community is prior to using the software in order to interpret the results correctly. There appears little to be gained from running data through a software programme unless the purpose is simply to convince the reader with what is regarded as 'empirical evidence' (which it clearly is not). Consequently, it was not considered necessary to use computer software to assist in assigning NVC community in this study.

4.2.9 The community description provides a discussion of how the floristic features compare to the standard vegetation community descriptions and highlights the character of vegetation communities at this site.

4.2.10 Where species names have been changed since the NVC was created, the name used in the NVC title is still used, whereas the text uses the current accepted name. Where this is the case, there is an explanatory note.

4.3 Limitations

4.3.1 Steep and/or loose areas of cliff face were not accessed during these surveys due to the risk to Health and Safety posed. However, where safe access was not possible steep cliff faces were viewed from the top/bottom with close focussing binoculars.

4.3.2 Wetland herb communities present within South Tyneside (M10) and Sunderland (OV26, S12 and S25 - Wetlands 1 and 3-8) were not accessible during the 2020 survey, as with the 2019 survey, due to their proximity to the edge of the cliff, therefore they could not be surveyed sufficiently with binoculars to attribute them to a sub-community or carry out quadrat surveys.

5.0 PHASE 1 HABITAT SURVEY RESULTS

5.1 Target Notes

5.1.1 Invasive and non-native/alien species (TNnA), including some Wildlife & Countryside Act Schedule 9 species; notable species (TNnN); and issues and pressures affecting the coast (TNnP) are highlighted as Target Notes and referred to in the text, as well as being listed in Appendix 1 and shown on the Phase 1 and NVC maps (Figures 1 and 2). Target Note photographs are attached at Appendix 2.

5.2 Habitats

5.2.1 Vegetation communities described below are mapped on Phase 1 Habitat Maps attached at Figure 1. Vegetation is listed by community, with paragraphs describing expressions of each community starting in the north and moving south.

Unimproved Neutral Grassland

South Tyneside

5.2.2 Unimproved neutral grassland occurs sporadically along the cliff top in South Tyneside, the majority of which exhibits little evidence of maritime influence.

5.2.3 Patches of unimproved neutral grassland occur close to Trow Point, around Frenchman's Bay and close to the cliff edge to the north of Marsden Bay, which contains false oat-grass, cock's-foot (*Dactylis glomerata*), red fescue, glaucous sedge (*Carex flacca*), meadow vetchling (*Lathyrus pratensis*), greater knapweed (*Centaurea scabiosa*), yarrow (*Achillea millefolium*), lady's bedstraw (*Galium verum*), common hogweed (*Heracleum sphondylium*), creeping thistle and creeping cinquefoil (*Potentilla reptans*). Multiple non-native perennial sweet pea (*Lathyrus latifolius*) plants are also present on this outcrop at TN26A on Figure 1e.

5.2.4 This habitat occurs round the cliff edge of Marsden Bay and in the north of Whitburn Coastal Park, where grassland is rank and contains false oat-grass, cock's-foot, perennial rye-grass (*Lolium perenne*), common ragwort (*Jacobaea vulgaris*), silverweed (*Potentilla anserina*), ribwort plantain, colt's-foot, meadow vetchling, common toadflax (*Linaria vulgaris*), field bindweed (*Convolvulus arvensis*), white clover (*Trifolium repens*) and occasional sea plantain indicating some maritime influence. There are lots of holes and evidence of sinking in this area, revealing colliery spoil (TN45P on Figure 1i). To the east of Souter Lighthouse, this community extends right to the cliff edge in places. Many

northern marsh-orchids (*Dactylorhiza purpurella*) are present in this area, with notable species narrow-leaved marsh orchid also present (TN72N on Figure 1i), and northern marsh-orchids and bee orchid (*Ophrys apifera*) nearby (TN68N on Figure 1j).

5.2.5 Within the fenced area near Potter's Hole, in the south of Whitburn Coastal Park, unimproved neutral grassland contains creeping bent, Yorkshire fog (*Holcus lanatus*), red fescue, bird's-foot trefoil (*Lotus corniculatus*), sea plantain, white clover, red clover (*Trifolium pratense*), common vetch (*Vicia sativa*), hairy tare (*Vicia hirsuta*), ribwort plantain, dandelion (*Taraxacum officinalis* agg.) and common cat's-ear (*Hypochaeris radicata*). Notable species narrow-leaved marsh orchid is also present at TN70N, with two northern marsh-orchids observed during 2020 at TN92N (both on Figure 1k).

5.2.6 Semi-improved neutral grassland is present from the north end of Whitburn Beach (known locally as Jackie's beach) up to the southern extent of Whitburn Point Nature Reserve, reaching the cliff edge in places but mostly bordered on the seaward side by coastal grassland. Grasses present include false oat-grass, cock's-foot, red fescue, Yorkshire fog, creeping bent and yellow oat-grass (*Trisetum flavescens*); and forbs include common sorrel (*Rumex acetosa*), yarrow, meadow vetchling, creeping cinquefoil, black knapweed (*Centaurea nigra*), creeping thistle, tufted vetch (*Vicia cracca*), white clover and occasional lady's bedstraw.

5.2.7 On the cliff edge around Whitburn Beach, there are more diverse areas of grassland adjacent to semi-improved neutral grassland, with perennial rye-grass, cock's-foot, yellow-oat grass, red fescue, tufted vetch, black knapweed, creeping thistle, common sorrel, field horsetail, occasional lady's bedstraw and betony (*Betonica officinalis*) present.

5.2.8 Along the cliff edge around the former rifle ranges, and just south of them in Whitburn, there are patches of unimproved neutral grassland on crumbling soft cliff, which contain false oat-grass, red fescue, yellow oat-grass, creeping bent, cock's-foot, false brome (*Brachypodium sylvaticum*), glaucous sedge, common spotted-orchids (*Dactylorhiza fuchsii*) (TN63N on Figure 1o), bird's-foot trefoil, black knapweed, common sorrel, meadow vetchling, creeping cinquefoil, yarrow, creeping thistle, wild carrot (*Daucus carota*), common hogweed, black medick (*Medicago lupulina*), common cat's-ear, rough hawkbit (*Leontodon hispidus*) and restharrow (*Ononis repens*).

5.2.9 Unimproved neutral grassland also occurs along the Whitburn cliff tops where the soft cliff is eroding (TN41P on Figure 1o). Grasses present include false oat-grass, yellow oat-grass, red fescue, creeping bent and Yorkshire fog. Forbs include black knapweed, meadow vetchling, goat's-beard (*Tragopogon pratensis*), creeping cinquefoil, yarrow, agrimony (*Agrimonia eupatoria*), dandelion, ribwort plantain, tufted vetch, red clover,

black medick, yellow-wort (*Blackstonia perfoliata*), kidney vetch and common ragwort. Thrift (*Armeria maritima*) indicates a maritime influence.

Sunderland and Durham

5.2.10 On the eroding slope of the soft cliff west of Salterfen Rocks – just outside the Durham Coast SAC boundary, on an island off Pincushion and on cliffs at the southern end of the survey area, there is a patch of unimproved neutral grassland which contains false oat-grass, false brome, glaucous sedge, black knapweed, colt's-foot, rough hawkbit, water horsetail (*Equisetum fluviatile*), zig-zag clover (*Trifolium medium*), dyer's greenweed (*Genista tinctoria*) and sea plantain. Orchids (*Dactylorhiza* sp.) are also present within this habitat at TN82N and TN83N (Figure 1z.1).

Semi-improved Neutral Grassland

South Tyneside

5.2.11 The rocky outcrop of Trow Point is a mosaic of habitats, with semi-improved neutral grassland in places comprising a short sward of predominantly perennial rye-grass and daisy (*Bellis perennis*). Further to the south-east, common vetch, hedge bindweed (*Calystegia sepium*), broad-leaved dock (*Rumex obtusifolius*), creeping buttercup (*Ranunculus repens*), yarrow, meadow vetchling, common hogweed, silverweed, black medick, tufted vetch and small timothy (*Phleum bertolonii*) (TN30A) are present, with a stand of white butterbur (*Petasites albus*) at TN29A and of Spanish bluebell (*Hyacinthoides hispanica*) at TN89A (all TN on Figure 1a). This habitat also continues to the south-west of the path.

5.2.12 A small bay is present between Trow Point and Frenchman's Bay containing rocks to prevent coastal erosion. Around this bay, and either side of the path to the south-west of it, semi-improved neutral grassland comprises perennial rye-grass, red fescue, hoary plantain (*Plantago media*), creeping cinquefoil, white clover, red clover, ribwort plantain, colt's-foot, black knapweed, rough hawkbit and bird's-foot trefoil. Within this area, multiple potential Schedule 9 species Montbretia (*Crocosmia* sp.) are present at TN27A and TN28A (Figure 1b). During the 2020 survey, 28 common spotted-orchids and one pyramidal orchid (*Anacamptis pyramidalis*) were observed within this grassland (TN91N on Figure 1c/ 1d).

5.2.13 Rank semi-improved neutral grassland continues around the headland between Frenchman's Bay and Man Haven, and further south around the headland between Frenchman's Bay and Marsden Bay, where in places it is fenced and dominated by rank false-oat grass with occasional other species including Yorkshire fog, perennial rye-grass, red fescue, creeping cinquefoil, dandelion, white clover, black knapweed, colt's-

foot, meadow vetchling, ribwort plantain, yarrow and creeping thistle. On the cliff to the north of the steps to Marsden Bay near the roundabout off the A183, species such as false oat-grass, cock's-foot, yellow oat-grass, timothy (*Phleum pratense*) (TN25A on Figure 1e) black knapweed, cow parsley (*Anthriscus sylvestris*), common sorrel, field bindweed and common nettle (*Urtica dioica*) are present.

5.2.14 An area of short-mown grassland is present along the cliff edge immediately to the north-west of a patch of unimproved calcareous grassland at Marsden Bay, reaching Marsden Grotto car park. This habitat contains perennial rye-grass, daisy, creeping thistle, dandelion, ribwort plantain and common hogweed. This habitat becomes more rank to the north of Marsden Grotto, where false oat-grass, cock's-foot, creeping buttercup, Alexanders (*Smyrnium olusatrum*), ribwort plantain, and white clover occur. There is netting on the cliffs either side of the steps from Marsden Grotto down to the beach at Marsden Bay (TN47P on Figure 1f and 1g). Atop the cliff towards the north of Marsden Bay, there is an area dominated by rank false oat-grass.

5.2.15 Rank semi-improved neutral grassland occurs close to the car park north of Souter Lighthouse, bordered by a strip of coastal grassland, with species present such as red fescue, false oat-grass, creeping thistle and mugwort (*Artemisia vulgaris*). This habitat continues along the cliff top adjacent to Marsden Quarry and lime kilns, where it contains the above listed species, as well as creeping cinquefoil, ribwort plantain, yarrow and common toadflax.

5.2.16 To the east of Souter Lighthouse, semi-improved neutral grassland occurs on a more nutrient-enriched substrate and perennial rye-grass, curled dock (*Rumex crispus*), common hogweed and creeping thistle are abundant. This community extends to the cliff edge at TN46P (Figure 1i).

5.2.17 Along the cliff top around Whitburn Beach, there is further semi-improved neutral grassland dominated by false-oat grass, with Yorkshire fog, common spotted-orchid (TN64N on Figure 1m), bird's-foot trefoil, creeping cinquefoil, common hogweed and scattered bramble (*Rubus fruticosus* agg.) scrub also within it. Further to the north, this becomes more species-rich and transitions into unimproved calcareous and unimproved neutral grassland.

5.2.18 The top of the cliff around the former rifle ranges also contains semi-improved neutral grassland comprising red fescue, creeping bent, false-oat grass, yellow oat-grass, perennial rye-grass, black knapweed, creeping thistle, creeping cinquefoil, rough hawkbit, common hogweed, meadow vetchling, common sorrel, tufted vetch, white clover, sea mayweed (*Tripleurospermum maritimum*) and bird's-foot trefoil. The footpath is very close to the cliff edge in this area (TN43P on Figure 1n). Semi-improved neutral grassland also occurs just south, and along the east of Whitburn Point Nature Reserve

with a similar species assemblage, however growth is ranker, and transitions into unimproved neutral grassland and coastal grassland at multiple places closer to the cliff edge, but in other places reaches right to the cliff edge.

5.2.19 Along the top of the cliff just south of the former rifle ranges at Whitburn, there is an area of rank semi-improved neutral grassland which becomes more species-rich towards the edge of the cliff. Grasses include false oat-grass, wall barley (*Hordeum murinum*) and cock's-foot, with forbs comprising cow parsley, ribwort plantain, black knapweed, creeping thistle, meadow vetchling, white dead-nettle (*Lamium album*) and common nettle. Scattered bramble scrub is present here and teasel (*Dipsacus fullonum*) is also present (TN13A on Figure 1o). Schedule 9 species Spanish bluebell, and non-native garden escapes red hot poker (*Kniphofia* sp.), and spearmint (*Mentha spicata*) are also present within this grassland (TN14A on Figure 1o), with grass cuttings piled onto the verge at TN42P (Figure 1o).

5.2.20 Whitburn cliff tops contains semi-improved neutral grassland dominated by false oat-grass, with cock's-foot, red fescue, yellow oat-grass, false brome, red clover, meadow vetchling, common hogweed, black medick, creeping thistle, common hogweed, goat's-beard, meadow crane's-bill (*Geranium pratense*), yellow-wort, yarrow, tufted vetch, colt's-foot, rough hawkbit, field horsetail, white clover, black knapweed, spear thistle (*Cirsium vulgare*), common ragwort, creeping thistle, scattered bramble and occasional marram grass (*Ammophila arenaria*) present. The slope up the beach from Whitburn Bents to Whitburn, and inland from the cliff east of Whitburn, also contains this community with rank native yellow loosestrife (*Lysimachia vulgaris*) present (TN11A on Figure 1q). In places, this community reaches to the edge of the cliff.

5.2.21 There is a patch of this grassland to the east of the Whitburn anglers' building either side of a dry outlet (TN40P on Figure 1r). Perennial rye-grass dominates this habitat, with wall barley, soft brome (*Bromus hordeaceus*), silverweed, mugwort, broad-leaved dock and fool's-water-cress (*Apium nodiflorum*) also present.

Sunderland and Durham

5.2.22 Semi-improved neutral grassland occurs along the Sunderland coast, outside of the SAC boundary. Notable observations include a field drain at TN60P (Figure 1s), which is a focus for sea-cliff erosion and a burnt area of grassland noted at the No. 29 sign (TN59P on Figure 1t). East of Grangetown, the grassland is mown short (TN57P on Figure 1u), and differs from the cliff vegetation, creating potential for enhanced buffering.

5.2.23 The vegetation on top of the cliff along the Sunderland section of the coast which is outside the SAC boundary, comprises semi-improved neutral grassland. On the cliff to the east of the roundabout at Grangetown horseradish (*Armoracia rusticana*) is present

(TN39A on Figure 1u) and one stand of sea buckthorn (*Hippophae rhamnoides*) was noted at TN87N (Figure 1u). False-oat grass, timothy and perennial rye-grass was noted as being particularly dominant at TN38A (Figure 1v).

5.2.24 In the southern section of Sunderland and the northern section of Durham, which lies just outside the SAC boundary, there is soft cliff with evidence of erosion and dripping water and clay (TN50P, TN51P on Figure 1z.1). The vegetation on this cliff is dominated by semi-improved neutral grassland which is sparse in places, with some indicators of maritime influence such as thrift and sea plantain. Species identified within this habitat include creeping bent, false oat-grass, cock's-foot, black knapweed, common hogweed, field bindweed, white clover, tufted vetch, ribwort plantain, dandelion, goat's-beard, common nettle, colt's-foot, red clover, rough hawkbit, yellow-wort and creeping thistle. South of Ryhope Denemouth, there is also a land drain which is evidently exacerbating erosion in this area (TN52P on Figure 1z.1). On this same Figure, five common spotted-orchids were found on the cliff top at TN93N.

Unimproved Calcareous Grassland

South Tyneside

5.2.25 On top of the rock to the south-east of Graham's Sand near Trow Point, calcareous grassland is present which contains wild thyme (*Thymus drucei*), hoary plantain, glaucous sedge, selfheal (*Prunella vulgaris*), bird's-foot trefoil, sea plantain and kidney vetch.

5.2.26 Around the edge of the cliff to the north-west of Frenchman's Bay, the cliff top contains unimproved calcareous grassland. Graminoids include cock's-foot, red fescue and glaucous sedge; and forbs comprise greater knapweed, tufted vetch, bird's-foot trefoil, black knapweed, daisy, creeping thistle, hoary plantain, kidney vetch, red clover and ribwort plantain. Towards the edge, the grassland becomes more maritime with thrift and sea plantain present.

5.2.27 On the steep cliff edges either side of the path to Marsden Bay, unimproved calcareous grassland occurs, containing glaucous sedge, sea plantain, greater knapweed, field scabious (*Knautia arvensis*), black knapweed, rough hawkbit, yarrow, zig-zag clover, carline thistle (*Carlina vulgaris*), betony and yellow-wort. Scattered bramble scrub is encroaching on this slope.

5.2.28 A patch of grassland inland from the cliff, north-east of Marsden quarry and limekilns within the SAC boundary contains notably diverse unimproved calcareous grassland, where graminoids include tor-grass (*Brachypodium pinnatum*), quaking grass (*Briza media*), meadow oat-grass (*Helictochloa pratensis*), cock's-foot, Yorkshire fog; and forbs

present are pyramidal orchid (TN71N on Figure 1h), yellow rattle (*Rhinanthus minor*), small scabious (*Scabiosa columbaria*), wild thyme, kidney vetch, hoary plantain, black knapweed, rough hawkbit, yarrow, common mouse-ear (*Cerastium fontanum*), red clover and creeping thistle. Tor-grass is becoming dominant in places. Unimproved calcareous grassland is also present in a patch to the east of Whitburn quarry and lime kilns, where there is a definite transition to semi-improved neutral grassland.

5.2.29 On the cliff top, slope and at the base of it around Whitburn Beach, unimproved calcareous grassland contains the graminoids quaking grass, meadow oat-grass, creeping bent, glaucous sedge; and the forbs lady's bedstraw, restharrow, rough hawkbit, creeping cinquefoil, common spotted-orchid (TN65N on Figure 1m), wild carrot, fairy flax (*Linum catharticum*), agrimony, goat's-beard, betony, salad burnet (*Poterium sanguisorba*) and common centaury (*Centaurium erythraea*). Scattered bramble scrub is encroaching onto this habitat in places, and common hogweed is also present.

Sunderland and Durham

5.2.30 Just north and south of Ryhope Denemouth – both outside the SAC boundary, there are areas of unimproved calcareous grassland (TN84N on Figure 1z) which contain quaking grass, red fescue, harebell (*Campanula rotundifolia*), greater knapweed, rough hawkbit, rockrose (*Helianthemum nummularium*), burnet-saxifrage (*Pimpinella saxifraga*) and bladder campion (*Silene vulgaris*) (TN85N on Figure 1z). Schedule 9 species Himalayan balsam is widespread within Ryhope Denemouth (TN35A on Figure 1z). Erosion of the cliff to the north of Ryhope Denemouth has revealed rubble within the cliff which may be colliery spoil (TN53P on Figure 1z).

<u>Coastal Grassland</u>

South Tyneside

5.2.31 Outcrops to the east of Graham's Sand south of Trow Point and the mosaic of habitats on Trow Point includes coastal grassland with species present such as red fescue, cock's-foot, soft brome, restharrow, bird's-foot trefoil, hoary plantain, dandelion, creeping thistle, prickly sow-thistle (*Sonchus asper*), common ragwort, colt's-foot, curled dock and wild thyme. During the survey, numerous people were having barbecues on Trow Point (TN49P on Figure 1a). During the 2020 survey, three juvenile common linnets (*Linaria cannabina*) were observed begging for food from one adult around the inland cliff and coastal grassland (TN90N on Figure 1a).

5.2.32 The inland cliff to the south-west of Frenchman's Bay contains coastal grassland on the rock face, comprising red fescue, black knapweed, bird's-foot trefoil, thrift, creeping

cinquefoil, glaucous sedge, common hogweed and dandelion. Schedule 9 species Spanish bluebell also occurs here (TN31A on Figure 1b).

5.2.33 The bay between Frenchman's Bay and Man Haven, and the outcrop north of Man Haven (Figure 1c) contains coastal grassland which extends to the path in places, where red fescue is dominant, with sea plantain, grass-leaved orache (*Atriplex littoralis*), thrift, white clover and creeping bent also present. Northern marsh-orchids are present on the edge of this habitat at TN81N (Figure 1c). This area of cliff appears more exposed than further south, with a greater maritime influence, and also appears to be trampled with a short sward.

5.2.34 On the cliff to the south of Man Haven, coastal grassland is dominated by sea plantain, thrift, buck's-horn plantain (*Plantago coronopus*) and red fescue and additional species including creeping bent, false brome, cock's-foot, perennial rye-grass, dyer's greenweed, greater knapweed, rough hawkbit, ribwort plantain, meadow vetchling, black knapweed, hoary plantain, harebell and creeping thistle.

5.2.35 Coastal grassland on the cliff edge around the Velvet Beds and either side of the access steps to Marsden Bay, comprises thrift, red fescue, rough hawkbit and greater knapweed, with common spotted-orchids present at TN79N and a cluster of >10 pyramidal orchids within this habitat (TN80N, both on Figure 1d).

5.2.36 Coastal grassland occurs close to the cliff edge east of Marsden quarry and lime kilns, and along the north of Marsden Bay. Species present include false oat-grass, bird's-foot trefoil, bladder campion (TN76N on Figure 1e), field scabious, lady's bedstraw, lady's mantle, burnet-saxifrage, meadow vetchling, yarrow and ribwort plantain. Saw-wort (*Serratula tinctoria*) is present within this habitat at TN76N. A similar species assemblage is present on a steep slope on the cliff edge east of Marsden Bay car park, where restharrow and saw-wort (TN77N on Figure 1g) are also present.

5.2.37 Coastal grassland containing predominantly sea plantain, red fescue and thrift occurs on the north of Marsden Bay, with buck's-horn plantain also present in this place. This species composition occurs along the south of Marsden Bay, east of Souter Lighthouse, in the north of Whitburn Coastal Park and extends up to the safety barrier in the south of it. North of Souter Lighthouse, this habitat additionally contains ribwort plantain, rough hawkbit, yellow-wort and black knapweed. Coastal grassland extends to the SAC boundary east of Souter Lighthouse. North of the stand of white butterbur (TN24A on Figure 1h), this habitat continues, with grasses present including meadow oat-grass and red fescue, with forbs represented by rough hawkbit, lady's mantle, yarrow, hoary plantain, colt's-foot, bird's-foot trefoil, wild carrot, salad burnet, greater knapweed, field bindweed, creeping thistle, sea plantain and common hogweed.

5.2.38 Areas of coastal grassland exist along the cliff top to the north of Whitburn Beach; the southern edge of Whitburn Point Nature Reserve; east of Souter Lighthouse; and at the southern end of Marsden Bay which contain red fescue, glaucous sedge, sea plantain, hoary plantain, thrift, rough hawkbit, colt's-foot, bird's-foot trefoil, red clover and black knapweed. There is a cluster of >10 northern marsh-orchids (TN73N on Figure 1i) in this habitat east of Souter Lighthouse.

5.2.39 To the east of Whitburn Coastal Park, rank semi-improved neutral grassland along the cliff top gives way to coastal grassland and also occurs at Whitburn Point Nature Reserve. Grasses present include cock's-foot, false oat-grass, red fescue and forbs rough hawkbit, ribwort plantain, kidney vetch, salad burnet, restharrow and sea plantain. There are also three bee orchids at TN67N (Figure 1k) and another at TN66N (Figure 1k). The coastal grassland becomes less diverse in the south of Whitburn Coastal Park, where there is no salad burnet or kidney vetch, and common hogweed is present.

5.2.40 Towards the north of Whitburn Beach, the cliff becomes higher and rockier, with loose stones present. This habitat contains a thin strip of coastal grassland comprising thrift, sea plantain, ribwort plantain and lady's bedstraw.

5.2.41 On the sloping edge of the cliff around Whitburn Beach, there is sparse coastal grassland which constitutes over 10% cover of the cliff. This contains sea plantain, perennial sow-thistle (*Sonchus arvensis*), false oat-grass, yarrow and common nettle. Further to the north, this habitat has additional species including restharrow, kidney vetch, mugwort, common hogweed, dyer's greenweed, black knapweed, sweet vernal-grass (*Anthoxanthum odoratum*) and lady's bedstraw.

5.2.42 Coastal grassland is present in a narrow strip on the edge of the cliff around the former rifle ranges containing red fescue, sea plantain, bird's-foot trefoil, wild carrot, yarrow, lady's bedstraw, thrift, common hogweed and dandelion. South of the former rifle ranges, this is dominated by sea plantain with thrift, curled dock and restharrow also present, occurring at the edge of the eroding soft cliff.

Sunderland and Durham

5.2.43 The northernmost point of the Sunderland section of SAC contains coastal grassland located on very steep hard cliff (TN88N on Figure 1s), where the cliff has been physically modified.

5.2.44 There is coastal grassland present on the cliff edge to the north-east of Grangetown; on the slope adjacent to steps down to Ryhope village beach; and on the cliff to the south of Ryhope Denemouth, all just outside the SAC boundary. This habitat comprises red fescue, restharrow, colt's-foot, sea plantain, rough hawkbit, curled dock, thrift and

occasional cock's-foot and black knapweed. There is Himalayan balsam present adjacent this habitat and the steps down to Ryhope village beach at TN37A, where there was also a pile of rubble and litter noted (TN54P – both on Figure 1w).

Tall Ruderal

South Tyneside

5.2.45 Inland from the south-west of a small bay between Frenchman's Bay and Graham's Sand, there is a stand of tall ruderal comprising common nettle and mugwort; and closer to the inland cliff, containing great willowherb (*Epilobium hirsutum*). Adjacent to this habitat, there is a large stand of non-native Canadian goldenrod (*Solidago canadensis*), which measures ~7 x 2m (TN32A). There are also two stands of Schedule 9 species Japanese knotweed on the slope up the inland cliff, which have been treated but are still alive, measuring ~7 x 5m each (TN33A and TN34A, all on Figure 1a).

5.2.46 There is a patch of common nettles on the cliff north of Frenchman's Bay, and at the base of the cliff to the north of Marsden Bay, there is a stand of tall ruderal vegetation which comprises common nettle, cleavers (*Galium aparine*), curled dock, false oat-grass and sea mayweed.

5.2.47 There are stands of Alexanders to the north-west and south-east of Marsden Grotto car park, with common nettle, cleavers, common hogweed, mugwort and black knapweed also present to the north-west of the car park.

5.2.48 A stand of Japanese knotweed measuring ~20 x 10m is present on the cliff edge at (TN23A), north of Souter Lighthouse. A patch of white butterbur measuring ~3 x 4m in size is present immediately to the north of this at (TN24A, both on Figure 1i).

5.2.49 The base of the cliff at Whitburn Beach contains tall ruderal vegetation comprising rosebay willowherb (*Chamerion angustifolium*), common hogweed, common nettle, creeping thistle and scattered bramble scrub. Among this habitat there is also potential Schedule 9 Montbretia at TN16A (Figure 1m).

5.2.50 At the western edge of Whitburn Bents, adjacent to the road leading to the Whitburn anglers' building, a patch of tall ruderal is present comprising common nettle, broad-leaved dock, yarrow, creeping cinquefoil, red fescue, barren brome (*Bromus sterilis*), dandelion and white butterbur (TN6A on Figure 1q). On the slope up to the car park west of Whitburn Bents there is an area dominated by white butterbur (TN7A on Figure 1q), within which there is scattered red fescue, field horsetail and common couch (*Elytrigia repens* (old name *Elymus repens*)).

5.2.51 Tall ruderal vegetation is present on the slope up from the open dunes at Whitburn Steel, where creeping thistle, common nettle, false oat-grass, common hogweed, sand sedge (*Carex arenaria*), yarrow, common ragwort and occasional marram grass occurs. Non-native species red valerian (*Centranthus ruber*) is also present within this habitat (TN4A on Figure 1r). Immediately to the west of the SAC boundary, near the Whitburn angling building at Whitburn Steel there is a stand of Schedule 9 Japanese knotweed (TN5A on Figure 1r). Further tall ruderal occurs to the south of a dry outlet at TN40P (Figure 1r) running from the Whitburn anglers' building. Species present here include creeping thistle, broad-leaved dock and common mallow (*Malva sylvestris*).

Bracken

Sunderland and Durham

5.2.52 There is a patch of bracken (*Pteridium aquilinum*) within Ryhope Denemouth and south of it on the eroding cliff slope, with some field scabious underneath, and at TN36A (Figure 1z.1).

Flush and Spring

South Tyneside

5.2.53 There is a small calcareous flush on the cliff slope at Marsden Bay in an inaccessible location.

Swamp

Sunderland and Durham

5.2.54 At Ryhope Nook, there are two patches of swamp vegetation perched on the soft cliff, comprising common reed (*Phragmites australis*) and hemp-agrimony (*Eupatorium cannabinum*).

5.2.55 South of Ryhope Denemouth, there is an area of swamp on the cliff top comprising reed mace (*Typha latifolia*).

Dense and Scattered Scrub

South Tyneside

5.2.56 Gorse (*Ulex europaeus*) scrub is present on a rocky outcrop to the east of Graham's Sand and Trow Point.

5.2.57 Dense blackthorn (*Prunus spinosa*) and gorse scrub occur on the cliff edge adjacent to the path to Marsden Bay.

5.2.58 Dense bramble scrub is present at the cliff edge, just south of Whitburn Point Local Nature Reserve, among rank semi-improved neutral grassland; and dense and scattered bramble and blackthorn scrub occur on the cliff top around Whitburn Beach.

5.2.59 A large patch of dense scrub composed of blackthorn, measuring ~30 x 8m is present on the semi-improved neutral grassland verge, east of the former rifle ranges at Whitburn, with an understory of common couch and dyer's greenweed, as well as blackthorn scrub to the south of the former rifle ranges.

5.2.60 There are two stands of dense bramble on the cliff edge east of Whitburn; and scattered bramble scrub within the semi-improved neutral grassland communities east of Whitburn, close to the Church of England Academy School.

5.2.61 On the slope to the west of Whitburn Steel, there is a patch of dense scrub which contains dog rose (*Rosa canina*), with an understory of creeping thistle, false oat-grass, marram grass and common hogweed.

Sunderland and Durham

5.2.62 Around the patch of bracken south of Ryhope Denemouth outside of the SAC boundary, there is scattered scrub comprising bramble and goat willow (*Salix caprea*).

Scattered Broadleaved Trees

South Tyneside

5.2.63 Along the cliff top at Whitburn Beach and further north, there are occasional scattered immature whitebeam (*Sorbus* sp.) trees.

Sunderland and Durham

5.2.64 The cliff tops around Ryhope have occasional scattered young trees.

Crevice and Ledge Vegetation

South Tyneside

5.2.65 To the south-east of Frenchman's Bay, red fescue, thrift, creeping bent, and curled dock make up crevice and ledge vegetation covering >30% of the cliff. North of Marsden Bay,

this vegetation contains common mallow, perennial sow-thistle, wall barley, red fescue and sea mayweed.

5.2.66 On the sloping eroded cliff to the north of Whitburn Coastal Park, there is an area of crevice and ledge vegetation containing red fescue, wild carrot and sea plantain. The cliff edge and ledges along it to the east and north of Souter Lighthouse contains crevice and ledge vegetation on the hard cliffs where sea mayweed, bird's-foot trefoil, ribwort plantain and thrift are also present.

5.2.67 The soft cliff on Whitburn cliff tops is crumbling, with ~40% of the cliff area covered by vegetation such as creeping bent, red fescue, tall fescue, ribwort plantain, creeping cinquefoil, sea plantain, curled dock, bird's-foot trefoil, wild carrot and colt's-foot.

Open Dune

South Tyneside

5.2.68 There are open dunes around the beach to the west of Frenchman's Bay and on Trow Point which contain red fescue, cock's-foot, false oat-grass, sand couch (*Elytrigia juncea* (NVC old name - *Elymus farctus*)), yarrow, dandelion and creeping thistle.

5.2.69 Small open sand dunes also occur on Whitburn Beach where there are numerous stands of Schedule 9 species Japanese rose, including established patches and young seedlings (TN15A, TN16A – TN22A on Figure 1m).

5.2.70 The west of Whitburn Bents and Whitburn Steel comprises partially stabilised open sand dunes with incomplete plant cover. Species present include sand sedge, perennial rye-grass, wild carrot, frosted orache (*Atriplex laciniata*), sea rocket (*Cakile maritima*), creeping thistle, Babington's orache (*Atriplex glabriuscula*), ribwort plantain, dandelion, colt's foot, curled dock, restharrow, common cat's-ear, black knapweed, yarrow, mugwort, goat's beard and false oat-grass. Within this area of open dune on the beach at Whitburn Steel there are stands of red valerian (TN2A, TN3A on Figure 1r); Schedule 9 species Japanese rose (TN1A and TN8A – TN10A on Figure 1q) and non-native red valerian on the soft cliff (TN12A, all on Figure 1q).

Maritime Soft Cliff

South Tyneside

5.2.71 South of the former rifle ranges at Whitburn, there is perched soft cliff over hard cliff, with sand martin (*Riparia riparia*) holes present at this grid reference (TN62N on Figure 1o).

5.2.72 The cliff in the south of the South Tyneside region is heavily eroded soft cliff, which contains sparse vegetation with <10% cover in places, with species present such as yellow oat-grass, cock's-foot, tall fescue, sea rocket, oxeye daisy (*Leucanthemum vulgare*), restharrow, kidney vetch, colt's-foot, weld (*Reseda luteola*), wild carrot, ribwort plantain, bird's-foot trefoil, creeping cinquefoil, common couch, creeping thistle, black knapweed, black medick, meadow vetchling and common hogweed. Some of this vegetation has evidently slipped down through erosion of the soft cliff. There are two stands where yellow loosestrife dominates this community (TN11A on Figure 1q).

Sunderland and Durham

5.2.73 Along the majority of the cliff just outside the Durham and Sunderland regions of the SAC up to Grangetown, there is eroded soft cliff which has vegetation covering <10% of the cliff with creeping bent, cock's-foot, red clover, colt's-foot, thrift, curled dock and prickly sow-thistle. Along the soft cliff to the east of Grangetown, there is a dangerous access point with a rope and makeshift steps where people access the beach (TN58P on Figure 1t).

Maritime Hard Cliff

South Tyneside

5.2.74 Part of the outcrop of Trow Point comprises hard cliff, with sporadic sea plantain on it. The cliff becomes higher from NZ3951565868 southwards.

5.2.75 At TN48P (Figure 1e) north of Marsden Bay, there is perched soft cliff eroding over the hard limestone cliffs, where seepage of clay is also visible. This contains scattered bird's-foot trefoil and red fescue.

5.2.76 On the cliffs around Marsden Bay there are nesting sea birds heavily influencing the vegetation, and here the sparse vegetation present comprises sea plantain, false oat-grass and curled dock.

5.2.77 Exposed maritime hard cliff with vegetation making up <10% cover north-east of Marsden Bay car park comprises thrift, red fescue, sea plantain and restharrow; and is also present east of Marsden quarry and lime kilns.

5.2.78 Rocky outcrops and stacks comprising maritime hard cliff present as exposed cliff is present to the east of Souter Lighthouse; and occurs with occasional sea plantain and bird's-foot trefoil around the south of Whitburn Coastal Park; and. There is an example of netting to stabilise the banks at TN44P (Figure 1k), with erosion evident around this area.

5.2.79 Hard cliff to the east of Marsden quarry and limekilns on the hard cliff comprises wild thyme, rough hawkbit and sea plantain, with rockrose at TN75N (Figure 1g).

5.2.80 Beneath the vegetation, the maritime soft cliff transitions to hard cliff with soil on from NZ4136363135, just south of Whitburn Point Nature Reserve.

Sunderland and Durham

5.2.81 The north of the Sunderland section of cliff comprises hard cliff with perched soft cliff, which is mostly unvegetated, seemingly due to heavy erosion.

Strandline Vegetation

South Tyneside

5.2.82 A small quantity of strandline vegetation occurs below the cliffs at Marsden Bay, where common mallow and sea mayweed are present (too small to map).

5.2.83 Patches of strandline vegetation occur on Whitburn Beach, comprising sea sandwort (*Honckenya peploides*), perennial sow-thistle and perennial rye-grass.

5.2.84 There are patches of strandline community along Whitburn Bents and Whitburn Steel, characterised by occasional Babington's orache, sand couch, curled dock, restharrow and notable species prickly saltwort (*Salsola kali* subsp. *kali*) towards the north (TN61N on Figure 1q).

Sunderland and Durham

5.2.85 There is a small quantity of strandline vegetation at Ryhope Denemouth, containing sea mayweed.

Intertidal

South Tyneside, Sunderland and Durham

5.2.86 Intertidal vegetation on rocks is present along the majority of the coast in South Tyneside and Sunderland, comprising green algal beds and seaweeds such as bladder wrack (*Fucus vesiculosus*).

Rocks above high-tide mark

South Tyneside, Sunderland and Durham

5.2.87 Several stacks occur above the high-tide mark along the coast, classified as maritime hard cliff communities with species listed above.

Bare ground

South Tyneside

5.2.88 There is an area of bare ground hard standing around an old gun turret on Trow Point.

5.2.89 There are bare ground platforms at the base the cliffs at Marsden Bay including steps down to the beach, and next to Marsden Grotto.

5.2.90 Just outside the SAC boundary to the north of Souter Lighthouse there is a bare ground hard standing car park.

Other Observations

South Tyneside

5.2.91 Sand martin nest holes were observed along the South Tyneside section of the coast at TN78N (Figure 1d), TN69N (Figure 1j), TN62N (Figure 1o), and TN74N (Figure 1p).

Sunderland and Durham

5.2.92 It was noted that on the cliff top between Grangetown and Ryhope (TN55P on Figure 1v), the presence of the train line parallel to the coast limits the amount of access people have to the coast to a few points, and not many people were observed along this stretch, in comparison with the South Tyneside stretch.

5.2.93 East of the roundabout at Grangetown, cliff erosion has exposed rubble and other debris which may indicate that there was a tip there (TN56P on Figure 1u).

5.2.94 Sand martin nest holes are also present in the Sunderland section at TN86N (Figure 1z).

6.0 VEGETATION COMMUNITY DESCRIPTIONS

6.1 Rationale for Community Descriptions

6.1.1 The NVC sets out to represent identifiable communities at various points in the phyto-sociological continuum. In the introduction to Maritime Cliff Communities (Rodwell 2000), it is stated that the east coast of England, and in particular soft cliffs, were not extensively sampled, and this vegetation is not comprehensively characterised at present. Indeed, sampling from the Durham Coast barely appears to have taken place at all. Consequently, the communities encountered do not readily accord with those described in Rodwell.

6.1.2 Recognising this, the vegetation communities represented in this Section are described in terms of analogous communities appearing in the NVC published literature. These are the headings and labels given to the community, but practitioners must remain aware that whilst those NVC codes have been assigned, the communities we are dealing with differ in significant ways from those described in Rodwell. This is particularly important when considering the mapped information.

6.1.3 Community descriptions are offered below for each sub-community encountered based on quadrat data collected.

6.2 Summary of Communities Mapped

6.2.1 The NVC communities encountered are listed in the Table below. NVC Maps are provided at Figure 2.

6.2.2 NVC Communities present in study area:

NVC Community	South Tyneside	Sunderland & Durham
CG2c *Festuca ovina – Helictotrichloa pratensis* grassland; *Holcus lanatus – Trifolium repens* sub-community	Yes	Yes
CG4a *Brachypodium pinnatum* grassland; *Helictotrichloa pratensis – Thymus drucei* sub-community	Yes	
MC6 *Atriplex prostrata – Beta vulgaris ssp. maritima*; sea-bird cliff community	Yes	
MC8a *Festuca rubra – Armeria maritima* grassland; Typical sub-community	Yes	Yes
MC8e *Festuca rubra – Armeria maritima* grassland; *Plantago coronopus* sub-community	Yes	
MC8f *Festuca rubra – Armeria maritima* grassland; *Anthyllis vulneraria* sub-community	Yes	

NVC Community	South Tyneside	Sunderland & Durham
MC9a *Festuca rubra – Holcus lanatus* maritime grassland; *Plantago maritima* sub-community	Yes	
MC9c *Festuca rubra – Holcus lanatus* maritime grassland; *Achillea millefolium* sub-community	Yes	
MC10b *Festuca rubra – Plantago* spp. maritime grassland; *Carex panicea* sub-community	Yes	Yes
MC11b *Festuca rubra – Daucus carota* ssp. *gummifer* maritime grassland; *Ononis repens* sub-community	Yes	
MG1a *Arrhenatherum elatius* grassland; *Festuca rubra* sub-community	Yes	
MG1d *Arrhenatherum elatius* grassland; *Pastinaca sativa* sub-community	Yes	Yes
MG1e *Arrhenatherum elatius* grassland; *Centaurea nigra* sub-community	Yes	
MG5b *Cynosurus cristatus – Centaurea nigra* grassland; *Galium verum* sub-community	Yes	Yes
MG6a *Lolium perenne-Cynosurus cristatus* grassland; Typical sub-community	Yes	
MG11b *Festuca rubra – Agrostis stolonifera – Potentilla anserina* grassland, *Atriplex prostrata* sub-community	Yes	Yes
MG12a – *Festuca arundinacea* grassland *Lolium perenne – Holcus lanatus* sub-community	Yes	Yes
OV24a *Urtica dioica – Galium aparine* community; Typical sub-community	Yes	
OV25b *Urtica dioica-Cirsium arvense* community; *Rumex obtusifolius – Artemisia vulgaris* sub-community	Yes	Yes
OV26d (Wetland 2) *Epilobium hirsutum* community; *Arrhenatherum elatius- Heracluem sphondylium* sub-community		Yes
OV26 (Wetlands 3, 4 & 5) *Epilobium hirsutum* community		Yes
OV27b *Chamerion angustifolium* community; *Urtica dioica-Cirsium arvense* sub-community	Yes	
W21c *Crataegus monogyna – Hedera helix* scrub; *Brachypodium sylvaticum* sub-community	Yes	
W22c *Prunus spinosa – Rubus fruticosus* agg. scrub; *Dactylis glomerata* sub-community	Yes	
W24a *Rubus fruticosus – Holcus lanatus* underscrub; *Cirsium arvense – Cirsium vulgare* sub-community	Yes	
W24b *Rubus fruticosus – Holcus lanatus* underscrub; *Arrhenatherum elatius – Heracleum sphondylium* sub-community	Yes	
W25a *Pteridium aquilinum – Rubus fruticosus* agg. underscrub; *Hyacinthoides non-scripta* sub-community		Yes
S12 (Wetland 1) *Typha latifolia* swamp		Yes
S25 (Wetland 6 & 7) *Phragmites australis – Eupatorium cannabinum* fen		Yes
M10 (Wetland 8) *Carex dioica – Pinguicula vulgaris* mire	Yes	
SD2 *Honkenya peploides – Cakile maritima* strandline community	Yes	Yes
SD3 *Matricaria maritima – Galium aparine* strandline community	Yes	
SD5b Leymus arenarius mobile dune community; Elymus farctus sub-community	Yes	

NVC Community	South Tyneside	Sunderland & Durham
SD8a *Festuca rubra – Galium verum* fixed dune grassland; Typical sub-community	Yes	

6.3 CG2c *Festuca ovina – Helictotrichloa pratensis* grassland *Holcus lanatus – Trifolium repens* sub-community

Community Attributes

Attribute	Status - CG2c
Broad habitat type	Calcareous Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Lowland Calcareous Grassland
UKHabs code	g2a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – South Tyneside (General)

6.3.1 Whilst sheep's fescue (*Festuca ovina*) was not recorded during the survey, community constants are otherwise well represented including meadow oat-grass, quaking grass, glaucous sedge, crested hair-grass, rough hawkbit and mouse-ear hawkweed (*Pilosella officinarum*). Ribwort plantain is replaced by sea plantain as a community constant, and sheep's fescue is replaced throughout by red fescue.

6.3.2 The replacement of sheep's fescue by red fescue, and the abundance of hoary plantain accompanied by black knapweed, creeping bent and yarrow indicates that this community is best described in terms of its affinity with CG2c *Holcus lanatus – Trifolium repens* sub-community.

6.3.3 Sea plantain is a community constant, and salt tolerant bryophytes such as *Tortella flavovirens* thrive indicating that this is para-maritime grassland with strong affinity to grassland recorded elsewhere on Magnesian limestone outcrops on the Durham Coast and chalk cliffs in North Yorkshire.

6.3.4 CG2c is associated with hard cliffs north of Souter Point and near Whitburn Beach occurring on steep, free-draining slopes where the substrate is largely stable. These stands are considered to be of high nature conservation value as the sward is flower-rich with much small scabious, betony, carline thistle and restharrow. It was also noted that invertebrate diversity and abundance appeared to be high.

6.3.5 The community is well developed on the low cliffs around Whitburn Beach, appearing again below hard cliffs at Marsden Bay on exposed slopes and at the head of Frenchman's Bay. CG2c is also present on outcrops left by quarrying south-east of Trow Point.

Community Description – Marsden Bay (south)

6.3.6 Within Durham Coast SAC there is a well-defined managed area of CG2 grassland on the cliff-top in the south part of Marsden Bay. Whilst sheep's fescue was not recorded during the survey, community constants for CG2c are well represented here including meadow oat-grass, quaking grass, glaucous sedge, rough hawkbit and ribwort plantain. Salad burnet and small scabious are also present. Sheep's fescue is replaced throughout by red fescue.

6.3.7 It is acknowledged that placing this expression of CG2 grassland is problematic as it is a poor fit for all published sub-communities and it is possible that the grassland has formed on soil influenced by (or comprising?) spoil from the nearby industrial lime kilns (now disused).

6.3.8 CG2d *Dicranum scoparium* sub-community was considered, however, the complete lack of mosses which are the hallmark of this lush sub-community characteristic of north-facing slopes in the Yorkshire Wolds and Craven District makes this a poor candidate for CG2d. Similarly, preferential vascular plants are absent such as common bent, sweet vernal-grass and limestone bedstraw (*Galium sterneri*). CG2b was also considered, however, on balance whilst preferential species such as black knapweed, cock's-foot, red clover and hoary plantain are present, placement within this sub-community characteristic of Salisbury Plain and closely related sites in the south-west with a very specific management history seems unacceptable.

6.3.9 Overall, given the physiognomy of the stand, it's location on moderately fertile soil over calcareous substrate and the appearance of sub-community preferentials creeping bent, yarrow and yellow oat-grass it is considered that this vegetation is best described in terms of its affinity with CG2c *Holcus lanatus – Trifolium repens* sub-community.

6.3.10 Sea plantain is a community constant indicating that this should be regarded as para-maritime grassland with affinity to grassland recorded elsewhere on Magnesian limestone outcrops on the Durham Coast.

6.3.11 This expression of CG2c is restricted to the cliff top in the south part of Marsden Bay where it occurs on free-draining substrates right up to the cliff edge, although in more exposed cliff-top situations this CG2c gives way to MC8f maritime grassland. This grassland is considered to be of high nature conservation value as the sward is flower-

rich with burnet-saxifrage, yellow rattle, small scabious and pyramidal orchid, the latter suggesting much affinity with para-maritime calcareous grasslands of North Yorkshire coast. Species of note in this community also include saw-wort.

6.3.12 Over time the community may be threatened through invasion by tor-grass which tends to dominate and reduce species richness. Control of tor-grass is problematic in public places requiring hard grazing or burning. Periodic topping with a robust mower may keep tor-grass in check.

Community Description – South Tyneside (General)

6.3.13 The following species were recorded in CG2c during this study:

Species	**DAFOR**
Briza media	A
Festuca rubra	A
Plantago maritima	F
Aira praecox	F
Betonica officinalis	F
Brachypodium sylvaticum	F
Carex flacca	F
Carlina vulgaris	F
Helictochloa pratensis	F
Ononis repens	F
Galium verum	LF
Linum catharticum	LF
Pilosella officinarum	LF
Sanguisorba minor	LF
Tortella flavovirens	LF
Agrostis stolonifera	O
Anthyllis vulneraria	O
Blackstonia perfoliata	O
Centaurea nigra	O
Centaurea scabiosa	O
Centaurium erythraea	O
Dactylis glomerata	O
Hypochaeris radicata	O
Jacobaea erucifolius	O
Knautia arvensis	O
Leontodon hispidus	O
Lotus corniculatus	O
Pimpinella saxifraga	O
Scabiosa columbaria	O
Carex panicea	O
Plantago media	O
Achillea millefolium	R
Daucus carota	R
Campylium stellatum	R

Species	DAFOR
Campanula rotundifolia	R
Ononis spinosa	R

6.3.14 The following quadrat data was recorded for CG2c:

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid NZ	**4132 6289**	**4133 6299**	**3968 6520**	**3968 6522**	**3889 6620**		
Sward height (cm)	**10**	**20**	**10**	**8**	**7**		
Plantago maritima	5	4	3	4	3	V	(3-5)
Festuca rubra	3	3	3	3	4	V	(3-4)
Agrostis stolonifera	2	4	4	4	5	V	(2-5)
Leontodon hispidus	3	2	3	3	3	V	(2-3)
Carex flacca		3	5	3	6	IV	(3-6)
Helictochloa pratensis	3	6	4	4		IV	(3-6)
Centaurea nigra		2	2	2	3	IV	(2-3)
Carlina vulgaris	1	2	1	1		IV	(1-2)
Briza media	4	3	3			III	(3-4)
Pilosella officinarum	3	2		2		III	(2-3)
Sanguisorba minor	2	2		3		III	(2-3)
Brachypodium sylvaticum	5	2	1			III	(1-5)
Dactylis glomerata	2	1			2	III	(1-2)
Lotus corniculatus			3		3	II	(_3)
Blackstonia perfoliata			3	3		II	(_3)
Galium verum	2	3				II	(2-3)
Scabiosa columbaria			2	3		II	(2-3)
Hypochaeris radicata			2	3		II	(2-3)
Aira praecox		2	2			II	(_2)
Ononis repens		3	1			II	(1-3)
Betonica officinalis		2	1			II	(1-2)
Centaurea scabiosa				2	1	II	(1-2)
Pimpinella saxifraga			1	1		II	(_1)
Anthyllis vulneraria					3	I	(_3)
Daucus carota	3					I	(_3)
Linum catharticum		3				I	(_3)
Tortella flavovirens		3				I	(_3)
Jacobaea erucifolius	2					I	(_2)
Achillea millefolium					1	I	(_1)
Centaurium erythraea		1				I	(_1)
Knautia arvensis		1				I	(_1)

Community Description – South Tyneside (Marsden Bay, south expression)

6.3.15 The following species were recorded in the Marsden Bay (south) expression of CG2c:

Species	**DAFOR**
Briza media	D
Festuca rubra	D
Helictochloa pratensis	D
Carex flacca	A
Galium verum	A
Plantago lanceolata	F
Centaurea nigra	F
Dactylis glomerata	F
Primula veris	F
Leontodon hispidus	F
Plantago maritima	F
Dactylorhiza fuchsii	F
Trifolium pratense	F
Anthyllis vulneraria	F
Lotus corniculatus	F
Pimpinella saxifraga	F
Koeleria macrantha	F
Rhinanthus minor	LF
Cerastium fontanum	O
Anacamptis pyramidalis	O
Agrostis stolonifera	O
Tragopogon pratensis	O
Plantago media	O
Achillea millefolium	O
Trisetum flavescens	O
Brachypodium rupestre	O
Conopodium majus	R
Sanguisorba minor	R
Centaurea scabiosa	R
Jacobaea vulgaris	R
Rumex acetosa	R
Ranunculus bulbosus	R
Scabiosa columbaria	R
Serratula tinctoria	R
Prunella vulgaris	R
Helianthemum nummularium	R
Thymus drucei	R

6.3.16 The following quadrat data was recorded in the Marsden Bay (south) expression of CG2c:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Frequency**	**Abundance**
Quadrat location - OS Grid NZ	**4019 6468**	**4044 6453**	**4046 6453**	**4051 6448**	**4053 6445**		
Sward height (cm)	**30**	**25**	**25**	**25**	**25**		
Briza media	5	5	6	7	4	V	(4-7)
Festuca rubra	4	5	6	4	6	V	(4-6)
Helictochloa pratensis	6	5	4	6	5	V	(4-6)
Carex flacca	4	3	4	3	4	V	(3-4)
Galium verum	3	5	2	3	3	V	(2-5)
Plantago lanceolata	2	2	2	3	3	V	(2-3)
Centaurea nigra	2	3	2	1	3	V	(1-3)
Dactylis glomerata	2	2	1	2	2	V	(1-2)
Primula veris	2	3	2	1	3	V	(1-3)
Leontodon hispidus	3	3		3	4	IV	(3-4)
Plantago maritima	3	3	3	2		IV	(2-3)
Dactylorhiza fuchsii	2		2	2	2	IV	(_2)
Trifolium pratense	2	2		2	2	IV	(_2)
Anthyllis vulneraria	2	4	2	1		IV	(1-4)
Lotus corniculatus	2	3	2	1		IV	(1-3)
Pimpinella saxifraga	2	2			3	III	(2-3)
Koeleria macrantha	2	2			3	III	(2-3)
Cerastium fontanum	1	1			2	III	(1-2)
Rhinanthus minor	1			3	2	III	(1-3)
Anacamptis pyramidalis	1				1	II	(_1)
Agrostis stolonifera					3	I	(_3)
Conopodium majus				2		I	(_2)
Tragopogon pratensis				2		I	(_2)
Sanguisorba minor		2				I	(_2)
Plantago media				2		I	(_2)
Centaurea scabiosa		1				I	(_1)
Jacobaea vulgaris		1				I	(_1)
Rumex acetosa					1	I	(_1)
Ranunculus bulbosus					1	I	(_1)
Scabiosa columbaria			1			I	(_1)
Serratula tinctoria	1					I	(_1)
Prunella vulgaris	1					I	(_1)

6.4 CG4a *Brachypodium pinnatum* grassland *Helictotrichloa pratensis – Thymus drucei* sub-community

Community Attributes

Attribute	Status – CG4a
Broad habitat type	Calcareous Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Lowland Calcareous Grassland
UKHabs code	g2a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.4.1 Dominated by tor-grass, this grassland community has only two other community constants: glaucous sedge and sheep's fescue. The former is constant in the expression in South Tyneside, but sheep's fescue was absent replaced by red fescue. The frequency of meadow oat-grass suggests most affinity with CG4a sub-community.

6.4.2 The community was encountered once in association with CG2c on the cliff top in the south part of Marsden Bay (TN75N on Figure 2g). Tor-grass has extensive rhizomes and invades calcareous grassland with vigour; consequently, it is likely that where CG4a occurs it has replaced more species-rich CG2c. More robust calcareous forbs persist for a time, but ultimately tor-grass is known to become overwhelmingly dominant.

6.4.3 The following species were recorded in CG4a:

Species	**DAFOR**
Brachypodium pinnatum	D
Carex flacca	F
Briza media	F
Helictochloa pratensis	F
Plantago lanceolata	F
Centaurea nigra	F
Prunella vulgaris	F
Festuca rubra	F
Campanula rotundifolia	F
Sanguisorba minor	O
Galium verum	O
Knautia arvensis	O

Species	DAFOR
Dactylorhiza fuchsii	O
Dactylis glomerata	R
Primula veris	R
Lotus corniculatus	R
Plantago maritima	R
Plantago media	R
Serratula tinctoria	R
Potentilla reptans	R
Achillea millefolium	R
Leontodon hispidus	R
Pimpinella saxifraga	R
Rhinanthus minor	R

6.4.4 The following quadrat data was collected for CG4a:

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid NZ	**4048 6452**	**4050 6452**	**4049 6450**	**4051 6450**	**4050 6449**		
Sward height (cm)	**35**	**25**	**40**	**25**	**40**		
Brachypodium pinnatum	9	9	10	9	10	V	(9-10)
Carex flacca	3	3	3	3	3	V	(_3)
Briza media	2	2	2	2	1	V	(1-2)
Helictochloa pratensis	4	3		4	3	IV	(3-4)
Plantago lanceolata	2		2	2	2	IV	(_2)
Centaurea nigra	2	2	1	1		IV	(1-2)
Prunella vulgaris	1	1	1		2	IV	(1-2)
Festuca rubra			3	3	3	III	(_3)
Campanula rotundifolia		2		1	2	III	(1-2)
Sanguisorba minor	2		3			II	(2-3)
Galium verum	2	2				II	(_2)
Knautia arvensis				2	2	II	(_2)
Dactylorhiza fuchsii		1		2		II	(1-2)
Dactylis glomerata	1				1	II	(_1)
Primula veris				1	1	II	(_1)
Lotus corniculatus			2			I	(_2)
Plantago maritima				2		I	(_2)
Plantago media			2			I	(_2)
Serratula tinctoria	2					I	(_2)
Potentilla reptans				2		I	(_2)
Achillea millefolium			1			I	(_1)
Leontodon hispidus					1	I	(_1)
Pimpinella saxifraga			1			I	(_1)
Rhinanthus minor	1					I	(_1)

6.5 MC6 *Atriplex prostrata – Beta vulgaris* ssp. *maritima* sea-bird cliff community

Community Attributes

Attribute	Status – MC6
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	s2a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.5.1 This community occurs on cliff ledges and stacks in the well fertilised environment created by an abundance of nesting and roosting sea birds. This community is generally dominated by sea mayweed, as well as a variety of associates including much wild-rocket (*Diplotaxis tenuifolia*) and wall barley in some less exposed situations. Orache (*Atriplex* spp.) was much in evidence with grass-leaved orache recorded in one location.

6.5.2 The community is well developed on wide ledges on the hard cliffs in Marsden Bay, and occurs on various stacks to the south of this where roosting seabirds congregate.

6.5.3 The following species were recorded in MC6:

Species	**DAFOR**
Tripleurospermum maritimum	D
Plantago coronopus	F / O
Diplotaxis tenuifolia	F / O
Malva sylvestris	F / O
Agrostis stolonifera	O
Armeria maritima	O
Bellis perennis	O
Plantago lanceolata	O
Hordeum murinum	O
Lolium perenne	O
Sonchus asper	O
Atriplex sp.	O
Arrhenatherum elatius	O
Atriplex littoralis	R
Rumex obtusifolius	R
Rumex crispus	R

6.5.4 Quadrats were surveyed from the beach and cliff, using binoculars, and are detailed below:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 40231 64641**	**NZ 40082 64763**	**NZ 40078 64770**	**NZ 39989 64863**	**NZ 39997 64848**		
Sward height (cm)	15	16	10	15	14		
Tripleurospermum maritimum	7	6	7	7	7	V	(6-7)
Plantago coronopus		4		5	4	III	(4-5)
Diplotaxis tenuifolia	5		4	3		III	(3-5)
Malva sylvestris	4	4			4	III	(_4)
Agrostis stolonifera	5	4				II	(4-5)
Armeria maritima	4			3		II	(3-4)
Hordeum murinum		2		2		II	(_2)
Bellis perennis			5			I	(_5)
Plantago lanceolata					3	I	(_3)
Lolium perenne		3				I	(_3)
Sonchus asper					3	I	(_3)
Arrhenatherum elatius				3		I	(_3)
Atriplex sp.		2				I	(_2)
Rumex obtusifolius	2					I	(_2)
Rumex crispus			2			I	(_2)

6.6 MC8a *Festuca rubra – Armeria maritima* maritime grassland; Typical sub-community

Community Attributes

Attribute	Status – MC8a
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	s2a5 and s2a6
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.6.1 Community constants red fescue and thrift are present with creeping bent. The Typical sub-community does not have any associate species, and is often overwhelmingly dominated by red fescue where the sward forms a thick 'mattress'. Species which are intolerant of salt-spray are absent (e.g. false oat-grass) allowing red fescue to dominate. Species of restricted distribution occurring in this sub-community include saw-wort, grass-leaved orache and bladder campion.

6.6.2 This community occurs predominantly on the tops of hard cliffs where the substrate is relatively stable and the community has been exposed to maritime influences for some time. Consequently, there is much MC8a on the north-east facing cliff tops north of Lizard Point to Trow Point, often featuring significant areas of pruinose red fescue.

6.6.3 The community features thrift only in the most exposed locations, or where trampling or other pressure reduces the dominance of red fescue. On prominent headlands where sea birds roost there is an observable increase in nutrient demanding species such as daisy.

Community Description – Sunderland and Durham

6.6.4 Expressions of MC8a maritime grassland were encountered south of Ryhope Denemouth in Durham where enhanced maritime influence was present, for example exposed grassland at the eroding edge of perched soft cliffs. The MC8a has formed through editing of species in MG1 grassland whereby false oat-grass becomes less

vigorous and dies along with hogweed and other species intolerant of salt spray, allowing red fescue and salt tolerant forbs to increase in abundance.

6.6.5 Further MC8a grassland has formed where the top of the cliff has been removed above the concrete slip-way (Figure 2s). This has allowed grassland to develop which has clear affinity with MC8a maritime grassland.

6.6.6 The quadrat samples taken in Sunderland section for MC8a are acknowledged as a poor fit for any maritime grassland community and consequently the physiognomy and character of the vegetation was a major consideration in placing the vegetation in the NVC. MC10 *Festuca rubra – Plantago* spp maritime grassland was considered. This grassland type is abundant on west coast of Scotland and Wales where the community is well developed with clear zonation as described in Rodwell (2000). The key factor driving development of this community is heavy grazing (and trampling) to produce a tight sward with an abundance of *Plantago* sp. MC10 maritime grassland is also recorded on east coast of northern England on thin soils with heavy trampling.

6.6.7 The Sunderland MC8a grassland communities are un-grazed and do not have a tight sward. Notably, they have a 'thick mattress' of red fescue which readily accords with the description of MC8 in Rodwell (2000). The apparent abundance of ribwort plantain in quadrat data (which contrasts with the recording of ribwort plantain as 'rare' in the DAFOR table) may be due to the fact that safely accessible expressions of MC8a in Sunderland were on cliff tops where there was less maritime influence. On balance the description of this sub-community is considered most appropriate in terms of MC8a.

6.6.8 The following species were recorded in MC8a in South Tyneside:

Species	**DAFOR**
Festuca rubra	D
Agrostis stolonifera	F
Cirsium arvense	F
Centaurea scabiosa	LF
Bellis perennis	vLF
Plantago maritima	O / LF
Centaurea nigra	O
Dactylis glomerata	O
Lotus corniculatus	O
Potentilla reptans	O
Trifolium repens	O
Convolvulus arvensis	O
Galium verum	O
Potentilla anserina	O
Taraxacum agg	O
Cochlearia officinalis	R
Achillea millefolium	R

Species	DAFOR
Armeria maritima	R
Heracleum sphondylium	R
Lathyrus pratensis	R
Leontodon hispidus	R
Plantago lanceolata	R
Scorzoneroides autumnalis	R
Silene vulgaris	R
Serratula tinctoria	R
Sonchus arvensis	R
Arrhenatherum elatius	R
Lolium perenne	R
Atriplex littoralis	R

6.6.9 The following species were recorded in MC8a in Sunderland and Durham:

Species	DAFOR
Festuca rubra	D
Agrostis stolonifera	F
Cirsium arvense	F
Blackstonia perfoliata	vLF
Bellis perennis	vLF
Trifolium pratense	vLF
Pilosella officinalis	vLF
Anthyllis vulneraria	vLF
Plantago maritima	O / LF
Achillea millefolium	O
Centaurea nigra	O
Dactylis glomerata	O
Hypochaeris radicata	O
Lotus corniculatus	O
Medicago lupulina	O
Taraxacum agg	O
Tragopogon pratensis	O
Trifolium repens	O
Tortella flavovirens	O
Jacobaea erucifolius	O
Linaria vulgaris	O
Cerastium fontanum	R
Dactylorhiza praetermissa	R
Heracleum sphondylium	R
Jacobaea vulgaris	R
Leontodon hispidus	R
Pastinaca sativa	R
Pimpinella saxifraga	R
Plantago lanceolata	R
Plantago media	R
Trifolium dubium	R

Species	DAFOR
Vicia sativa	R

6.6.10 The following quadrat data was recorded for MC8a in South Tyneside:

Species	Q1	Q2	Q3	Q4	Q5	Q6	Frequency	Abundance
Quadrat location - OS Grid NZ	**4094 6427**	**4092 6429**	**4018 6472**	**3964 6586**	**3939 6599**	**4120 6371**		
Sward height (cm)	**20**	**25**	**15**	**25**	**20**	**18**		
Festuca rubra	10	9	10	10	9	10	V	(9-10)
Agrostis stolonifera	2	2	3		3		IV	(2-3)
Cirsium arvense	4	3	3				III	(3-4)
Potentilla reptans	3	3					II	(_3)
Plantago maritima				2	4		II	(2-4)
Lotus corniculatus			3		2		II	(2-3)
Trifolium repens				2	2		II	(_2)
Armeria maritima					1	4	II	(_1)
Centaurea nigra		1	1				II	(_1)
Dactylis glomerata		1	1				II	(_1)
Scorzoneroides autumnalis					2		I	(_2)
Plantago lanceolata					2		I	(_2)
Cochlearia officinalis						2	I	(_2)
Heracleum sphondylium			1				I	(_1)
Leontodon hispidus			1				I	(_1)
Lathyrus pratensis	1						I	(_1)
Achillea millefolium			1				I	(_1)

6.6.11 The following quadrat data was recorded for MC8a in Sunderland and Durham:

Species	Q7	Q8	Q9	Frequency	Abundance
Quadrat location - OS Grid NZ	**4192 5183**	**4159 5303**	**4125 5474**		
Sward height (cm)	**25**	**20**	**25**		
Festuca rubra	9	9	7	V	(7-9)
Agrostis stolonifera	4	3	5	V	(3-5)
Plantago lanceolata	3	2	3	V	(2-3)
Hypochaeris radicata	2		2	III	(_2)
Leontodon hispidus	2		1	III	(1-2)
Achillea millefolium		2	1	III	(1-2)
Tragopogon pratensis	1	2		III	(1-2)
Cirsium arvense	1	1		III	(_1)
Plantago maritima			5	II	(_5)
Trifolium repens			3	II	(_3)
Medicago lupulina	3			II	(_3)
Lotus corniculatus		2		II	(_2)
Centaurea nigra		2		II	(_2)

Species	Q7	Q8	Q9	Frequency	Abundance
Quadrat location - OS Grid NZ	**4192 5183**	**4159 5303**	**4125 5474**		
Dactylis glomerata	2			II	(_2)
Heracleum sphondylium	2			II	(_2)
Pimpinella saxifraga		2		II	(_2)
Trifolium dubium			2	II	(_2)
Plantago media		1		II	(_1)
Jacobaea vulgaris			1	II	(_1)

6.7 MC8e *Festuca rubra – Armeria maritima* maritime grassland; *Plantago coronopus* sub-community

Community Attributes

Attribute	Status – MC8e
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	S2a5 and s2a6
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.7.1 Community constants red fescue and thrift are well represented in a short, tight sward with preferential species buck's-horn plantain, sea plantain and the moss *Tortella flavovirens*.

6.7.2 The sub-community contrasts physiognomically with other MC8 maritime grasslands generally forming on exposed, skeletal soils with bare ground and opportunity for less competitive forbs and bryophytes.

6.7.3 The community is associated with a rocky outcrop which is regularly accessed and trampled at Byer's Hole in the north of Whitburn Coastal Park (Figure 2j), and various points on headlands between Marsden Bay and Frenchman's Bay where trampling by people is intense (usually view points). At the latter locations the sub-community is maintained by intense trampling by people.

6.7.4 The following species were recorded in MC8e:

Species	**DAFOR**	**Species**	**DAFOR**
Plantago maritima	D	*Agrostis stolonifera*	O
Festuca rubra	A	*Tortella flavovirens*	O
Plantago coronopus	A	*Plantago lanceolata*	R
Armeria maritima	F	*Lolium perenne*	R
Lotus corniculatus	O	*Hypochaeris radicata*	R
Trifolium repens	O		

6.7.5 The following quadrat data was recorded for MC8e:

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid NZ	**4107 6383**	**3968 6582**	**3951 6586**	**3937 6600**	**3928 6607**		
Sward height	**2**	**2**	**2**	**1**	**3**		
Plantago maritima	8	10	7	9	8	V	(7-10)
Festuca rubra	6	3	6	4	3	V	(3-6)
Plantago coronopus	4	2	3	3		IV	(2-4)
Armeria maritima	3	2	2			III	(2-3)
Lotus corniculatus				2	3	II	(2-3)
Trifolium repens			2	2		II	(_2)
Agrostis stolonifera			2			I	(_2)
Plantago lanceolata					2	I	(_2)
Tortella flavovirens		2				I	(_2)
Lolium perenne			2			I	(_2)
Hypochaeris radicata				1		I	(_1)

6.8 MC8f *Festuca rubra – Armeria maritima* maritime grassland; *Anthyllis vulneraria* sub-community

Community Attributes

Attribute	Status – MC8f
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	S2a5 and s2a6
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.8.1 A maritime cliff grassland community with red fescue and thrift, MC8f is found predominantly on soft cliffs where slopes are partially stabilised and is the natural succession from MG11 colonisation grassland, consequently creeping bent can form a significant part of the graminoid element. Dominated by red fescue, the sub-community preferential kidney vetch was recorded sporadically. Creeping bent is not dominant in this community; however, it can appear to have significant coverage in late summer. Yellow-wort is preferential in this sub-community as were other soft cliff colonising species such as prickly sow-thistle.

6.8.2 It is likely that some stands of MC8f have been derived from MG5 grassland as turfs move down-slope into situations more exposed to salt spray, the incremental movement allowing gaps for kidney vetch and sea plantain to colonise.

6.8.3 The community usually forms as a transient vegetation community during natural succession following erosion of soft cliff, however, it was also encountered on hard cliffs. In these situations, the community was not influenced by species arriving on turfs from higher up the slope, and it appears the steep slope supports a stable, self-sustaining community.

6.8.4 Due to its open character this community forms a niche for ‘soft cliff species’, i.e. those species capable of sustainably colonising bare ground as it forms on the soft cliff slope. Soft cliff species are not dependent on input from vegetation communities at the top of the cliff, and consequently are less under threat from simplification of vegetation

communities adjacent to the cliff due to agricultural intensification or lack of management.

6.8.5 An expression of MC8f maritime grassland was encountered in an artificial location north of Lizard Point where an abandoned car-park has had the tarmac broken up and left. Species colonising this substrate close to the top of the cliff have formed vegetation consistent with MC8f maritime grassland. An adjacent plot where soil has been spread has been colonised by false-oat grass and has more affinity with MG1 grassland.

6.8.6 The following species were recorded in MC8f:

Species	**DAFOR**
Agrostis stolonifera	F
Armeria maritima	F
Festuca rubra	F
Plantago lanceolata	F
Plantago maritima	F
Sonchus asper	F
Brachypodium sylvaticum	LF
Lotus corniculatus	LF
Ononis repens	LF
Potentilla reptans	LF
Tortella flavovirens	LF
Tripleurospermum maritimum	LF
Anthyllis vulneraria	O
Bellis perennis	O
Centaurea nigra	O
Hypochaeris radicata	O
Jacobaea erucifolia	O
Rumex crispus	O
Daucus carota	O
Cirsium arvense	O
Leontodon hispidus	O
Blackstonia perfoliata	R
Carex flacca	R
Thymus drucei	R
Trifolium campestre	R

6.8.7 The following quadrat data was recorded for MC8f:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Frequency**	**Abundance**
Quadrat location - OS Grid NZ	**4149 6272**	**4133 6303**	**4137 6312**	**4119 6361**	**4107 6382**		
Sward height (cm)	**15**	**12**	**10**	**10**	**20**		
Plantago maritima	8	5	7	6	6	V	(5-8)
Festuca rubra	6	4	6	7	5	V	(4-7)
Sonchus asper	2	2	3		3	IV	(2-3)
Armeria maritima	4		6		2	III	(2-6)
Plantago lanceolata	1	1	2			III	(1-2)
Agrostis stolonifera		4			3	II	(3-4)
Tortella flavovirens			3	3		II	(_3)
Potentilla reptans			2	3		II	(2-3)
Anthyllis vulneraria				4		I	(_4)
Brachypodium sylvaticum		3				I	(_3)
Blackstonia perfoliata				2		I	(_2)
Bellis perennis				2		I	(_2)
Hypochaeris radicata				2		I	(_2)
Lotus corniculatus				2		I	(_2)
Ononis repens			2			I	(_2)
Tripleurospermum maritimum					2	I	(_2)
Centaurea nigra		1				I	(_1)
Jacobaea erucifolia		1				I	(_1)

6.9 MC9a *Festuca rubra – Holcus lanatus* maritime grassland; *Plantago maritima* sub-community

Community Attributes

Attribute	Status – MC9a
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	S2a5 and s2a6
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.9.1 Encountered only at Trow Point, the community is characterised by an abundance of red fescue in a closed sward with much Yorkshire fog and ribwort plantain, however, community constant thrift was not encountered during the survey. Sub-community preferentials bird's-foot trefoil, sea plantain and white clover are all present.

6.9.2 The community has developed on low rocky cliffs south of sandy beach at Trow Point and is supported by sandy soils of aeolian origin (Figure 2a). Reference to Rodwell (2000) indicates that the location and physiognomy also sit well with a description in terms of MC9a.

6.9.3 At Trow Quarry there is a crag facing north which probably represents the abandoned quarry face (Figure 2a and 2b). This is subjected to varying degrees of maritime influence and supports an expression of MC9a maritime grassland. It is acknowledged that there is significant calcareous influence and maritime influence reduces considerably to the northern end of the rock face, consequently placement in CG2 grassland would not be impossible, however, the absence of meadow oat-grass makes description in terms of CG2 grassland problematic.

6.9.4 Whilst it is acknowledged that the vegetation on the inland crag represents a poor fit for MC9a, there is clearly a degree of maritime influence and the vegetation should be regarded as part of the SAC feature (H1230). This species-rich community has been recorded separately below and is considered to be of high nature conservation value.

6.9.5 The following species were recorded in MC9a:

Species	DAFOR	Species	DAFOR
Festuca rubra	D	*Trifolium repens*	F
Holcus lanatus	F / LA	*Ononis repens*	LF
Lotus corniculatus	F / LA	*Achillea millefolium*	O
Agrostis stolonifera	F	*Jacobaea vulgaris*	O
Cerastium fontanum	F	*Plantago maritima*	O
Cirsium arvense	F	*Centaurea nigra*	O
Dactylis glomerata	F	*Trifolium pratense*	O
Plantago lanceolata	F	*Lolium perenne*	R

6.9.6 The following quadrat data was collected for MC9a:

Species	Q1	Q2	Q3	Frequency	Abundance
Quadrat location - OS Grid NZ	**3833 6667**	**3834 6669**	**3835 6667**		
Sward height	**15**	**20**	**25**		
Festuca rubra	8	8	7	V	(7-8)
Holcus lanatus	4	4	6	V	(4-6)
Cirsium arvense	2	4	2	V	(2-4)
Plantago lanceolata	3	3	2	V	(2-3)
Dactylis glomerata	2	2	2	V	(_2)
Lotus corniculatus	5	4	1	V	(1-5)
Plantago maritima	3	2		IV	(2-3)
Cerastium fontanum	2		3	IV	(2-3)
Agrostis stolonifera		3	2	IV	(2-3)
Achillea millefolium	2		2	IV	(_2)
Jacobaea vulgaris		2	1	IV	(1-2)
Trifolium repens	3			II	(_3)

6.9.7 The following species were recorded in MC9a on the crag at Trow Point:

Species	DAFOR
Festuca rubra	A
Lotus corniculatus	F / LA
Agrostis stolonifera	F
Centaurea nigra	F
Cochlearia officinalis	F
Dactylis glomerata	F
Leontodon hispidus	F
Pimpinella saxifraga	F
Plantago lanceolata	F
Plantago maritima	F
Plantago media	F
Arrhenatherum elatius	LF

Species	DAFOR
Calystegia sepium	LF
Carex flacca	LF
Tussilago farfara	LF
Armeria maritima	LF
Heracleum sphondylium	O
Jacobaea vulgaris	O
Potentilla reptans	O
Prunella vulgaris	O
Sonchus asper	O
Taraxacum agg	O
Dactylorhiza purpurea	O
Asplenium scolopendrium	R
Bellis perennis	R
Carex caryophyllea	R
Cerastium fontanum	R
Galium verum	R
Holcus lanatus	R
Centaurea scabiosa	R
Cirsium arvense	R

6.9.8 The following quadrat data was recorded for MC9a on the crag at Trow Point:

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid NZ	**3869 6639**	**3864 6641**	**3861 6642**	**3847 6644**	**3877 6635**		
Sward height (cm)	**15**	**25**	**15**	**30**	**20**		
Festuca rubra	7	6	7	6	7	V	(6-7)
Lotus corniculatus	4	4	4	3	5	V	(3-5)
Plantago media	2	2	2	3	6	V	(2-6)
Leontodon hispidus	2	2	3	2	5	V	(2-5)
Plantago lanceolata	2	4	4	3	3	V	(2-4)
Agrostis stolonifera	3	3	4		3	IV	(3-4)
Plantago maritima	2	2	2		7	IV	(2-7)
Centaurea nigra	4	2	2	4		IV	(2-4)
Taraxacum agg	1	1	2	2		IV	(1-2)
Cochlearia officinalis	2	1	2	2		IV	(1-2)
Dactylis glomerata	3	3			2	III	(2-3)
Heracleum sphondylium	2	1		2		III	(1-2)
Arrhenatherum elatius		4		5		II	(4-5)
Carex flacca		3			3	II	(_3)
Pimpinella saxifraga	2		2			II	(_2)
Jacobaea vulgaris		1		2		II	(1-2)
Galium verum	3					II	(_3)
Cerastium fontanum	2					I	(_2)
Holcus lanatus		2				I	(_2)
Potentilla reptans	2					I	(_2)
Prunella vulgaris			2			I	(_2)

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid NZ	**3869 6639**	**3864 6641**	**3861 6642**	**3847 6644**	**3877 6635**		
Asplenium scolopendrium				2		I	(_2)
Tussilago farfara		2				I	(_2)
Bellis perennis	1					I	(_1)
Carex caryophyllea	1					I	(_1)
Sonchus asper			1			I	(_1)
Calystegia sepium					1	I	(_1)

6.10 MC9c *Festuca rubra – Holcus lanatus* maritime grassland; *Achillea millefolium* sub-community

Community Attributes

Attribute	Status – MC9c
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	S2a5 and s2a6
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.10.1 A maritime cliff grassland community of more sheltered location, MC9 is generally encountered on deeper soils and shallower slopes than MC8. Red fescue and creeping bent are sometimes co-dominant with community constant ribwort plantain well represented. Sea plantain is frequent in this community, particularly in more maritime stands, however the occurrence of lady's bedstraw, black knapweed and dyer's-greenweed indicate considerable affinity with *Achillea millefolium* sub-community.

6.10.2 This sub-community is localised on the soft cliffs throughout the study area, often forming small stands on spurs exposed to high levels of maritime influence. Expressions here are generally derived from non-maritime grassland growing on the cliff top which becomes exposed to maritime influence through erosion. When this takes place species which are not salt tolerant become scarce allowing red fescue to thrive and allowing sea plantain, kidney vetch and prickly sow-thistle to establish. On soft cliffs where incremental erosion is especially active, ruderal species (colt's-foot and hoary ragwort (*Jacobaea erucifolia*)) are prominent in the gaps between turfs, and can mask this community at a distance.

6.10.3 Extensive stands are present in Whitburn Coastal Park where positive management promotes development of this community and soils are less fertile. This expression is characterised by an open sward and kidney vetch is present. Maritime grassland MC9c is also well represented on the tops of cliffs at Marsden Bay through to Trow Point, albeit in a more restricted zone. The community is threatened by eutrophication which promotes growth of coarse grasses, creeping thistle and other robust forbs dependent on high nutrient status.

6.10.4 The community supports saw-wort and dyer's-greenweed, both of which have a very restricted distribution in South Tyneside. Bee orchid, small scabious and northern marsh-orchid also occur.

6.10.5 Calcareous influence is apparent on the top of high cliffs at Marsden Bay in sheltered situations and a transitional community with elements of both MC9 maritime grassland and CG2c calcareous grassland is present characterised by greater knapweed, hoary plantain, lady's bedstraw and rough hawkbit occurring alongside pruinose red fescue, sea plantain and thrift.

6.10.6 The following species were recorded in MC9c:

Species	**DAFOR**
Festuca rubra	A
Plantago maritima	A
Agrostis stolonifera	F
Plantago lanceolata	F
Tussilago farfara	F
Jacobaea erucifolia	LF
Ononis repens	LF
Brachypodium sylvaticum	LF
Convolvulus arvensis	LF
Serratula tinctoria	LF
Cirsium arvense	O / LF
Genista tinctoria	O / LF
Anthyllis vulneraria	O
Armeria maritima	O
Carex flacca	O
Centaurea nigra	O
Daucus carota	O
Galium verum	O
Leontodon hispidus	O
Lotus corniculatus	O
Potentilla reptans	O
Sonchus asper	O
Potentilla anserina	O
Dactylorhiza purpurea	O
Campanula rotundifolia	O
Koeleria macrantha	O
Arrhenatherum elatius	R
Asplenium scolopendrium	R
Bellis perennis	R
Calystegia sepium	R
Carex caryophyllea	R
Cerastium fontanum	R
Cochlearia officinalis	R
Dactylis glomerata	R
Heracleum sphondylium	R

Species	DAFOR
Holcus lanatus	R
Hypochaeris radicata	R
Jacobaea vulgaris	R
Persicaria amphibia	R
Pimpinella saxifraga	R
Plantago media	R
Prunella vulgaris	R
Taraxacum agg	R
Tragopogon pratensis	R
Trifolium pratense	R
Lolium perenne	R
Trifolium repens	R
Sanguisorba minor	R
Dactylorhiza fuchsii	R
Ophrys apifera	R
Dipsacus fullonum	R
Lathyrus pratensis	R
Achillea millefolium	R
Centaurea scabiosa	R
Anacamptis pyramidalis	R

6.10.7 The following quadrat data was recorded for MC9c:

Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Freq	Abun-dance
Quadrat location - OS Grid NZ	**4130 6189**	**4127 6219**	**4148 6270**	**4134 6303**	**4135 6308**	**4126 6356**	**4004 6482**	**3972 6562**	**3939 6598**		
Sward height	**25**	**15**	**15**	**15**	**17**	**15**	**15**	**20**	**15**		
Festuca rubra	8	7	9	5	7	4	7	4	7	V	(4-9)
Plantago maritima	5	3	4	5	3	9	5	5	6	V	(3-9)
Plantago lanceolata	1	2	2	2	3	3	2	2	2	V	(1-3)
Agrostis stolonifera	3	4		5	5	2	1	5	3	V	(1-5)
Dactylis glomerata				1	2	2	1			III	(1-2)
Lotus corniculatus		4	1				3		3	III	(1-4)
Potentilla reptans				3	3			3		II	(_3)
Armeria maritima							2	2	3	II	(2-3)
Centaurea nigra		2			2		2			II	(_2)
Genista tinctoria				4	5					II	(4-5)
Carex flacca	3	5								II	(3-5)
Cirsium arvense			2						2	II	(_2)
Galium verum				3	2					II	(2-3)
Daucus carota				2	2					II	(_2)
Jacobaea erucifolia	2			2						II	(_2)
Leontodon hispidus		2					2			II	(_2)
Sonchus asper			2					2		II	(_2)
Hypochaeris radicata						2			1	II	(1-2)
Trifolium pratense		2				1				II	(1-2)

Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Freq	Abun-dance
Tussilago farfara	4									I	(_4)
Ononis repens		4								I	(_4)
Taraxacum agg						2				I	(_2)
Pimpinella saxifraga							2			I	(_2)
Persicaria amphibia	2									I	(_2)
Anthyllis vulneraria						2				I	(_2)
Cerastium fontanum							1			I	(_1)
Tragopogon pratensis						1				I	(_1)
Heracleum sphondylium							1			I	(_1)
Arrhenatherum elatius	1									I	(_1)

6.11 MC10b *Festuca rubra – Plantago* spp. maritime grassland *Carex panicea* sub-community

Community Attributes

Attribute	Status – MC10b
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	s2a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.11.1 More usually a community associated with exposed west coast of Britain, a phytosociological grouping having most affinity with MC10b has found a locus on the exposed cliff tops at Trow Point. These maritime cliffs are formed by small craggy knolls left on the seaward side of the quarry. This cliff-top maritime community is characterised by a closed, tight sward dominated by red fescue. Interleaved with red fescue is an abundance of sea plantain and ribwort plantain.

6.11.2 Glaucous sedge is frequent, suggesting most affinity with the sedge rich *Carex panicea* sub-community. Species indicating occurrence on base-rich substrates such as wild thyme, hoary plantain and carline thistle occur sporadically throughout.

6.11.3 The community has a very restricted distribution on the coast of South Tyneside with limited areas from Trow Point to Figures 2a, 2b and 2c) as it is generally maintained by grazing. In the absence of grazing, short turf is maintained through trampling and extreme maritime exposure of situations supporting this vegetation.

6.11.4 Maritime grassland which appeared to be MC10b was also present on two stacks in Sunderland section of the survey (Figure 2y). These were surveyed remotely.

6.11.5 The following species were encountered in MC10b:

Species	**DAFOR**
Carex flacca	A
Festuca rubra	F / LA
Thymus drucei	F / LA

Species	DAFOR
Centaurea nigra	F
Dactylis glomerata	F
Plantago maritima	F
Plantago media	F
Plantago lanceolata	F
Briza media	O
Lotus corniculatus	O
Prunella vulgaris	O
Dactylis glomerata	O
Anthyllis vulneraria	R
Leontodon hispidus	R
Pimpinella saxifraga	R
Bellis perennis	R
Carlina vulgaris	R

6.11.6 The following quadrat data was recorded for MC10b:

Species	Q1	Q2	Frequency	Abundance
Quadrat location - OS Grid NZ	**3861 6649**	**3861 6650**		
Sward height	**1**	**1**		
Carex flacca	8	7	V	(1-2)
Festuca rubra	5	5	V	(7-8)
Plantago media	5	5	V	(_2)
Dactylis glomerata	3	3	V	(2-4)
Lotus corniculatus	3	3	V	(4-6)
Plantago lanceolata	3	3	V	(1-3)
Plantago maritima	3	3	V	(1-3)
Thymus drucei	3	5	V	(_1)
Anthyllis vulneraria	2	2	V	(_4)
Centaurea nigra	3	2	V	(_2)
Briza media		3	III	(_3)
Prunella vulgaris	2		III	(_1)
Leontodon hispidus		2	III	(_1)
Pimpinella saxifraga		1	III	(_1)

6.12 MC11b *Festuca rubra – Daucus carota* ssp. *gummifer* maritime grassland *Ononis repens* sub-community

Community Attributes

Attribute	Status – MC11b
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	s2a6
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.12.1 Community constants red fescue, cock's-foot and wild carrot are present, however, it should be noted that no *D. carota* ssp *gummifer* was encountered. The distinctive appearance of this vegetation suggests most affinity with MC11, and the presence of restharrow and common ragwort suggest MC11b sub-community. Sea plantain is abundant throughout, along with thyme-leaved sandwort and kidney vetch, giving the vegetation a maritime character.

6.12.2 Whilst a poor fit to the published data for MC11b, this is considered to be an artefact of the sampling regime used for maritime NVC whereby the coast of the north-east of England was largely ignored.

6.12.3 The community is restricted to Whitburn Beach (Figure 2m) where vegetation is exposed to salt spray drift above the strandline and occurs on freely draining calcareous soils derived from adjacent cliffs. This species rich maritime grassland community is of high nature conservation importance supporting species of limited distribution such as thyme-leaved sandwort (*Arenaria serpyllifolia subsp. serpyllifolia*) and dyer's greenweed. High invertebrate activity was noted during the survey.

6.12.4 The following species were encountered in MC11b:

Species	**DAFOR**
Plantago maritima	A
Rosa rugosa	vLA
Ononis repens	F / LA
Galium verum	F / LA

Species	DAFOR
Centaurea nigra	F
Agrostis stolonifera	F
Anthyllis vulneraria	F
Daucus carota	F
Festuca rubra	F
Leontodon hispidus	F
Plantago lanceolata	F
Potentilla reptans	F
Taraxacum agg	F
Sanguisorba minor	F
Lotus corniculatus	LF
Rubus fruticosus agg	LF
Genista tinctoria	LF
Trisetum flavescens	LF
Leymus arenaria	LF
Ammophila arenaria	vLF
Hypochaeris radicata	O / LF
Achillea millefolium	O
Dactylis glomerata	O
Jacobaea vulgaris	O
Sonchus arvensis	O
Tragopogon pratensis	O
Arrhenatherum elatius	O
Rumex crispus	O
Heracleum sphondylium	O
Cirsium arvense	O
Lathyrus pratensis	R
Lolium perenne	R
Elytrigia juncea	R
Pulicaria dysenterica	R
Trifolium repens	R

6.12.5 The following species were recorded in quadrat survey of MC11b:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Frequency**	**Abundance**
Quadrat location - OS Grid NZ	**4138 6278**	**4136 6282**	**4135 6286**	**4134 6290**	**4133 6294**		
Sward height	**25**	**25**	**20**	**20**	**25**		
Festuca rubra	5	8	5	5	6	V	(5-8)
Plantago maritima	6	4	5	7	6	V	(4-7)
Ononis repens	4	3	7	4	3	V	(3-7)
Agrostis stolonifera	4	4	3	3	4	V	(3-4)
Plantago lanceolata	2		1	3	2	IV	(1-3)
Taraxacum agg	1	1	1		2	IV	(1-2)
Daucus carota	3	1	1			III	(1-3)
Achillea millefolium	3			2		II	(2-3)
Sonchus arvensis	2	2				II	(_2)
Rubus fruticosus agg	2		1			II	(1-2)
Anthyllis vulneraria			2			I	(_2)
Pulicaria dysenterica	2					I	(_2)
Potentilla reptans				2		I	(_2)
Leontodon hispidus			1			I	(_1)
Tragopogon pratensis		1				I	(_1)
Trifolium repens					1	I	(_1)
Elytrigia juncea (*Elymus farctus*)	1					I	(_1)

6.13 MG1a *Arrhenatherum elatius* grassland; *Festuca rubra* sub-community

Community Attributes

Attribute	Status – MG1a
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.13.1 MG1a occurs along the cliff top in South Tyneside, where false oat-grass dominates but other grasses including creeping bent, cock's-foot and red fescue are also abundant. Grasses dominate over forbs, indicating the affinity of the community with MG1a. Although the community as a whole contains a wide range of species, with sea plantain indicating a maritime influence, it consistently contains the forbs ribwort plantain, creeping thistle, hedge bindweed, large umbellifer common hogweed and meadow vetchling.

6.13.2 This community is unmown, developing tussocky swards dominated by coarse grasses, and it extends to the end of the cliff in much of South Tyneside, where it is also visible on eroding and slumping cliffs, with minimal maritime influence evident.

6.13.3 Species recorded in this community in South Tyneside are listed below:

Species	**DAFOR**
Arrhenatherum elatius	D
Cirsium arvense	A
Agrostis stolonifera	A
Festuca rubra	A
Dactylis glomerata	A
Holcus lanatus	A / O
Plantago lanceolata	A / O
Calystegia sepium	F / O
Heracleum sphondylium	F / O
Lathyrus pratensis	F / O
Trifolium repens	F / O
Taraxacum officinalis agg.	O

Species	**DAFOR**
Urtica dioica	O
Tussilago farfara	O
Lolium perenne	O
Leontodon hispidus	O
Trifolium medium	O
Chamerion angustifolium	O
Jacobaea vulgaris	O / R
Anthriscus sylvestris	O / R
Hordeum murinum	O / R
Potentilla reptans	O / R
Centaurea nigra	O / R
Rubus fruticosus agg.	O / R
Elytrigia repens (*Elymus repens*)	O / R
Cirsium vulgare	O / R
Plantago maritima	O / R
Daucus carota	O / R
Vicia cracca	O / R
Rumex acetosa	O / R
Equisetum arvense	R
Phleum bertolonii	R
Potentilla anserina	R
Jacobaea erucifolius	R
Lotus corniculatus	R
Achillea millefolium	R
Sonchus asper	R
Carex nigra	R
Schedonorus arundinaceus (*Festuca arundinacea*)	R
Ranunculus repens	R
Rumex crispus	R
Stachys sylvatica	R
Vicia sepium	R
Artemisia vulgaris	R
Dactylorhiza traunsteinerioides	R
Vicia sativa	R
Convolvulus arvensis	R
Avena fatua	R

3.4.4 Quadrat data recorded in this community is detailed below:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Freque-ncy**	**Abund-ance**
Quadrat location - OS Grid Reference	**NZ 38616 66448**	**NZ 40165 64712**	**NZ 41014 63996**	**NZ 41307 63392**	**NZ 41326 63020**	**NZ 41275 62157**	**NZ 41290 61883**	**NZ 41313 62909**		
Sward height (cm)	35	32	30	28	28	30	35	37		
Arrhenatherum elatius	8	8	9	8	8	8	8	7	V	(7-9)
Cirsium arvense	4	3	5	6		5	6	3	V	(3-6)
Agrostis stolonifera	4	6		6	3	6	5		IV	(3-6)
Festuca rubra	5		4	5		5	6	6	IV	(3-6)
Dactylis glomerata	4		5	3	3	4	4		IV	(3-5)
Holcus lanatus		7		4	4		3	4	IV	(3-7)
Plantago lanceolata		6		5			3		II	(3-6)
Calystegia sepium	5		6						II	(5-6)
Heracleum sphondylium		4				3	5		II	(3-5)
Lathyrus pratensis			4			2	4		II	(2-4)
Trifolium repens		6	7						II	(6-7)
Tussilago farfara	7						5		II	(5-7)
Taraxacum officinalis agg.	5						2		II	(2-5)
Urtica dioica	4					4			II	(_4)
Rubus fruticosus agg.					4			4	II	(_4)
Lolium perenne		6							I	(_6)
Potentilla reptans						6			I	(_6)
Centaurea nigra					5				I	(_5)
Potentilla anserina	4								I	(_4)
Equisetum arvense					4				I	(_4)
Phleum bertolonii	4								I	(_4)
Jacobaea erucifolius			4						I	(_4)
Lotus corniculatus			3						I	(_3)
Achillea millefolium			3						I	(_3)
Rumex acetosa		2							I	(_2)
Sonchus asper		2							I	(_2)
Schedonorus arundinaceus (*Festuca*					2				I	(_2)

Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Freque-ncy	Abund-ance
arundinacea)										
Anthriscus sylvestris						2			I	(_2)
Ranunculus repens			2						I	(_2)
Rumex crispus			2						I	(_2)

6.14 MG1d *Arrhenatherum-elatius* grassland; *Pastinaca sativa* sub-community

Community Attributes

Attribute	Status – MG1d
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.14.1 MG1d grassland occurs as a more calcareous expression of *Arrhenatherum elatius* grassland, along Whitburn Beach and Marsden Bay, where ribwort plantain and lady's bedstraw are frequent, with occasional to rare field scabious, greater knapweed and agrimony, which suggest affinity with this grassland sub-community. Locally frequent orchids were also recorded within this grassland.

6.14.2 Species recorded in this community in South Tyneside are listed below:

Species	**DAFOR**
Arrhenatherum elatius	D
Festuca rubra	A
Galium verum	F
Agrostis stolonifera	F
Lathyrus pratensis	F
Centaurea nigra	F
Plantago lanceolata	F
Potentilla reptans	F / O
Dactylis glomerata	F / O
Lotus corniculatus	O
Equisetum arvense	O
Phleum bertolonii	O
Rubus fruticosus agg.	O
Cerastium fontanum	O
Trisetum flavescens	O
Trifolium repens	O
Agrimonia eupatoria	O
Melilotus altissimus	O
Achillea millefolium	O / R

Species	DAFOR
Hypochaeris radicata	O / R
Cynosurus cristatus	O / R
Vicia sativa	O / R
Potentilla anserina	O / R
Senecio jacobaea	O / R
Knautia arvensis	O / R
Centaurea scabiosa	O / R
Holcus lanatus	O / R
Prunus spinosa	O / R
Cirsium arvense	R
Ononis repens	R
Elymus caninus	R
Tragopogon pratensis	R
Lolium perenne	R
Leontodon hispidus	R
Dactylorhiza fuchsii	R
Carex flacca	R
Pimpinella saxifraga	R
Schedonorus arundinaceus (*Festuca arundinacea*)	R
Carex panicea	R
Crepis capillaris	R
Vicia cracca	R
Trifolium medium	R
Elymus caninus	R
Plantago maritima	R
Smyrnium olusatrum	R
Trifolium pratense	R
Tragopogon pratensis	R
Anacamptis pyramidalis	R
Tussilago farfara	R
Dactylorhiza traunsteinerioides	R

3.5.3 Quadrat data recorded in this community is detailed below:

Species	Q1	Q2	Q3	Q4	Q5	Q6	Frequency	Abundance
Quadrat location - OS Grid Reference	**NZ 39441 65847**	**NZ 39713 65740**	**NZ 41330 63284**	**NZ 41365 63136**	**NZ 41318 62856**	**NZ 41333 62828**		
Sward height (cm)	30	30	35	40	38	36		
Arrhenatherum elatius	7	6	8	6	7	7	V	(6-8)
Festuca rubra	7	7	6	6	3	7	V	(3-7)
Galium verum	4	8	4	6		5	V	(4-8)
Agrostis stolonifera	7	8	6	6			IV	(6-8)
Lathyrus pratensis		6	6		6	4	IV	(4-6)
Centaurea nigra	5	3			6	5	IV	(3-6)

Species	Q1	Q2	Q3	Q4	Q5	Q6	Frequency	Abundance
Plantago lanceolata	5	4	5		4		IV	(4-5)
Potentilla reptans			5		7	7	III	(5-7)
Dactylis glomerata	3				6	6	III	(3-6)
Lotus corniculatus	4	3	5				III	(3-5)
Equisetum arvense	2				2	4	III	(2-4)
Prunus spinosa				7	3		II	(3-7)
Phleum bertolonii				6		6	II	(_6)
Holcus lanatus	6					6	II	(_6)
Rubus fruticosus agg.					5	6	II	(5-6)
Cerastium fontanum	3			6			II	(3-6)
Potentilla anserina			5	5			II	(_5)
Trisetum flavescens					5	4	II	(4-5)
Trifolium repens	3			5			II	(3-5)
Agrimonia eupatoria		3				3	II	(_3)
Cirsium arvense		6					I	(_6)
Ononis repens					6		I	(_6)
Elymus caninus				6			I	(_6)
Tragopogon pratensis	5						I	(_5)
Lolium perenne	4						I	(_4)
Leontodon hispidus					4		I	(_4)
Achillea millefolium				4			I	(_4)
Hypochaeris radicata				4			I	(_4)
Dactylorhiza fuchsii		3					I	(_3)
Carex flacca		3					I	(_3)
Pimpinella saxifraga		2					I	(_2)
Schedonorus arundinaceus (*Festuca arundinacea*)					2		I	(_2)
Carex panicea		2					I	(_2)
Crepis capillaris	1						I	(_1)

Community Description – Sunderland and Durham

6.14.3 Much of the cliff top grassland in Sunderland section is MG1d sub-community grassland where it usually continues to the very edge of the cliff, presenting a very narrow ecotone and little maritime influence. Up to the cliff edge, false oat-grass is dominant and common hogweed and cock's-foot are frequent, with creeping bent abundant, to create species-poor para-maritime grassland version of MG1d which also has affinity with MG1a.

6.14.4 A number of species of limited distribution locally are present in the MG1d grassland in Sunderland including welted thistle (*Carduus crispus*), nodding (musk) thistle (*Carduus nutans*), tall melilot (*Melilotus altissimus*) and wild parsnip (*Pastinaca sativa*).

6.14.5 Species recorded in this community, in Sunderland and Durham are listed below:

Species	**DAFOR**
Arrhenatherum elatius	D
Agrostis stolonifera	A
Cirsium arvense	F
Plantago lanceolata	F
Dactylis glomerata	F
Heracleum sphondylium	F
Lolium perenne	F
Holcus lanatus	F
Pastinaca sativa	O
Jacobaea vulgaris	O
Taraxacum officinalis agg.	O
Tussilago farfara	O
Artemisia vulgaris	O / R
Cirsium vulgare	O / R
Rubus fruticosus agg.	O / R
Galium verum	O / R
Ranunculus repens	R
Trifolium repens	R
Urtica dioica	R
Pteridium aquilinium	R
Convolvulus arvensis	R
Cerastium fontanum	R
Medicago lupulina	R
Centaurea nigra	R
Lathyrus pratensis	R
Rumex crispus	R
Tragopogon pratensis	R
Schedonorus arundinaceus (*Festuca arundinacea*)	R
Carduus nutans	R
Sambucus nigra	R
Trifolium pratense	R
Melilotus altissimus	R
Achillea millefolium	R
Vicia cracca	R
Salix caprea	R
Carduus crispus	R
Chamerion angustifolium	R

6.14.6 Quadrat data recorded in this community is detailed below:

Species	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41289 54496**	**NZ 41439 53487**	**NZ 41726 52695**	**NZ 41891 52466**	**NZ 41848 52097**	**NZ 41950 51581**		
Sward height (cm)	40	36	35	35	37	34		
Arrhenatherum elatius	8	8	8	7	8	8	V	(7-8)
Agrostis stolonifera	6	5	7	7	7	6	V	(5-7)
Cirsium arvense	4	6	4	7		4	V	(4-7)
Plantago lanceolata	5	5	4	6	7		V	(4-7)
Dactylis glomerata	6	6	4	6	6		V	(4-6)
Heracleum sphondylium	4	2	4	4		3	V	(2-4)
Lolium perenne		6	6		6		III	(_6)
Holcus lanatus	5	6			6		III	(5-6)
Jacobaea vulgaris	3	4			3		III	(3-4)
Pastinaca sativa		3	3			2	III	(2-3)
Cerastium fontanum	4				4		II	(_4)
Taraxacum officinalis agg.			4		3		II	(3-4)
Ranunculus repens	7						I	(_7)
Trifolium repens				6			I	(_6)
Urtica dioica						5	I	(_5)
Pteridium aquilinium						4	I	(_4)
Convolvulus arvensis						4	I	(_4)
Medicago lupulina					4		I	(_4)
Centaurea nigra				4			I	(_4)
Lathyrus pratensis					3		I	(_3)
Rumex crispus			2				I	(_2)
Tragopogon pratensis					2		I	(_2)

6.15 MG1e *Arrhenatherum elatius* grassland; *Centaurea nigra* sub-community

Community Attributes

Attribute	Status – MG1e
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.15.1 This species-rich expression of MG1 occurs along Marsden Bay and black knapweed (Centaurea nigra) attains co-dominance with false oat-grass along with frequent yarrow, meadow vetchling and bird's-foot trefoil. Overall cover and abundance of forbs is higher in proportion to grasses compared with MG1a. This area of grassland is also managed, and appears to be periodically cut, but was unmown at the time of survey. Frequent orchids were also recorded within this grassland.

6.15.2 Species recorded in this community in South Tyneside are listed below:

Species	**DAFOR**
Arrhenatherum elatius	D
Centaurea nigra	D
Agrostis stolonifera	A
Dactylis glomerata	A
Festuca rubra	A
Achillea millefolium	F
Taraxacum officinalis agg.	F / O
Lotus corniculatus	F / O
Lathyrus pratensis	F / O
Elymus caninus	O
Plantago lanceolata	O
Heracleum sphondylium	O
Potentilla reptans	O
Holcus lanatus	O
Trifolium pratense	O / R
Plantago maritima	R
Ranunculus repens	R
Cerastium fontanum	R

Species	DAFOR
Rubus fruticosus agg.	R
Cirsium arvense	R
Galium verum	R
Lolium perenne	R
Trifolium repens	R
Crepis capillaris	R
Bellis perennis	R
Tragopogon pratensis	R
Anacamptis pyramidalis	R
Dactylorhiza purpurella	R
Dactylorhiza fuchsii	R

6.15.3 Quadrat data recorded in this community is detailed below:

Species	Q1	Q2	Q3	Frequency	Abundance
Quadrat location - OS Grid Reference	**NZ 40110 64729**	**NZ 40069 64762**	**NZ 41050 63944**		
Sward height (cm)	26	25	30		
Arrhenatherum elatius	7	6	8	V	(6-8)
Centaurea nigra	7	6	7	V	(6-7)
Festuca rubra	6	6	3	V	(3-6)
Holcus lanatus	3	3	4	V	(3-4)
Agrostis stolonifera	6		6	IV	(_6)
Dactylis glomerata	6	6		IV	(_6)
Lathyrus pratensis		3	6	IV	(3-6)
Achillea millefolium	5	3		IV	(3-5)
Lotus corniculatus	3	3		IV	(_3)
Taraxacum officinalis agg.	2		1	IV	(1-2)
Elymus caninus			6	II	(_6)
Heracleum sphondylium		6		II	(_6)
Potentilla reptans		6		II	(_6)
Plantago maritima			5	II	(_5)
Plantago lanceolata		4		II	(_4)
Ranunculus repens	4			II	(_4)
Cerastium fontanum	4			II	(_4)
Rubus fruticosus agg.			4	II	(_4)
Cirsium arvense			3	II	(_3)
Galium verum		3		II	(_3)
Lolium perenne	3			II	(_3)
Trifolium repens	3			II	(_3)
Crepis capillaris	3			II	(_3)
Bellis perennis	3			II	(_3)
Tragopogon pratensis	2			II	(_2)

6.16 MG5b *Cynosurus cristatus – Centaurea nigra* grassland *Galium verum* sub-community

Community Attributes

Attribute	Status – MG5b
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	s2a
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – South Tyneside

6.16.1 This community is distributed throughout the site on both the cliff top and developing on the soft cliff as para-maritime grassland in the south of the study area, in particular where soils have stabilised for some time and are well-drained. A degree of exposure to salt spray appears to be tolerated, and the community has a widespread distribution on clayey soils.

6.16.2 Community constants for MG5 are well represented with red fescue, black knapweed, cock's-foot, Yorkshire fog, bird's-foot trefoil, ribwort plantain and red clover. White clover is also present sporadically.

6.16.3 Whilst dominated by red fescue, false oat-grass is also present, although usually represented by poorly grown individuals. Forbs are represented by frequent wild carrot and black knapweed, and occasional black medick and meadow vetchling. The influence of base-rich sub-soils is often apparent, with the appearance of hoary plantain, lady's bedstraw and greater knapweed. Yellow oat-grass, yarrow, glaucous sedge and meadow oat-grass are also preferential suggesting strong affinity with MG5b *Galium verum* sub-community.

6.16.4 MG5b grassland recorded in South Tyneside is a diverse grassland supporting a range of grassland species. Species recorded only in this community include betony, hairy tare and narrow-leaved marsh orchid. Species of restricted distribution occurring in MG5b grassland include northern marsh orchid, pyramidal orchid, bee orchid, hemp agrimony, dyer's greenweed and common centaury.

6.16.5 Species-rich neutral grassland dominates Whitburn Coastal Park, but appears less diverse than the community which occurs on the cliff tops north of Lizard Point near Souter Lighthouse where greater knapweed, field scabious and bladder campion occur.

6.16.6 To a large extent, the persistence of species-rich MG5b on the soft cliff resource in the south of the study area is dependent on maintenance of species-rich MG5 grassland at the top of the eroding slope. Unfortunately, this is being whittled away south of Whitburn Beach and as MG5 turfs are lost, it is clear that the next turfs to fall will be MG1 (or MG6 where grasslands are managed as pasture for horses and cattle).

Community Description – Sunderland and Durham

6.16.7 MG5b grassland is present in two small patches in Sunderland, one of which occurs on a stack. The community is also present sporadically south of Ryhope Denemouth (Figure 2z.1) where agricultural improvement has been avoided.

6.16.8 The following species were recorded in MG5b grassland (South Tyneside, Sunderland and Durham):

Species	**DAFOR**
Festuca rubra	A
Trisetum flavescens	F / LA
Agrostis stolonifera	F
Arrhenatherum elatius	F
Centaurea nigra	F
Daucus carota	F
Plantago lanceolata	F
Brachypodium sylvaticum	LF
Equisetum arvense	LF
Genista tinctoria	LF
Ononis repens	LF
Trifolium pratense	LF
Trifolium repens	LF
Agrimonia eupatoria	LF
Ervilia hirsuta	vLF
Dactylorhiza purpurella	vLF
Galium verum	O / LF
Cirsium arvense	O / LF
Hypochaeris radicata	O / LF
Achillea millefolium	O
Betonica officinalis	O
Carex flacca	O
Centaurea scabiosa	O
Cerastium fontanum	O
Dactylis glomerata	O
Helictochloa pratensis	O
Heracleum sphondylium	O

Species	DAFOR
Holcus lanatus	O
Jacobaea vulgaris	O
Kindbergia praelonga	O
Lathyrus pratensis	O
Leontodon hispidus	O
Medicago lupulina	O
Plantago media	O
Potentilla reptans	O
Rumex acetosa	O
Vicia cracca	O
Aira praecox	O
Brachythecium rutabulum	O
Knautia arvensis	O
Blackstonia perfoliata	R
Carex nigra	R
Elytrigia repens (*Elymus repens*)	R
Tussilago farfara	R
Tragopogon pratensis	R
Sonchus oleraceus	R
Leucanthemum vulgare	R
Prunella vulgaris	R
Centaurium erythraea	R
Jacobaea erucifolius	R
Lotus corniculatus	R
Dactylorhiza fuchsii	R
Plantago maritima	R
Briza media	R
Ophrys apifera	R
Dactylorhiza traunsteinerioides	R
Silene vulgaris	R
Anacamptis pyramidalis	R

6.16.9 The following quadrat data was recorded for MG5b grassland (South Tyneside, Sunderland and Durham):

Species	Q1	Q2	Q3	Q4	Q5	Q6	Frequency	Abundance
Quadrat location - OS Grid NZ	**4100 6148**	**4125 6182**	**4131 6232**	**4134 6308**	**3965 6549**	**4196 5157**		
Sward height (cm)	**25**	**30**	**25**	**25**	**35**	**20**		
Festuca rubra	4	4	8	8	6	7	V	(4-8)
Agrostis stolonifera	6	3	4	3	4	5	V	(3-6)
Centaurea nigra	4	4	4	2	2	4	V	(2-4)
Plantago lanceolata		2	3	2	3	1	V	(1-3)
Brachypodium sylvaticum	5	6			3	1	IV	(1-6)
Dactylis glomerata			1	2	2	3	IV	(1-3)
Trisetum flavescens	5	6	4				III	(4-6)
Carex flacca				2	3	5	III	(2-5)

Species	Q1	Q2	Q3	Q4	Q5	Q6	Frequency	Abundance
Quadrat location - OS Grid NZ	**4100 6148**	**4125 6182**	**4131 6232**	**4134 6308**	**3965 6549**	**4196 5157**		
Lathyrus pratensis	4		1	2			III	(1-4)
Daucus carota	2	1	2				III	(1-2)
Jacobaea vulgaris	1	1				2	III	(1-2)
Arrhenatherum elatius	3				4		II	(3-4)
Equisetum arvense		3		3			II	(_3)
Trifolium pratense		3	3				II	(_3)
Leontodon hispidus		3				3	II	(_3)
Kindbergia praelonga		3				3	II	(_3)
Holcus lanatus		2		4			II	(2-4)
Elytrigia repens (*Elymus repens*)				2	2		II	(_2)
Tussilago farfara		2				2	II	(_2)
Galium verum			4	1			II	(1-4)
Achillea millefolium			1		2		II	(1-2)
Heracleum sphondylium	1		1				II	(_1)
Centaurea scabiosa					5		I	(_5)
Trifolium medium						5	I	(_5)
Ononis repens			4				I	(_4)
Genista tinctoria				3			I	(_3)
Potentilla reptans				3			I	(_3)
Medicago lupulina		3					I	(_3)
Carex nigra	3						I	(_3)
Tortella flavovirens						3	I	(_3)
Lophocolea bidentata						3	I	(_3)
Cerastium fontanum		2					I	(_2)
Helictochloa pratensis				2			I	(_2)
Betonica officinalis				2			I	(_2)
Rumex acetosa				2			I	(_2)
Vicia cracca				2			I	(_2)
Schedonorus arundinaceus (*Festuca arundinacea*)						2	I	(_2)
Plantago maritima						2	I	(_2)
Pellia sp						2	I	(_2)
Riccardia chamedryfolia						2	I	(_2)
Plantago media					1		I	(_1)
Trifolium repens		1					I	(_1)
Blackstonia perfoliata		1					I	(_1)
Taraxacum agg						1	I	(_1)

6.17 MG6a *Lolium perenne – Cynosurus cristatus* grassland Typical sub-community

Community Attributes

Attribute	Status – MG6a
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c6
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.17.1 MG6a occurs in mown patches along Marsden Bay and further north, with a notably large area at Trow Point. This is a species-poor grassland dominated by perennial rye-grass, with the abundance of white clover, and occurrence of ribwort plantain, yarrow, creeping buttercup and daisy at low cover, indicating that this grassland is best described as the Typical MG6 sub-community.

6.17.2 The following species were recorded in MG6a grassland:

Species	**DAFOR**
Lolium perenne	D
Plantago lanceolata	A
Dactylis glomerata	A
Poa annua	F
Jacobaea vulgaris	F
Trifolium repens	F
Taraxacum officinalis	F
Festuca rubra	O
Agrostis stolonifera	O
Holcus lanatus	O
Ranunculus repens	O
Bellis perennis	O
Achillea millefolium	O
Arrhenatherum elatius	R
Cirsium arvense	R
Elytrigia repens (*Elymus repens*)	R
Plantago media	R

Species	DAFOR
Hordeum murinum	R
Heracleum sphondylium	R
Cerastium fontanum	R
Sonchus asper	R
Trifolium pratense	R
Rumex obtusifolius	R
Potentilla anserina	R
Jacobaea erucifolia	R
Centaurea nigra	R
Tragopogon pratensis	R
Potentilla reptans	R
Lotus corniculatus	R
Plantago maritima	R

6.17.3 Quadrat data recorded for this community is detailed below:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 38355 66517**	**NZ 39684 65809**	**NZ 40032 64811**	**NZ 40391 64539**	**NZ 40558 64424**	**NZ 40817 61238**		
Sward height (cm)	15	12	14	12	10	7		
Lolium perenne	6	7	7	7	8	8	V	(6-8)
Plantago lanceolata	5	5	5	6	5	5	V	(5-6)
Dactylis glomerata	3	6	7		7	6	V	(3-7)
Poa annua	5	4			7	7	IV	(4-7)
Jacobaea vulgaris			2	3	3	2	IV	(2-3)
Trifolium repens	6				4	4	III	(4-6)
Taraxacum officinalis	6		6			4	III	(4-6)
Festuca rubra	8	4		6			III	(6-8)
Agrostis stolonifera	8			8			II	(_8)
Holcus lanatus		4		6			II	(4-6)
Arrhenatherum elatius		4		6			II	(4-6)
Ranunculus repens	4			6			II	(4-6)
Bellis perennis			3		6		II	(3-6)
Achillea millefolium				5		4	II	(4-5)
Sonchus asper	2					3	II	(2-3)
Cirsium arvense	5						I	(_5)
Elytrigia repens (*Elymus repens*)	5						I	(_5)
Plantago media					5		I	(_5)
Hordeum murinum						4	I	(_4)
Heracleum sphondylium				4			I	(_4)
Cerastium fontanum				4			I	(_4)
Trifolium pratense				3			I	(_3)
Rumex obtusifolius						2	I	(_2)
Potentilla anserina						2	I	(_2)
Jacobaea erucifolia				2			I	(_2)

6.18 MG11b *Festuca rubra – Agrostis stolonifera – Potentilla anserina* grassland, *Atriplex prostrata* sub-community

Community Attributes

Attribute	Status – MG11b
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c6
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description

6.18.1 This study has been restricted to describing vegetation in terms of the published NVC accounts (Rodwell 1991 et seq), however, there have been various reviews of NVC since publication, and a number of additional communities have been proposed by practioners. The vegetation observed on soft cliffs in South Tyneside and Sunderland described below in terms of MG11b is acknowledged as a poor fit to the published description, however, this is believed to be the 'best' fit. A better fit is the proposed *Tussilago farfara – Festuca rubra* open vegetation community included in Mountford (2011). This vegetation is described in the 2011 publication as follows:

Tussilago farfara-Festuca rubra community (OV type); Natural and anthropogenic communities of unstable habitats, periodically wetted and dried out or alternating brackish and fresh. Among the sea-cliff communities in the NVC, herbaceous vegetation of softer clay cliffs is noticeably absent but it occurs widely along the eastern coast of England and locally in the south and essentially similar assemblages can be seen inland throughout the lowlands colonising slumping clay banks on open ground, roadsides and building sites, often with surface runnels where rain or ground water runs away. Tussocky grasses like Festuca rubra, F. arundinacea and Dactylis glomerata form an open cover with scattered Tussilago farfara very distinctive and, on spray-splashed sites, Armeria maritima and Plantago coronopus can figure.

6.18.2 Clearly the data gathered on soft cliffs during this study has much affinity with this vegetation type, however, at present a description with NVC data tables has not been published and so MG11b has been used as the locus for description below.

Community Description – South Tyneside

6.18.3 The community present on the eroding soft cliffs principally in the south of the survey area has affinities with MG11 as described in Rodwell (1992), however, whilst the floristics are similar, the habitat is quite different. MG11 generally forms on areas of poorly vegetated mud, inundated occasionally by brackish water. Here the community is forming on bare mud, but the maritime influence comes from salt spray rather than direct inundation.

6.18.4 Although invariably present, red fescue is less abundant in MG11 on this site than the description in Rodwell suggests, which is likely due to the derivation of the community reflecting the instability of the substrate. The community present is considered to have most affinity with MG11b *Atriplex prostrata* sub-community, and Babington's orache is locally frequent. Other maritime species are present dependent on proximity of a seed source with sea plantain, buck'-horn plantain, common scurvy-grass, thrift and sea mayweed all present sporadically.

6.18.5 MG11 is widespread throughout the site where soft cliffs occur, particularly where active erosion is taking place exposing large areas of bare soil and subsoil. At a distance, areas with this community can look like bare ground. On closer inspection a thinly distributed grassland community is apparent, with creeping bent straggling across the surface colonising bare ground. This grass is frequently joined by colt's-foot and, less frequently, silverweed which can be abundant in some stands, both species colonising vegetatively.

6.18.6 The bare soil exposed during erosion events represent a low-competition environment where a number of species with good colonising capabilities thrive such as hoary ragwort, weld, common centaury, yellow-wort and kidney vetch. Where slopes stabilise for a time after erosion events, MG11b can form species-rich communities with a vibrant invertebrate community.

Community Description – Sunderland and Durham

6.18.7 By far the most common para-maritime community on the cliffs in Sunderland and Durham the vegetation is poorly developed on rapidly eroding soft cliffs and there is generally much bare soil. Community constants are represented by creeping bent and colt's-foot with cock's-foot, ribwort plantain and common ragwort the only other species regularly occurring. A number of other species occur at low frequency either persisting from the species-poor MG1 grassland on the cliff top, or establishing via wind-borne seeds opportunistically.

6.18.8 Whilst not intrinsically of high nature conservation value, this could be improved by creating species-rich grassland on the cliff top.

6.18.9 The following species were recorded in MG11b in South Tyneside:

Species	**DAFOR**
Agrostis stolonifera	F
Armeria maritima	F
Centaurea nigra	F
Sonchus asper	F
Tussilago farfara	F
Atriplex glabriuscula	LF
Festuca rubra	LF
Leontodon hispidus	LF
Anthyllis vulneraria	O
Blackstonia perfoliata	O
Cirsium arvense	O
Jacobaea erucifolius	O
Ononis repens	O
Plantago coronopus	O
Plantago lanceolata	O
Plantago maritima	O
Potentilla anserina	O
Potentilla reptans	O
Tortella flavovirens	O
Trifolium repens	O
Centaurium erythraea	R
Cochlearia officinalis	R
Daucus carota	R
Elytrigia repens (*Elymus repens*)	R
Equisetum arvense	R
Linaria vulgaris	R
Malva sylvestris	R
Medicago lupulina	R
Reseda luteola	R
Rubus fruticosus agg	R
Taraxacum officinale agg	R
Tripleurospermum maritimum	R

6.18.10 The following species were recorded in MG11b in Sunderland and Durham:

Species	**DAFOR**
Agrostis stolonifera	F
Sonchus asper	F
Tussilago farfara	F
Festuca rubra	LF
Leontodon hispidus	LF

Species	DAFOR
Anthyllis vulneraria	O
Cirsium arvense	O
Jacobaea vulgaris	O
Plantago lanceolata	O
Plantago maritima	O
Dactylis glomerata	O
Calystegia sepium	R
Chamerion angustifolium	R
Dicranella varia	R
Elytrigia repens (*Elymus repens*)	R
Equisetum arvense	R
Holcus lanatus	R
Lotus corniculatus	R
Papaver rhoeas	R
Pellia sp	R
Phascum cuspidatum ssp piliferum	R
Pteridium aquilinum	R
Rumex crispus	R
Rumex obtusifolius	R
Taraxacum agg	R

6.18.11 The following quadrat data was recorded for MG11b grassland in South Tyneside:

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid NZ	**4120 6174**	**4103 6396**	**4015 6472**	**3964 6586**	**3958 6586**		
Sward height	**5**	**20**	**15**	**7**	**5**		
Agrostis stolonifera	6	6	5	4	4	V	(4-6)
Armeria maritima			2	3	2	III	(2-3)
Festuca rubra			1	2	4	III	(1-4)
Plantago maritima				3	3	II	(_3)
Tussilago farfara	4	3				II	(3-4)
Plantago coronopus			2		2	II	(_2)
Plantago lanceolata	1		2			II	(1-2)
Sonchus asper	1	2				II	(1-2)
Potentilla anserina		4				I	(_4)
Tortella flavovirens			3			I	(_3)
Elytrigia repens (*Elymus repens*)	3					I	(_3)
Tripleurospermum maritimum			2			I	(_2)
Rubus fruticosus agg	2					I	(_2)
Trifolium repens	1					I	(_1)
Blackstonia perfoliata	1					I	(_1)
Cochlearia officinalis			1			I	(_1)

6.18.12 The following quadrat data was recorded for MG11b grassland in Sunderland and Durham:

Species	**Q6**	**Q7**	**Q8**	**Frequency**	**Abundance**
Quadrat location - OS Grid NZ	**4196 5161**	**4192 5174**	**4141 5398**		
Sward height	**10**	**15**	**15**		
Agrostis stolonifera	4	5	5	V	(4-5)
Tussilago farfara	3	2	3	V	(2-3)
Dactylis glomerata	1	4	2	V	(1-4)
Plantago lanceolata	1	1	1	V	(_1)
Jacobaea vulgaris	1	2		III	(1-2)
Festuca rubra			4	II	(_4)
Plantago maritima	4			II	(_4)
Equisetum arvense	3			II	(_3)
Pellia sp			3	II	(_3)
Dicranella varia			3	II	(_3)
Hypochaeris radicata	2			II	(_2)
Taraxacum agg		2		II	(_2)
Anthyllis vulneraria			2	II	(_2)
Cirsium arvense			2	II	(_2)
Phascum cuspidatum ssp piliferum			2	II	(_2)
Sonchus asper			1	II	(_1)
Leontodon hispidus	1			II	(_1)
Lotus corniculatus			1	II	(_1)
Holcus lanatus			1	II	(_1)

6.19 MG12a – *Festuca arundinacea* grassland *Lolium perenne – Holcus lanatus* sub-community

Community Attributes

Attribute	Status – MG12a
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c8
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.19.1 This para-maritime grassland community develops on moist but free-draining soils on coastal soft cliffs, and is characteristic of the north-east coast of England. Encountered in small quantity on soft cliffs in the study area, the community is dominated by tussocks of tall fescue usually with red fescue and creeping bent which are the community constants for MG12. Yorkshire fog is locally prominent. Forbs are represented by black knapweed and meadow vetchling, with ribwort plantain and wild carrot often present. This combination of associates is consistent with MG12a *Lolium perenne – Holcus lanatus* sub-community.

6.19.2 Where incremental erosion is taking place, ruderal species may be prominent in the gaps between turfs such as field horsetail and colt's-foot. As the community matures, ruderal species become less important, and a sward dominated by grasses including yellow oat-grass emerges. The early phase can also allow invasive non-native species to dominate where these have been introduced.

6.19.3 MG12 is well represented on soft cliff in the study area, and should be regarded as characteristic of soft cliffs in the north-east. MG12a is the least maritime of the sub-communities, which reflects the low maritime influence at this site, even on apparently exposed slopes.

6.19.4 MG12a grassland is not extensive in the study area, however, there was evidence of the community forming in two principal ways. Swards dominated by tall fescue can originate from large turfs which have fallen from the cliff top, species less tolerant of maritime influence such as false oat-grass grow poorly under these conditions, and this allows tall

fescue present to flourish, encouraging change from a sward dominated by false oat-grass to one dominated by tall fescue. Break up of turfs as incremental erosion takes place allows opportunistic soft cliff species to colonise, and the sward becomes more species rich.

6.19.5 Alternatively, species-rich grassland turfs subjected to incremental erosion processes are invaded by tall fescue seeding into gaps created as large turfs break up. Other opportunistic soft cliff species also invade either vegetatively or by seed.

6.19.6 Species richness of MG12a is compromised by simplification of the cliff top sward, with enhanced species richness where the precursor vegetation is MG5 or CG2, and reduced species richness where the precursor is MG6 or MG1.

Community Description – Sunderland and Durham

6.19.7 One area of MG12 was encountered on the cliff top to the south of Ryhope Denemouth where the sward was relatively diverse featuring meadowsweet (*Filipendula ulmaria*).

6.19.8 The following species were recorded in MG12a (all sites):

Species	**DAFOR**
Schedonorus arundinaceus (*Festuca arundinacea*)	D
Agrostis stolonifera	F
Centaurea nigra	F
Festuca rubra	F
Tussilago farfara	F
Cirsium arvense	LF
Holcus lanatus	LF
Potentilla reptans	O
Lathyrus pratensis	O
Trisetum flavescens	O
Galium aparine	O
Equisetum arvense	O
Epilobium hirsutum	O
Daucus carota	O
Elytrigia repens (*Elymus repens*)	O
Plantago lanceolata	O
Urtica dioica	R
Cirsium vulgare	R
Sonchus oleraceus	R
Rumex crispus	R
Vicia cracca	R

6.19.9 The following quadrat data was recorded in MG12a (all sites):

Species	**Q1**	**Q2**	**Q3**	**Frequency**	**Abundance**
Quadrat location - OS Grid NZ	**4096 6144**	**4123 6179**	**4191 5185**		
Sward height	**85**	**140**	**65**		
Schedonorus arundinaceus (*Festuca arundinacea*)	9	8	7	V	(8-9)
Cirsium arvense	1	2	2	V	(1-2)
Agrostis stolonifera	8	3		III	(3-8)
Centaurea nigra	2	5		III	(2-5)
Tussilago farfara	2	3		III	(2-3)
Festuca rubra			7	II	(_7)
Holcus lanatus		4		II	(_4)
Filipendula ulmaria			4	II	(_4)
Potentilla reptans	3			II	(_3)
Lathyrus pratensis	3			II	(_3)
Trisetum flavescens	3			II	(_3)
Dactylis glomerata			2	II	(_2)
Galium aparine		2		II	(_2)
Urtica dioica		2		II	(_2)
Equisetum arvense		2		II	(_2)
Epilobium hirsutum		2		II	(_2)
Heracleum sphondylium			2	II	(_2)
Hypochaeris radicata			2	II	(_2)
Cirsium vulgare		1		II	(_1)
Daucus carota	1			II	(_1)
Sonchus oleraceus	1			II	(_1)
Rubus fruticosus agg			1	II	(_1)

6.20 OV24a *Urtica dioica – Galium aparine* community; Typical sub-community

Community Attributes

Attribute	Status – OV24a
Broad habitat type	Modified grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	G4, Secondary code: 16
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.20.1 Patches of OV24a occur in South Tyneside, at Trow Point, Marsden Bay and Whitburn Steel, where this community is dominated by common nettle, with frequent cleavers with variable species associated with it across the community such as false oat-grass and occasional mugwort and yarrow which may suggest similarities with OV24b, Arrhenatherum elatius-Rubus fruticosus agg. sub-community. However, the prevalence of creeping thistle, high cover of common nettle, with occasional and rare associated species suggest closest affinity with the Typical sub-community, which may be transitioning to or from OV24b. The presence of sand couch and sea mayweed among expressions observed at Whitburn Steel, reflect the maritime influence on this community.

6.20.2 Species recorded within this community are listed below:

Species	**DAFOR**
Urtica dioica	D
Cirsium arvense	A
Arrhenatherum elatius	A
Galium aparine	F
Ranunculus repens	O / R
Sonchus asper	O / R
Rumex crispus	O / R
Artemisia vulgaris	O / R
Rubus fruticosus agg.	O / R
Hordeum murinum	O / R
Elytrigia juncea (*Elymus farctus*)	O / R
Malva sylvestris	R
Cirsium vulgaris	R

Species	DAFOR
Equisetum arvense	R
Plantago maritima	R
Juncus effusus	R
Holcus lanatus	R
Heracleum sphondylium	R
Achillea millefolium	R
Lamium album	R
Plantago lanceolata	R
Poa trivialis	R
Dactylis glomerata	R
Tripleurospermum maritimum	R
Smyrnium olusatrum	R
Avena fatua	R
Epilobium hirsutum	R
Calystegia sepium	R

6.20.3 Due to the limited extent of the community, only three quadrats were recorded, and these are detailed below:

Species	**Q1**	**Q2**	**Q3**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 39908 64927**	**NZ 40824 61263**	**NZ 40825 61261**		
Sward height (cm)	38	42	40		
Urtica dioica	8	8	8	V	(_8)
Cirsium arvense	3	4	4	V	(3-4)
Arrhenatherum elatius		7	8	IV	(7-8)
Elytrigia juncea (*Elymus farctus*)		8	5	IV	(5-8)
Sonchus asper	6		2	IV	(2-6)
Rumex crispus	6		2	IV	(2-6)
Galium aparine		5	4	IV	(4-5)
Artemisia vulgaris		5	4	IV	(4-5)
Rubus fruticosus agg.		4	5	IV	(4-5)
Hordeum murinum	5	4		IV	(4-5)
Malva sylvestris	6			II	(_6)
Plantago maritima	5			II	(_5)
Juncus effusus	5			II	(_5)
Achillea millefolium			4	II	(_4)
Lamium album			4	II	(_4)
Plantago lanceolata	4			II	(_4)
Tripleurospermum maritimum	4			II	(_4)
Smyrnium olusatrum	3			II	(_3)
Avena fatua		3		II	(_3)

6.21 OV25b *Urtica dioica – Cirsium arvense* community; *Rumex obtusifolius-Artemisia vulgaris* sub-community

Community Attributes

Attribute	Status – OV25b
Broad habitat type	Modified grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	G4, Secondary code: 17
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.21.1 OV25b occurs in Whitburn Steel, among the mobile dune communities, which is considered best described by the *Rumex obtusifolius-Artemisia vulgaris* sub-community due to the dominance of mugwort, and presence of occasional false oat-grass and cock's-foot. Sand couch reflects the location of this community, within and on the edge of the dunes.

6.21.2 Species recorded within this community are listed below:

Species	**DAFOR**
Artemisia vulgaris	D
Potentilla anserina	D
Cirsium arvense	A
Rumex obtusifolius	A
Agrostis stolonifera	A
Lolium perenne	F
Poa trivialis	F
Elytrigia juncea (*Elymus farctus*)	F / R
Ammophila arenaria	O
Dactylis glomerata	O
Arrhenatherum elatius	O
Taraxacum officinalis agg.	O
Sonchus asper	R
Heracleum sphondylium	R
Calystegia sepium	R

6.21.3 Quadrats recorded within this community are detailed below. Due to the limited extent of the community, three quadrats were recorded and are detailed below:

Species	**Q1**	**Q2**	**Q3**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 40833 61227**	**NZ 40830 61232**	**NZ 40783 61089**		
Sward height (cm)	25	24	20		
Artemisia vulgaris	5	7	4	V	(5-7)
Potentilla anserina	7	5	5	V	(5-7)
Cirsium arvense	5	6	7	V	(5-7)
Agrostis stolonifera	4	5	4	V	(4-5)
Rumex obtusifolius	4	5	2	V	(2-5)
Lolium perenne	4	3		IV	(3-4)
Poa trivialis	3	4		IV	(3-4)
Elytrigia juncea (*Elymus farctus*)	4	3		IV	(3-4)
Arrhenatherum elatius		2	3	IV	(2-3)
Dactylis glomerata	4			II	(_4)
Ammophila arenaria	2			II	(_2)
Taraxacum officinalis agg.		2		II	(_2)
Sonchus asper		2		II	(_2)

Community Description – Sunderland and Durham

6.21.4 Creeping thistle dominates where this community occurs on the cliff of Sunderland, where its associates cock's-foot, false oat-grass and common hogweed suggest affinity with OV25b. Species recorded within this community are listed below:

Species	**DAFOR**
Cirsium arvense	D
Dactylis glomerata	A
Agrostis stolonifera	A
Arrhenatherum elatius	A
Chamerion angustifolium	O
Heracleum sphondylium	O

6.21.5 Quadrats recorded within this community are detailed below. Only one quadrat was sampled due to the small size of the community:

Species	**Q1**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41897 52449**		
Sward height (cm)	24		
Cirsium arvense	8	V	(_8)
Dactylis glomerata	6	V	(_6)
Agrostis stolonifera	6	V	(_6)
Arrhenatherum elatius	6	V	(_6)
Chamerion angustifolium	3	V	(_3)
Heracleum sphondylium	2	V	(_2)

6.22 OV26d *Epilobium hirsutum* community; *Arrhenatherum elatius- Heracleum sphondylium* sub-community

Community Attributes

Attribute	Status – OV26d
Broad habitat type	Fen, marsh and swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Reedbeds
UKHabs code	f2e
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – Sunderland and Durham

6.22.1 Wetland 2 could be accessed therefore it has been attributed the OV26d *Arrhenatherum elatius-Heracleum sphondylium* sub-community, given the presence of false oat-grass, common nettle, creeping thistle and common hogweed preferential beside great willowherb. The abundance of hemp-agrimony is notable and is a feature of para-maritime expressions of this sub-community.

6.22.2 Species recorded within this community are listed below:

Species	DAFOR
Epilobium hirsutum	D
Arrhenatherum eliatus	O / R
Urtica dioica	O
Eupatorium cannabinum	O
Tortella flavovirens	O
Equisetum fluviatile	O
Heracleum sphondylium	O
Pellia sp.	O
Cirsium arvense	O
Galium aparine	O
Rubus fruticosus agg.	R
Agrostis stolonifera	R
Sambucus nigra	R
Pteridium aquilinium	R
Tussilago farfara	R

6.22.3 Due to the limited extent of this community, two quadrats were recorded and are detailed below.

Species	**Q1**	**Q2**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41947 51574**	**NZ 41957 51577**		
Sward height (cm)	26	20		
Epilobium hirsutum	8	8	V	(_8)
Urtica dioica	7	6	V	(6-7)
Arrhenatherum eliatus	6	6	V	(_6)
Eupatorium cannabinum	6	6	V	(_6)
Tortella flavovirens	6	6	V	(_6)
Equisetum fluviatile	5	4	V	(4-5)
Heracleum sphondylium	4	5	V	(4-5)
Pellia sp.	5	4	V	(4-5)
Cirsium arvense	4	4	V	(_4)
Galium aparine	4	4	V	(_4)
Rubus fruticosus agg.	3		III	(_3)
Agrostis stolonifera	3		III	(_3)
Sambucus nigra		3	III	(_3)
Pteridium aquilinium		2	III	(_2)
Tussilago farfara		2	III	(_2)

6.23 OV26 *Epilobium hirsutum* community

Community Attributes

Attribute	Status – OV26
Broad habitat type	Fen, marsh and swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Reedbeds
UKHabs code	f2e
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – Sunderland and Durham

6.23.1 Wetlands 3, 4 and 5 were inaccessible, and despite some species being identifiable using binoculars, these communities could not be exhaustively surveyed, therefore they have not been classified into sub-communities.

Wetland	Species present	DAFOR
3	*Epilobium hirsutum*	D
	Equisetum fluviatile	A
	Tussilago farfara	O
	Agrostis stolonifera	O
4	*Epilobium hirsutum*	D
	Equisetum arvense	A
	Tussilago farfara	O
	Agrostis stolonifera	O
5	*Epilobium hirsutum*	D
	Tussilago farfara	O
	Agrostis stolonifera	O

6.24 OV27b *Chamerion angustifolium* community; *Urtica dioica-Cirsium arvense* sub-community

Community Attributes

Attribute	Status – OV27b
Broad habitat type	Modified grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	G4, Secondary code: 16
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.24.1 OV27b occurs on the slope down to Whitburn Beach, where rosebay willowherb is dominant, and the preferential species common nettle, false oat-grass, creeping thistle and Yorkshire fog which is considered to most closely resemble the *Urtica-dioica – Cirsium arvense* sub-community.

6.24.2 Species recorded within this community are listed below:

Species	**DAFOR**
Chamerion angustifolium	D
Arrhenatherum elatius	A
Urtica dioica	A
Calystegia sepium	O
Holcus lanatus	O
Galium aparine	O
Potentilla reptans	R
Cirsium arvense	R
Potentilla anserina	R
Dactylis glomerata	R
Poa trivialis	R
Agrostis stolonifera	R
Kindbergia praelonga	R
Heracleum sphondylium	R
Rubus fruticosus agg.	R
Lathyrus pratensis	R
Trifolium repens	R
Crocosmia x crocosmiiflora	R

6.24.3 Given the small area of this community, one quadrat was recorded which is detailed below:

Species	**Q1**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41327 62913**		
Sward height (cm)	34		
Chamerion angustifolium	8	V	(_8)
Arrhenatherum elatius	4	V	(_4)
Urtica dioica	3	V	(_3)
Kindbergia praelonga	3	V	(_3)
Heracleum sphondylium	3	V	(_3)
Rubus fruticosus agg.	3	V	(_3)
Crocosmia x crocosmiiflora	2	V	(_2)
Galium aparine	2	V	(_2)

6.25 W21c *Crataegus monogyna – Hedera helix* scrub; *Brachypodium sylvaticum* sub-community

Community Attributes

Attribute	Status – W21c
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	S2a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – South Tyneside

6.25.1 W21c occurs on the slope to Whitburn Beach as a patch of dense hawthorn (*Crataegus monogyna*) scrub, with little groundflora except occasional false brome indicating affinity with the Brachypodium sylvaticum sub-community.

6.25.2 Species recorded within this community are listed below:

Species	**DAFOR**
Crataegus monogyna	D
Brachypodium sylvaticum	O
Cirsium arvense	O
Rubus fruticosus agg.	O
Ononis repens	O
Arrhenatherum elatius	R

6.25.3 Accessibility beneath the dense hawthorn is poor, consequently one ground flora quadrat was recorded within this community as detailed below:

Species	**Q1**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41371 62765**		
Sward height (cm)	20		
Crataegus monogyna	8	V	(_8)
Brachypodium sylvaticum	4	V	(_4)

Species	Q1	Frequency	Abundance
Cirsium arvense	3	V	(_3)
Rubus fruticosus agg.	3	V	(_3)
Ononis repens	3	V	(_3)
Arrhenatherum elatius	2	V	(_2)

6.26 W22c *Prunus spinosa – Rubus fruticosus* agg. scrub; *Dactylis glomerata* sub-community

Community Attributes

Attribute	Status – W22c
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	S2a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – South Tyneside

6.26.1 Among the mosaic of communities along the cliff of Whitburn Beach, the scrub community W22c is present, as well as at the top of the cliff by the former rifle ranges near Whitburn. This wind-pruned habitat contains barely any groundflora due to the dense growth of the blackthorn, with the greatest diversity towards the edge of the patches. Occasional false brome is visible which suggests closest affinity with the *Dactylis glomerata* sub-community.

6.26.2 Species recorded within this community are listed below:

Species	**DAFOR**
Prunus spinosa	D
Genista tinctoria	F
Arrhenatherum elatius	O
Urtica dioica	O
Brachypodium sylvaticum	O
Rubus fruticosus agg.	O
Potentilla reptans	O
Festuca rubra	O
Lotus corniculatus	O
Galium aparine	O
Dactylis glomerata	R
Heracleum sphondylium	R
Rumex crispus	R
Galium verum	R
Taraxacum officinalis agg.	R
Lathyrus pratensis	R
Dryopteris filix-mas	R
Asplenium scolopendrium	R
Plantago lanceolata	R

Species	DAFOR
Cirsium arvense	R
Agrostis stolonifera	R
Centaurea nigra	R

6.26.3 Ground flora quadrats recorded within this community are detailed below:

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid Reference	**NZ 41331 62363**	**NZ 41312 62871**	**NZ 41313 62960**	**NZ 41325 62952**	**NZ 41323 62875**		
Sward height (cm)	40	43	50	50	40		
Prunus spinosa	9	9	9	8	8	V	(8-9)
Arrhenatherum elatius	1	3	2	2	4	V	(1-4)
Urtica dioica	4			4	3	III	(3-4)
Brachypodium sylvaticum		4	4	3		III	(3-4)
Rubus fruticosus agg.		3		2	4	III	(2-4)
Potentilla reptans	2	2	2			III	(_2)
Festuca rubra		2		4		II	(2-4)
Galium aparine			3	3		II	(_3)
Dactylis glomerata	2		3			II	(2-3)
Heracleum sphondylium	1				3	II	(1-3)
Rumex crispus					4	I	(_4)
Galium verum		3				I	(_3)
Taraxacum officinalis agg.			3			I	(_3)
Lathyrus pratensis			3			I	(_3)
Dryopteris filix-mas					2	I	(_2)
Asplenium scolopendrium					2	I	(_2)
Plantago lanceolata		2				I	(_2)
Cirsium arvense	2					I	(_2)
Agrostis stolonifera	2					I	(_2)
Centaurea nigra	2					I	(_2)

6.27 W24a *Rubus fruticosus-Holcus lanatus* underscrub; *Cirsium arvense-Cirsium vulgare* sub-community

Community Attributes

Attribute	Status – W24a
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	s2a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – South Tyneside

6.27.1 W24a occurs along the Whitburn Cliff Tops, as patches of dense bramble with abundant creeping thistle emerging through it, with the edges transitioning to W24b, the false-oat grass sub-community. Few other species are present within the W24a community, with the abundance of creeping thistle indicating that these patches are best described as the *Cirsium arvense-Cirsium vulgare* sub-community.

6.27.2 Species recorded within this community are listed below:

Species	**DAFOR**
Rubus fruticosus agg.	D
Cirsium arvense	A
Arrhenatherum elatius	O
Urtica dioica	R
Equisetum arvense	R
Heracleum sphondylium	R

6.27.3 Due to the limited extent of this community, two quadrats were recorded and they are detailed below:

Species	**Q1**	**Q2**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41302 61984**	**NZ 41312 61938**		
Sward height (cm)	40	37		
Rubus fruticosus agg.	9	8	V	(8-9)
Cirsium arvense	7	6	V	(6-7)
Arrhenatherum elatius	3	3	V	(_3)
Urtica dioica	6		III	(_6)
Equisetum arvense		3	III	(_3)
Heracleum sphondylium	2		III	(_2)

6.28 W24b *Rubus fruticosus-Holcus lanatus* underscrub; *Arrhenatherum elatius-Heracleum sphondylium* sub-community

Community Attributes

Attribute	Status – W24b
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	S2a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – South Tyneside

6.28.1 Where W24a occurs, its edges become less dominated by bramble and creeping thistle, and grasses become more prominent, notably false oat-grass, which suggests that this habitat is the W24b sub-community. Due to the more open nature of dominant species, there is greater diversity here than in W24a, with other grasses represented by creeping bent, tall fescue and cock's-foot.

6.28.2 Species recorded within this community are listed below:

Species	**DAFOR**
Rubus fruticosus agg	D
Arrhenatherum elatius	A
Galium aparine	O
Agrostis stolonifera	O
Heracleum sphondylium	O
Centaurea nigra	O
Cirsium arvense	O
Schedonorus arundinaceus (*Festuca arundinacea*)	O
Urtica dioica	O / R
Dactylis glomerata	R
Rumex crispus	R
Alopecurus pratensis	R
Lathyrus pratensis	R

6.28.3 Quadrats recorded within this community are detailed below:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41333 62979**	**NZ 41332 62856**	**NZ 41335 62844**	**NZ 41062 61588**		
Sward height (cm)	40	41	37	36		
Rubus fruticosus agg	8	9	8	10	V	(8-10)
Arrhenatherum elatius	5	4	6	4	V	(4-6)
Galium aparine	6	5	7		IV	(5-7)
Urtica dioica		4	4		III	(_4)
Centaurea nigra	3		3		III	(_3)
Schedonorus arundinaceus (*Festuca arundinacea*)		5			II	(_5)
Dactylis glomerata	5				II	(_5)
Heracleum sphondylium			4		II	(_4)
Agrostis stolonifera				3	II	(_3)
Rumex crispus			3		II	(_3)

6.29 W25a *Pteridium aquilinum – Rubus fruticosus* underscrub; *Hyacinthoides non-scripta* sub-community

Community Attributes

Attribute	Status – W25a
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	S2a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – Sunderland and Durham

6.29.1 Dense bracken (*Pteridium aquilinium*), occurs in patches at Ryhope Denemouth, and south of Ryhope Denemouth, where few other species persist, with the prevalence of common nettle and occurrence of common cleavers indicating affinity with the W25a sub-community.

6.29.2 Species recorded within this community are listed below:

Species	**DAFOR**
Pteridium aquilinium	D
Arrhenatherum elatius	F
Cirsium arvense	F
Urtica dioica	F
Heracleum sphondylium	R
Galium aparine	R
Trifolium medium	R

6.29.3 Quadrats recorded within this community are detailed below:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41960 51593**	**NZ 41963 51598**	**NZ 41964 51596**	**NZ 41907 51901**	**NZ 41904 51918**		
Sward height (cm)	40	36	37	41	42		
Pteridium aquilinium	9	9	9	9	9	V	(_9)
Arrhenatherum elatius	3	3	5	4	4	V	(3-5)
Cirsium arvense	4	4	4		3	IV	(3-4)
Urtica dioica	3	5	4	4		IV	(3-5)
Heracleum sphondylium		4	2			II	(2-4)
Trifolium medium	4					I	(_4)

6.30 S12 *Typha latifolia* swamp

Community Attributes

Attribute	Status – S12
Broad habitat type	Fen, marsh and swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Lowland Fen
UKHabs code	f2a
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – Sunderland and Durham

6.30.1 Wetland 1 (S12) could not be safely accessed for thorough survey therefore insufficient information was collected to attribute it to a sub-community.

Species	**DAFOR**
Typha latifolia	D

6.31 S25 *Phragmites australis – Eupatorium cannabinum* fen

Community Attributes

Attribute	Status – S25
Broad habitat type	Fen, marsh and swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Reedbeds
UKHabs code	f2e
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description– Sunderland and Durham

6.31.1 Wetlands 6 and 7 (S25) could not be safely accessed for thorough survey therefore insufficient information was collected to attribute it to a sub-community.

Species	**DAFOR**
Phragmites australis	D
Agrostis stolonifera	F
Epilobium hirsutum	O / R
Tussilago farfara	O / R

6.32 Community: M10 *Carex dioica – Pinguicula vulgaris* mire

Community Attributes

Attribute	Status – M10
Broad habitat type	Fen, marsh and swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Lowland Fen
UKHabs code	f2a7
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	Yes
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – South Tyneside

6.32.1 Only one flush was identified in South Tyneside consisting of a small area of species-poor M10 *Carex dioica – Pinguicula vulgaris* mire (Wetland 8). This bryophyte-dominated community could not be safely accessed to record species present.

6.33 SD2 *Honckenya peploides – Cakile maritima* strandline community

Community Attributes

Attribute	Status – SD2
Broad habitat type	Supralittoral sediment
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Coastal sand dunes
UKHabs code	s3a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.33.1 The SD2 community, represented by sparsely distributed plants on the strandline. They are all of high nature conservation value with sea rocket, Babington's orache, frosted orache, sea sandwort and prickly saltwort present at Whitburn Bents and Whitburn Steel, and sea sandwort occurring with perennial sow-thistle and sand couch on the beach at Whitburn Beach.

6.33.2 Prickly saltwort is a plant with a restricted distribution and no previous records in the north-east (NBN 2019). It has declined throughout its range due to excessive recreational pressure on beaches, and its occurrence at Whitburn Bents and Whitburn Steel is notable. The distribution of sea rocket and sea sandwort is also being compromised by excessive recreational pressure at Whitburn Bents and Whitburn Steel.

6.33.3 Species recorded within this community are listed below:

Species	**DAFOR**
Atriplex glabriuscula	F
Cakile maritima	F
Atriplex laciniata	F
Honckenya peploides	A
Sonchus arvensis	R
Elytrigia juncea (*Elymus farctus*)	R
Salsola kali ssp. kali	R

6.33.4 Quadrat data recorded within this community is listed below:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41386 62818**	**NZ 40947 61409**	**NZ 40866 61303**	**NZ 40823 61207**	**NZ 40805 61119**		
Sward height (cm)	6	10	10	9	4		
Atriplex glabriuscula		6	6	5	5	IV	(5-6)
Cakile maritima		6	5	3	2	IV	(2-6)
Atriplex laciniata		4	3	1	3	IV	(1-4)
Honckenya peploides	6	2	1			III	(1-6)
Sonchus arvensis	5					I	(_5)
Elytrigia juncea (*Elymus farctus*)	3					I	(_3)
Salsola kali ssp. kali		1				I	(_1)

Community Description – Sunderland and Durham

6.33.5 A small area of SD2 is present at Ryhope Denemouth, where a sparsely vegetated strandline community contains predominantly Babington's orache with occasional perennial sow-thistle and broad-leaved dock.

6.33.6 Species recorded within this community are listed below:

Species	**DAFOR**
Atriplex glabriuscula	F
Sonchus arvensis	O
Rumex obtusifolius	R

6.33.7 Quadrat data recorded within this community is listed below:

Species	**Q1**	**Q2**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 41908 51948**	**NZ 41907 51946**		
Sward height (cm)	5	6		
Atriplex glabriuscula	6	6	V	(_6)
Sonchus arvensis	4	3	V	(3-4)
Rumex obtusifolius	3		III	(_3)

6.34 SD3 *Matricaria maritima – Galium aparine* strandline community

Community Attributes

Attribute	Status –SD3
Broad habitat type	Supralittoral sediment
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Coastal sand dunes
UKHabs code	s3a5
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	No

Community Description – South Tyneside

6.34.1 SD3 occurs at Marsden Bay where there is stabilised talus in front of hard cliff, and is associated with eutrophication due to sea bird colonies. SD3 at this location is characterised by sea mayweed and Babington's orache joined by prickly sow-thistle, common mallow (Malva sylvestris) and sparsely distributed Alexanders. Due to the location at the cliff base and sporadic nature of occurrence, this community was not mapped.

6.34.2 Species recorded within this community are listed below:

Species	**DAFOR**
Tripleurospermum maritimum	F
Atriplex glabriuscula	LF
Malva sylvestris	O
Sonchus asper	O
Galium aparine	R
Smyrnium olusatrum	R
Rumex crispus	R
Urtica dioica	R

6.34.3 Quadrats recorded within this community are detailed below:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 39629 65434**	**NZ 39629 65434**	**NZ 39773 65124**	**NZ 39896 64942**	**NZ 40026 64837**		
Sward height (cm)	10	5	7	9	10		
Tripleurospermum maritimum	6	5	5	7	6	V	(5-7)
Atriplex glabriuscula	4		4	5		III	(4-5)
Malva sylvestris		3		3		II	(3-5)
Galium aparine			4			I	(_4)
Sonchus asper	2					I	(_2)
Smyrnium olusatrum		2				I	(_2)

6.35 SD5b *Leymus arenarius* mobile dune community; *Elymus farctus* sub-community

Community Attributes

Attribute	Status – SD5b
Broad habitat type	Supralittoral sediment
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Coastal sand dunes
UKHabs code	s3a6
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – South Tyneside

6.35.1 The following was recorded in SD5b:

Species	**DAFOR**
Leymus arenarius	A
Elytrigia juncea (*Elymus farctus*)	F
Jacobaea vulgaris	F
Ononis repens	F
Carex arenaria	F
Agrostis stolonifera	F
Potentilla anserina	F
Rumex crispus	F
Daucus carota	F
Potentilla reptans	F / O
Ammophila arenaria	F / O
Hypochaeris radicata	O
Plantago lanceolata	O
Taraxacum agg	O
Artemisia vulgaris	O
Cirsium arvense	O
Cakile maritima	O
Tragopogon pratensis	O
Centranthus ruber	O
Rosa rugosa	O
Atriplex glabriuscula	O
Dactylis glomerata	R
Festuca rubra	R
Linaria purpurea	R
Medicago lupulina	R
Atriplex laciniata	R
Lolium perenne	R

Species	DAFOR
Achillea millefolium	R
Lotus corniculatus	R
Plantago maritima	R
Tussilago farfara	R
Heracleum sphondylium	R
Plantago major	R
Arrhenatherum elatius	R

6.35.2 SD5b mobile dune community occurs at Whitburn Bents and Whitburn Steel and is characterised by the presence of lyme-grass (*Leymus arenarius*) (the only community constant) with sand couch and a wide range of associates including sand sedge, marram grass, sea rocket, restharrow and wild carrot making this a species-rich community of high nature conservation value.

6.35.3 The following species were recorded in SD5b:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 40852 61287**	**NZ 40839 61255**	**NZ 40804 61188**	**NZ 40802 61143**	**NZ 40787 61074**		
Sward height (cm)	10	6	7	7	8		
Leymus arenarius	7	7	6	7	8	V	(6-8)
Elytrigia juncea (*Elymus farctus*)	5		4	5		III	(4-5)
Jacobaea vulgaris		4	4		4	III	(_4)
Agrostis stolonifera	4			4	4	III	(_4)
Daucus carota		3	3	2		III	(2-3)
Ammophila arenaria			5	5		II	(_5)
Potentilla anserina	4	5				II	(4-5)
Carex arenaria	3			5		II	(3-5)
Rumex crispus	5				2	II	(2-5)
Festuca rubra				5		I	(_5)
Hypochaeris radicata		4				I	(_4)
Artemisia vulgaris					4	I	(_4)
Atriplex glabriuscula	4					I	(_4)
Dactylis glomerata				4		I	(_4)
Plantago maritima			4			I	(_4)
Atriplex laciniata		4				I	(_4)
Plantago lanceolata					3	I	(_3)
Cakile maritima		3				I	(_3)
Tussilago farfara		3				I	(_3)
Lolium perenne					2	I	(_2)

6.36 SD8a *Festuca rubra – Galium verum* fixed dune grassland; Typical sub-community

Community Attributes

Attribute	Status – SD8a
Broad habitat type	Supralittoral sediment
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Coastal sand dunes
UKHabs code	s3a7
Element of H1230 qualifying feature of Durham Coast SAC (listed in Natural England 2019)	No
Notified feature of Durham Coast SSSI (Natural England – Designated sites view accessed 20th January 2020)	Yes

Community Description – South Tyneside

6.36.1 Small areas of SD8a fixed dune grassland were encountered at Whitburn Beach and Trow Point. This community features an abundance of red fescue with sand couch occurring on a sandy substrate derived from former dunes. At Whitburn Beach the occurrence of SD8a is very limited and appears to be subject to erosion by the sea. At Trow Point the community is stable but relatively species poor.

6.36.2 The following species were recorded in SD8a:

Species	**DAFOR**
Festuca rubra	A
Leymus arenarius	F
Cirsium arvense	F
Achillea millefolium	O
Potentilla reptans	O
Taraxacum agg	O
Dactylis glomerata	O
Agrostis stolonifera	O
Jacobaea vulgaris	R

6.36.3 The following quadrat data was recorded for this sub-community:

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Frequency**	**Abundance**
Quadrat location - OS Grid Reference	**NZ 38287 66669**	**NZ 38283 66664**	**NZ 38290 66607**	**NZ 41358 62895**		
Sward height (cm)	15	14	16	16		
Festuca rubra	6	7	6	6	V	(6-7)
Leymus arenarius	4		4		III	(_4)
Achillea millefolium			3		II	(_3)
Potentilla reptans	5				II	(_5)
Taraxacum agg		4			II	(_4)
Dactylis glomerata		4			II	(_4)
Jacobaea vulgaris				3	II	(_3)

7.0 DISCUSSION

7.1 Durham Coast SAC

7.1.1 Durham Coast SAC was designated in April 2005 and represents the only example of vegetated sea cliffs on Magnesian limestone exposures in the UK. The qualifying habitat for SAC designation is 'H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts'. However, it should be noted that 'H2110 Embryonic shifting dunes' and 'H1210 Annual vegetation of drift lines' are present within the SAC at Whitburn Bents and Whitburn Steel and Whitburn Beach, and 'H2130 Fixed dunes with herbaceous vegetation' is present at Trow Point. Whilst not qualifying features these habitats should be recognised as important in their own right and as supporting maritime vegetation within the SAC.

7.1.2 Natural England produced Draft Supplementary advice on conserving and restoring site features for Durham Coast SAC (January 2019) and this advice underpins the discussion below. The following pressures were identified by Natural England in the Supplementary advice;

Extent and spatial distribution

7.1.3 The target is to restore the total extent of the cliff system capable of supporting H1230 sea cliff vegetation. At present Natural England point out that the total extent of the cliff system which is capable of supporting H1230 sea cliff vegetation is not known, and detailed vegetation survey is required to be able to establish an accurate extent target. It is intended that this study can form a baseline for extent.

Drainage

7.1.4 Agricultural drainage has the potential to impact negatively on the qualifying feature through disruption to perched wetlands on the soft cliff and though intensifying erosion where land drains are intercepted by cliff recession.

Eutrophication

7.1.5 It is noted that some landward transitions are truncated by eutrophication which leads to increased abundance of undesirable species indicative of high nutrient status. For example; cow parsley, creeping thistle, cleavers, perennial rye-grass and common nettle.

Lack of semi-natural vegetation on the cliff top

7.1.6 The aim is to restore active processes such that the system can adjust to longer-term natural change (and climate change), during landward recession. Fluctuations in the extent of vegetated areas and bare rock occur over time and space within the site. It was noted that some landward transitions are truncated by intensive agriculture.

Invasive Non-native Species

7.1.7 The key objective is to prevent any introductions or planting, however, where removal is possible this should be undertaken. Introduction includes the dumping of spoil or organic waste on cliff tops or slopes within or beyond the site boundary which may contain plant seeds or propagules or enrich the site.

7.1.8 Whilst all INNS are considered negative indicators, the following three species are listed by Natural England; common wallflower (*Erysimum cheiri*), Japanese knotweed and Himalayan balsam. However, a wide variety of garden 'escapes' are present, in particular close to habitation.

Air quality

7.1.9 Habitats in Durham Coast SAC are considered sensitive to changes in air quality, and critical loads for nitrogen and acid deposition for some features are understood to be exceeded at present (Natural England January 2019). Exceedance of these critical values for air pollutants has the potential to modify chemical status of the substrate, accelerating or damaging plant growth, altering vegetation structure and composition and causing the loss of sensitive typical species associated with the feature.

7.1.10 Based on current scientific understanding, significant harmful effects on habitats in Durham Coast SAC are likely where Critical Loads and Levels for air pollutants are exceeded. At present Critical Levels have been calculated for ammonia (NH_3), oxides of nitrogen (NOx) and sulphur dioxide (SO_2), and Critical Loads calculated for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as halogens, heavy metals, persistent organic pollutants (POPs), volatile organic compounds (VOCs) or dusts. These pollutants should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development.

7.2 Pressures – South Tyneside

Extent and spatial distribution

7.2.1 Despite coastal erosion, the Durham Coast SAC occurs within the South Tyneside section of the coast, and a rich resource of maritime and para-maritime grassland has been identified and mapped as a result of this study. Now that the extent has been recorded, this will allow monitoring to ensure that the extent is maintained or augmented.

7.2.2 The qualifying feature is bordered by a combination of: residential areas with grassland buffers; pastoral farmland at the former rifle ranges; Whitburn Point Local Nature Reserve and Whitburn Coastal Park. The proximity of densely populated areas presents the possibility of pressures on extent which will require management. These pressures are explored in the text below.

Drainage

7.2.3 At the former rifle ranges it was evident that land drains within the soil are becoming exposed due to erosion, which is exacerbating erosion at specific locations. Measures should be considered which will counteract the impact these features are having on the landscape – such as removing them or blocking them up.

Eutrophication

7.2.4 Garden waste is a significant source of eutrophication where habitation is close to the cliff edge and engagement with householders to reduce the source material is recommended.

7.2.5 Similarly, it would be worth liaising with landowners along the coast (for example at the former rifle ranges) to ensure that they are not putting chemicals such as herbicides, or fertiliser onto their land which will runoff onto nearby coastal vegetation. Fertiliser / herbicide drift can also be a significant problem if applied carelessly when there is an off-shore breeze.

Lack of semi-natural vegetation on the cliff top

7.2.6 Erosion of soft cliff, and to a lesser extent hard cliff, is a threat to the maritime vegetation, where the rate is faster than the ability of maritime communities to establish. This is particularly evident on soft cliffs north of Whitburn Bents and Whitburn Steel where maritime communities have mostly eroded, to be replaced by semi-improved neutral grassland sinking down the soft cliff. This is especially a problem where the

neighbouring land use is unsympathetic, such as the pastoral farmland at the former rifle range where there is a scant buffer between the cliff, footpath and farmland comprising improved grassland of low diversity. This represents a significant squeeze and pressure point for the maritime vegetation qualifying feature. It is therefore advised that the landowner of this section is liaised with in order to move their fence back and create more of a buffer comprising sensitively-managed grassland. The path is already very close to the cliff edge in this section and there is no fence, so this will soon become a pressing matter regarding safety as the coast is eroded further.

7.2.7 The narrow ecotone between maritime grassland and intensively-farmed pasture contrasts starkly with the broad ecotone present at nearby Whitburn Coastal Park. At the former the ecotone is truncated at as little as 5m from the cliff top, whilst at the Coastal Park maritime grassland extends up to 20m inland in a broad ecotone from maritime grassland to species-rich non-maritime grassland. Clearly the broad ecotone is the preferable state supporting development of a climate change resilient maritime and para-maritime zone supporting qualifying features of the SAC.

7.2.8 Where vegetation communities immediately inland are diverse, such as the calcareous grassland north of Souter Lighthouse and diverse neutral grassland around Souter and the Leas, it indicates positive management which promotes floristic diversity. This in turn supports a more diverse maritime grassland community. As such, it is recommended that the National Trust and other landowners are liaised with to ensure that the grassland inland is managed in a sensitive way – such as through cutting in late summer/early autumn without the use of fertilisers or herbicides. This will enhance botanical diversity, which will in turn maintain and enhance maritime communities.

7.2.9 At Whitburn Coastal Park the non-maritime grassland is species-rich and represents a good resource. However, it was noted that some species characteristic of the South Tyneside coast are absent and perhaps collection of seed from adjacent cliff tops to the north to strew (or grow and plant into the grassland) would be beneficial. Species which would benefit from this approach include greater knapweed, bloody crane's-bill (*Geranium sanguineum*), saw-wort and dyer's-greenweed.

Invasive Non-native Species

7.2.10 Japanese knotweed, Japanese rose, Montbretia, white butterbur and red valerian were recorded along the coastline (Target Notes TNnA), as well as other INNS, which present a threat to maritime communities by outcompeting them. In particular, Schedule 9 species should be controlled to ensure that they do not spread and impact maritime species. Japanese rose is considered a significant problem at Whitburn Bents and Whitburn Steel in the mobile dune community and Whitburn Beach on the stabilised shingle where the only expression of MC11b maritime grassland was recorded.

7.2.11 Dense and scattered native scrub is not considered to be a problem currently, however this vegetation should be monitored and managed within specified limits to ensure that it does not spread and overwhelm neighbouring grassland and maritime communities.

7.2.12 It should be noted that INNS are a particular threat to maritime vegetation on soft cliffs as these are actively eroding to reveal bare soil which is readily colonised by invasive plants. Once established control of INNS on unstable cliffs is problematic and so prevention of introduction is considered the best course of action.

7.2.13 All records of INNS encountered during the survey are listed at Appendix 1 and Target Noted TNnA.

Air quality

7.2.14 It is recognised by Natural England that achieving the target to restore exposure of SAC features to pollutant levels below Critical Levels and Critical Loads is subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution.

7.2.15 Critical loads/levels are not defined on Air Pollution Information System (APIS) for the SAC. However, critical loads/levels for relevant features of Durham Coast SSSI were used instead for Condition Assessment for the following habitats; neutral grassland; calcareous grassland; fen, marsh and swamp (Natural England January 2019).

7.2.16 The following impacts due to exceedance of critical loads have been identified (APIS accessed 21st January 2020);

Pollutant	Calcareous grassland (CG2 grassland)	Fen, marsh and swamp (M10 mire)	Neutral grassland (MG5 grassland)
Nitrogen deposition	Increase in tall grasses, decline in diversity, increased mineralization, N leaching; surface acidification.	Increase in tall graminoids, decrease in bryophytes.	Increase in tall grasses, decrease in diversity.
Acidity	Leaching will cause a decrease in soil base saturation, increasing the availability of Al3+ ions; mobilisation of Al3+ may cause toxicity to plants and mycorrhiza; may have direct effect on	Habitat not sensitive to acidification.	Leaching will cause a decrease in soil base saturation, increasing the availability of Al3+ ions, mobilisation of Al3+ may cause toxicity to plants and mycorrhiza, may have direct effect on

	lower plants (bryophytes and lichens).		lower plants (bryophytes and lichens).
Ammonia	Site specific impacts.	Habitat sensitive to ammonia.	Habitat sensitive to ammonia.
NOx	Habitat sensitive to NOx.	Habitat sensitive to NOx.	Habitat sensitive to NOx.
Sulphur dioxide	Site specific impacts.	Habitat sensitive to SO_2.	Habitat sensitive to SO_2.

7.2.17 Sources of air-borne pollutants listed above are many and varied, however, where a planning application is received and there is potential for an increase in production of any of these pollutants, then it is recommended that Habitats Regulations Assessment (HRA) is undertaken to identify receptors, pathways and potential for significant effects on the features of Durham Coast SAC. Where likely significant effect is identified an Appropriate Assessment will be necessary to consider appropriate avoidance, mitigation and compensation measures.

7.2.18 Sources of pollution which have the potential to impact features of the SAC due to impacts on air quality are tabulated below (APIS accessed 21st January 2020):

Pollutant	Sources
Nitrogen deposition	Fossil fuel combustion (motor vehicles, heating sources) Agriculture (use of fertiliser and herbicide)
Acid deposition	Intensive agriculture Point sources (power generation using fossil fuels, other industrial processes) Fossil fuel combustion (motor vehicles, heating sources)
Ammonia	The main source is agriculture, e.g. manures, slurries and fertiliser application. Other sources include; catalytic converters in petrol cars, landfill sites, sewage works, composting of organic materials, combustion and some industrial processes.
NOx	Fossil fuel combustion (half from motor vehicles, quarter from power stations, and a quarter from industrial and domestic combustion processes).
Sulphur dioxide	Main sources are electricity generation, industrial and domestic fuel combustion

7.2.19 It is recommended that land-use planning and consideration of planning applications takes into account sources of these air pollutants and their potential to impact features of Durham Coast SAC.

Access

7.2.20 Where access may be causing damage through excessive trampling (examples noted at TN43P in South Tyneside and TN58P in Sunderland) it is recommended that the path is fenced from the cliff edge. It should be noted that in certain places trampling pressure is beneficial and promotes development of coastal grassland dominated by sea plantain and red fescue– such as just south-east of Frenchman's Bay. Vegetation maintained by trampling includes all areas of maritime grassland mapped as MC10b *Festuca rubra – Plantago* spp. maritime grassland.

7.2.21 At Whitburn Bents and Whitburn Steel it is observable that sand is accreting allowing the development of a strandline community and mobile dunes inland. This is a dynamic ongoing process subject to change over time driven by aeolian deposits of sand around vegetation but subject to storms and tide removing material. Overall, net accretion is currently observable and is a natural process which should be facilitated. Unfortunately, at present, the distribution and abundance of strandline vegetation is being compromised by excessive recreational pressure at Whitburn Bents and Whitburn Steel. At this location one plant of prickly saltwort was recorded. This is a species of nature conservation value and concern which is likely being limited by recreational pressure (mainly dog walking) on the beach above high tide line. Due to its remoteness on the north part of the beach the problem is less severe than in Sunderland, however, action to reduce this disturbance would be beneficial.

Summary

Pressure identified in NE Jan 2019	**Pressure in STC?**	**Action points**
Extent and spatial distribution	Yes	Maintain extent of qualifying feature into the future through maintenance of a buffer of species-rich grassland inland. Buffer width should be 20 times erosion rate or 50m whichever is the larger (Whitehouse 2007). Creating a wider buffer at the former rifle ranges is an urgent priority to protect the qualifying feature. Now that the extent of qualifying feature is known this should be monitored regularly to ensure the resource is maintained.
Drainage	Yes – where land drains are severed	Severed land drains are accelerating erosion on the soft cliff. Block land drains inland where this occurs.
Eutrophication	Dog fouling	Fouling by dogs not considered significant.

Pressure identified in NE Jan 2019	Pressure in STC?	Action points
	Garden waste Agricultural inputs	Eutrophication due to dumping of garden waste to be curtailed. Ensure no fertiliser / herbicide use in designated buffer areas.
INNS	Yes	Work with local residents to stop accidental introductions via garden waste. Discourage deliberate introductions. Remove established INNS (in particular Japanese knotweed at Trow Point and Japanese rose at Whitburn Beach, Whitburn Bents and Whitburn Steel).
Air quality	Yes. Critical loads for Nitrogen and Acid deposition being exceeded.	It is recommended that land-use planning and consideration of planning applications takes into account sources of these air pollutants and their potential to impact features of Durham Coast SAC. Airborne NH3 inputs from fertiliser and herbicide use should never take place in the SAC. Fertiliser and herbicide use in designated buffer areas should be strictly controlled to minimise drift into the SAC. Need to consider NOx from traffic and other sources.
Access	Yes	Consider measures to reduce trampling pressure at Whitburn Bents, Whitburn Steel and Whitburn Beach to allow strandline vegetation to thrive.

7.3 Pressures – Sunderland

Extent and spatial distribution

7.3.1 The Sunderland section of Durham Coast SAC does not contain the qualifying feature H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts and as the SAC boundary does not include any suitable habitat for the qualifying feature the extent is unlikely to change. However, the sea-cliffs outside the SAC are capable of supporting maritime and para-maritime vegetation, and as such this should be promoted as supporting habitat for the SAC.

Drainage

7.3.2 In multiple places, it was evident that land drains within the soil are becoming exposed due to erosion, which is exacerbating erosion at specific locations. Measures should be considered which will counteract the impact that these features are having on the landscape – such as removing them or blocking them up.

Eutrophication

7.3.3 Liaison with landowners along the coast should be undertaken to discourage use of herbicides and fertiliser on their land which can runoff onto nearby coastal vegetation. Fertiliser / herbicide drift can also be a significant problem if applied carelessly when there is an off-shore breeze.

Lack of semi-natural vegetation on the cliff top

7.3.4 In order to maintain biodiversity in such a dynamic system, it is important to ensure natural processes are allowed to occur and manage habitats with an understanding of the system as a whole. The diversity of vegetation communities does, to a certain extent, depend on the quality of vegetation communities immediately inland as this is the source of ‘persisters’ and ‘opportunists’. Species-rich grassland will contribute much to the soft cliff ecosystem, species-poor grassland contributes little to diversity on the cliff.

7.3.5 The constant erosion of soft cliff and to a lesser extent hard cliff habitats, means that coastal communities of the cliff top are faced with a squeeze. Constantly being eroded on the seaward side, large turfs break off and contribute to the soft cliff ecosystem dynamic. Where intensive agriculture has been practised inland, this means that species-rich communities are replaced with simplified, species-poor communities, and thus species-rich grassland is lost to the cliff top in increments.

7.3.6 Observation suggests that whilst 'opportunists' and some 'soft cliff species' have the ability to colonise abandoned farmland, 'persisters' show little ability to do this. Consequently, to ensure that soft cliff continues to have 'persisters', management must aim to maintain these species in habitats on the cliff top.

7.3.7 Traditionally steep-sided valleys (e.g. Ryhope Denemouth) and much of the cliff top are considered likely to have been grazed as part of a mixed farming landscape. At these locations the squeeze is exacerbated by encroachment on to species-rich grassland by scrub, bracken and tall ruderal vegetation. Thus, in steep sided valleys where agricultural improvement has not been possible, the squeeze continues as unmanaged grassland becomes rank and is then replaced.

7.3.8 In order to address maritime vegetation squeeze, the following recommendations are made;

- Creation of a wide buffer inland using locally sourced seed from species-rich grasslands; possibly using green hay strewing to establish these;
- Consider methods to reduce the impact of persistent fertilisers in soil, in particular phosphate. Deep ploughing can help to bring less contaminated sub-soil to the surface; and
- Manage new grasslands as low input system permanent grassland by grazing and hay making as appropriate.

7.3.9 Species-rich grassland creation to form an inland buffer is recommended. The following species were observed during the survey and should be considered as locally occurring species which would be suitable for including in the seed mix for the buffer strip:

Species	**English name**
Centaurea nigra	Black knapweed
Leontodon hispidus	Rough hawkbit
Anthyllis vulneraria	Kidney vetch
Ononis repens	Restharrow
Pastinaca sativa	Wild parsnip
Vicia sativa	Common vetch
Centaurea scabiosa	Greater knapweed
Carduus nutans	Nodding / musk thistle
Carduus crispus	Welted thistle

7.3.10 Whilst the list above indicates desirable species, due to the fertile nature of the soil it is likely that much creeping thistle *Cirsium arvense* may become established in the first

few years. It is recommended that this species is tolerated as both a source of pollen / nectar and seed for seed eating birds in the autumn.

Invasive Non-native Species

7.3.11 Schedule 9 Japanese knotweed, Japanese rose, and non-native red valerian were observed in the dunes at Whitburn Bents and Whitburn Steel. These species represent a threat to native species by outcompeting them. Schedule 9 species should be controlled to ensure that they do not spread and impact maritime species, and red valerian should be managed within specified limits. Garden waste is being deposited in the dunes by local householders which should be curtailed.

7.3.12 In addition an abundance of Schedule 9 Himalayan balsam was recorded at Ryhope Denemouth and near access steps to Ryhope village beach, therefore measures should be undertaken to remove this plant from the catchment.

7.3.13 It should be noted that INNS are a particular threat to maritime vegetation on soft cliffs as these are actively eroding to reveal bare ground providing bare soil for colonisation for invasive plants. In addition, once established control of INNS on unstable cliffs is problematic and so prevention of introduction is considered the best course of action.

7.3.14 All instances of INNS encountered during the survey are recorded at Appendix 1 and as Target Notes TNnP.

Air quality

7.3.15 It is recognised by Natural England that achieving the target to restore exposure of SAC features to pollutant levels below Critical Levels and Critical Loads is subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution.

7.3.16 Critical loads/levels are not defined on Air Pollution Information System (APIS) for the SAC. However, critical loads/levels for relevant features of Durham Coast SSSI were used instead for Condition Assessment for the following habitats; neutral grassland; calcareous grassland; fen, marsh and swamp (Natural England January 2019).

7.3.17 The following impacts due to exceedance of critical loads have been identified (APIS accessed 21st January 2020);

Pollutant	Calcareous grassland (CG2 grassland)	Fen, marsh and swamp (M10 mire)	Neutral grassland (MG5 grassland)
Nitrogen	Increase in tall grasses,	Increase in tall	Increase in tall grasses,

deposition	decline in diversity, increased mineralization, N leaching; surface acidification.	graminoids, decrease in bryophytes.	decrease in diversity.
Acidity	Leaching will cause a decrease in soil base saturation, increasing the availability of Al3+ ions; mobilisation of Al3+ may cause toxicity to plants and mycorrhiza; may have direct effect on lower plants (bryophytes and lichens).	Habitat not sensitive to acidification.	Leaching will cause a decrease in soil base saturation, increasing the availability of Al3+ ions, mobilisation of Al3+ may cause toxicity to plants and mycorrhiza, may have direct effect on lower plants (bryophytes and lichens).
Ammonia	Site specific impacts.	Habitat sensitive to ammonia.	Habitat sensitive to ammonia.
NOx	Habitat sensitive to NOx.	Habitat sensitive to NOx.	Habitat sensitive to NOx.
Sulphur dioxide	Site specific impacts.	Habitat sensitive to SO_2.	Habitat sensitive to SO_2.

7.3.18 Sources of air-borne pollutants listed above are many and varied, however, where a planning application is received and there is potential for an increase in production of any of these pollutants, then it is recommended that Habitats Regulations Assessment (HRA) is undertaken to identify receptors, pathways and potential for significant effects on the features of Durham Coast SAC. Where likely significant effect is identified an Appropriate Assessment will be necessary to consider appropriate avoidance, mitigation and compensation measures.

7.3.19 Sources of pollution which have the potential to impact features of the SAC due to impacts on air quality are tabulated below (APIS accessed 21st January 2020):

Pollutant	Sources
Nitrogen deposition	Fossil fuel combustion (motor vehicles, heating sources) Agriculture (use of fertiliser and herbicide)
Acid deposition	Intensive agriculture Point sources (power generation using fossil fuels, other industrial processes) Fossil fuel combustion (motor vehicles, heating sources)
Ammonia	The main source is agriculture, e.g. manures, slurries and fertiliser application. Other sources include; catalytic converters in petrol cars,

Pollutant	Sources
	landfill sites, sewage works, composting of organic materials, combustion and some industrial processes.
NOx	Fossil fuel combustion (half from motor vehicles, quarter from power stations, and a quarter from industrial and domestic combustion processes).
Sulphur dioxide	Main sources are electricity generation, industrial and domestic fuel combustion

7.3.20 It is recommended that land-use planning and consideration of planning applications takes into account sources of these air pollutants and their potential to impact features of Durham Coast SAC.

Access

7.3.21 Despite the presence of a path along the coast, and a few incidences of litter, dangerous access points and burnt grass, particularly north of the access point to the beach at Leechmere, the impact of people using the coast in a way which would affect maritime vegetation appeared negligible. Access was noted as being limited where the train line runs parallel to the coast, which may also reduce potential for significant impact by people. Nevertheless, providing more bins, signs, and encouraging litter-picking along the coast would reduce the impact of litter and likelihood of more people littering.

7.3.22 At Whitburn Bents and Whitburn Steel it is observable that sand is accreting, allowing the development of a strandline community and mobile dunes inland. This is a dynamic ongoing process subject to change over time driven by aeolian deposits of sand around vegetation but subject to storms and tide removing material. Overall, net accretion is currently observable and is a natural process which should be facilitated. Unfortunately, at present, the distribution and abundance of strandline vegetation is being compromised by excessive recreational pressure at Whitburn Bents and Whitburn Steel.

Summary

Pressure identified in NE Jan 2019	**Pressure in Sunderland?**	**Options**
Extent and spatial distribution	Yes	Rapid rates of erosion coupled with species-poor grassland inland are compromising development of maritime cliff vegetation. Ensure buffer of species-rich grassland is established. 20 times erosion rate or 50m whichever is the larger (Whitehouse 2007).

Pressure identified in NE Jan 2019	Pressure in Sunderland?	Options
Drainage	Yes – where land drains are severed	Severed land drains are accelerating erosion on the soft cliff. Block land drains inland where this occurs.
Eutrophication	Dog fouling Garden waste Agricultural inputs	Dog fouling is not considered a pressure. Dumping of garden waste is limited by the lack of proximity to habitation, however, vigilance is necessary. Ensure no fertiliser / herbicide use in designated buffer areas.
INNS	Yes	Work with local residents to stop accidental introductions via garden waste. Discourage deliberate introductions. Remove established INNS. Particular targets should be; Japanese rose and Japanese knotweed in the dunes at Whitburn Bents. Himalayan balsam needs catchment wide approach in Ryhope Denemouth
Air quality	Yes. Critical loads for Nitrogen and Acid deposition being exceeded.	It is recommended that land-use planning and consideration of planning applications takes into account sources of these air pollutants and their potential to impact features of Durham Coast SAC. Airborne NH3 inputs from fertiliser and herbicide use should never take place in the SAC. Fertiliser and herbicide use in designated buffer areas should be strictly controlled to minimise drift into the SAC. Need to consider NOx from traffic and other sources.
Access	Yes	Consider steps to reduce trampling pressure at Whitburn Bents and Whitburn Steel to allow strandline vegetation to thrive.

7.4 Monitoring and Future Work

7.4.1 Key structural influential and distinctive species are identified by Natural England (January 2019) as follows; narrow-leaved marsh orchid, rush-leaved fescue (*Festuca arenaria*), bird's-eye primrose (*Primula farinosa*) and round-leaved wintergreen (*Pyrola rotundifolia*). Narrow-leaved marsh orchid was recorded during the current survey, and it is recommended that populations of this species are monitored annually along with search for further populations (which may not have been apparent in 2019).

7.4.2 Monitoring of maritime and para-maritime vegetation using the NVC methodology should take place regularly (at least every 5 years). Due to the dynamic nature of the soft cliff habitat future monitoring survey on soft cliffs should aim to record vegetation communities with the characteristics of those recorded on this occasion rather than attempt to record the same communities in the same places.

7.4.3 In order to monitor cliff erosion processes, use of fixed-point photography is recommended. A reference set of fixed-point monitoring locations is attached at Appendix 3. Photographs taken from these fixed points in 2019 are attached at Appendix 4 for South Tyneside and Appendix 5 for Sunderland. It is recommended that these are re-visited annually.

7.4.4 The Maritime NVC (Rodwell *et al* 2000) acknowledges under-sampling of soft cliffs in the North-east; consequently, although the communities recorded can be described in terms of their affinities with analogous NVC communities in the published texts, there is clearly a body of work to be undertaken in order to adequately describe the communities in definitive terms for Magnesian limestone and soft cliffs of Durham Coast SAC.

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FIGURE 1
PHASE 1 HABITAT MAPS

FIGURE 2
NATIONAL VEGETATION CLASSIFICATION MAPS

FIGURE 3
SURVEY OVERVIEW MAPS

(ATTACHED AS SEPARATE DOCUMENTS)

APPENDIX 1
TARGET NOTES

APPENDIX 2
TARGET NOTE PHOTOGRAPHS

APPENDIX 3
FIXED-POINT PHOTOGRAPH DATA

APPENDIX 4
FIXED-POINT PHOTOGRAPHS – SOUTH TYNESIDE

APPENDIX 5
FIXED-POINT PHOTOGRAPHS – SUNDERLAND

(SUPPLIED AS SEPARATE DOCUMENTS)