Maritime Cliff and Slope survey between Reighton Sands and Martin's Gill, East Yorkshire

National Vegetation Classification (NVC) survey undertaken summer 2022 by Haycock and Jay Associates Ltd

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Foreword

An NVC survey of maritime cliff and slope vegetation habitats between Reighton Sands and Martin's Gill (just south of Filey town) was undertaken in 2022 to investigate the potential for their inclusion within a Site of Special Scientific Interest (SSSI). This report does not itself make a case for designation, rather it provides an objective record of the survey findings which will be used to support Natural England's independent assessment of special interest.

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Executive summary

Haycock and Jay Associates were commissioned by Natural England to undertake a National Vegetation Classification (NVC) survey of habitats within a survey area extending from Reighton Gap to Martin's Gill near Filey.

The survey identified 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 growth and spread of non-native plant species.

The dynamic nature of the soft cliffs throughout the survey area has led to creation of an intimate mosaic of vegetation at all stages of succession from bare ground to mature woodland. Natural processes cause slipping and erosion at varying rates in different parts of the survey area. Extensive areas of bare ground and rotational slippage to form wetlands occurs alongside stabilised species-rich calcareous grassland and wind-clipped thickets of scrub.

Soft cliffs on this coast support a mosaic of maritime, sub-maritime and para-maritime vegetation communities which together form a Maritime Cliff and Slope habitat complex typically included in the Annex I habitat type H1230 Vegetated Sea Cliffs of the Atlantic and Baltic Coasts. Maritime grassland present is generally a poor fit for published NVC community descriptions, however, this is a recognised short-coming of NVC rather than a comment on the intrinsic quality of the vegetation. Sub-maritime grassland was also recorded along much of the coast; these are essentially lowland grasslands occurring on maritime cliff and consequently supporting an unusual assemblage of species including some species limited to coastal sites. Para-maritime features, in particular dense scrub and woodland, were also recorded. In these cases the influence of the sea is not immediately apparent, however, the sculpting of these features by constant strong winds from the sea is clear, and some climatic maritime influence is apparent.

Taken together the vegetation communities recorded represent an important reservoir of species-richness in a coastal location forming a good example of soft cliffs meeting the criteria for Annex I habitat type H1230 Vegetated Sea Cliffs of the Atlantic and Baltic Coasts.

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Introduction

Background

Haycock and Jay Associates were commissioned by Natural England to undertake a National Vegetation Classification (NVC) survey of habitats within a survey area extending from Reighton Gap to Martin's Gill near Filey. The survey area extends to 181ha, however, much of this is foreshore and terrestrial survey area totals some 63ha. Inhabited buildings, caravans and gardens were not surveyed and appear blank on the figures; unsurveyed area totals 6.29ha.

This report presents data collected during August 2022 and represents an update for survey carried out in this area by the author in 2012 (Haycock and Jay 2013).

For each community a description is recorded followed by a species list for that community, and quadrat data gathered during the survey where appropriate. The extent of each vegetation community is mapped on Figure 1 and tabulated below.

Where communities were encountered in intimate mosaic, these areas have been recorded on Figure 1 as 'Mosaic' each with a unique typology and vegetation communities stated in the legend. The percentage of each community in each mosaic area is recorded in the attribute table and tabulated in Section 3.35 below.

It should be noted that where vegetation occurs on steep or vertical substrates then the mapped area will under-estimate the extent of the community. This is particularly pertinent for cliff ledge vegetation and maritime grassland occurring on steep slopes at the cliff top.

Table 1. Summary of the NVC Communities present in the survey area. A spreadsheet is attached at Appendix 2 further summarising the attributes of each NVC community.

NVC Community	Extent (ha)
M10 *Carex dioica – Pinguicula vulgaris* mire	0.04
M22a *Juncus subnodulosus – Cirsium palustre* fen-meadow; Typical sub-community	0.27
M22b *Juncus subnodulosus – Cirsium palustre* fen-meadow; Briza media – Trifolium spp sub-community	0.38
M27b *Filipendula ulmaria – Angelica sylvestris* mire; *Urtica dioica – Vicia cracca* sub-community	0.05
MC8d *Festuca rubra – Armeria maritima* grassland; *Holcus lanatus* sub-community	2.20
MC8f *Festuca rubra – Armeria maritima* grassland; *Anthyllis vulneraria* sub-community	4.44
MC9c *Festuca rubra – Holcus lanatus* maritime grassland; *Achillea millefolium* sub-community	0.13
MC10b *Festuca rubra – Plantago* spp maritime grassland; *Carex panicea* sub-community	0.22
MC11c *Festuca rubra – Daucus carota* ssp gummifer maritime grassland *Sanguisorba minor* sub-community	1.31
MG1a *Arrhenatherum elatius* grassland; *Festuca rubra* sub-community	9.33
MG5b *Cynosurus cristatus – Centaurea nigra* grassland *Galium verum* sub community	0.27
MG5 species poor *Cynosurus cristatus – Centaurea nigra* grassland	1.82
MG6a *Lolium perenne-Cynosurus cristatus* grassland; Typical sub community	3.11
MG11b *Festuca rubra – Agrostis stolonifera – Potentilla anserina* grassland, *Atriplex prostrata* sub-community	4.51
MG12a – Festuca arundinacea grassland *Lolium perenne – Holcus lanatus* sub-community	0.98
S4diii *Phragmites australis* reedbed *Atriplex prostrata* sub-community *Agrostis stolonifera* variant	0.08
S28 *Phalaris arundinacea* tall-herb fen	0.07
SD3 *Matricaria maritima – Galium aparine* strandline community	NA
SD5 *Leymus arenarius* mobile dune community	NA
SEt *Equisetum telmateia* mire	0.72
S12b *Typha latifolia* swamp *Mentha aquatica* sub-community	0.07
OV24 *Urtica dioica – Galium aparine* community	0.02
OV25 *Urtica dioica – Cirsium arvense* community	0.36
OV26 *Epilobium hirsutum* community	0.59
OV27 *Chamerion angustifolium* community	0.14

NVC Community	Extent (ha)
W1 *Salix cinerea – Galium palustre* woodland	0.66
W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland	0.32
W21 *Crataegus monogyna – Hedera helix* scrub	4.58
W22c *Prunus spinosa – Rubus fruticosus* agg. scrub; *Dactylis glomerata* sub-community	11.16
W23 *Ulex europaeus – Rubus fruticosus* scrub	3.47
W24 *Rubus fruticosus – Holcus lanatus* underscrub	1.86
W25 *Pteridium aquilinum – Rubus fruticosus* underscrub	1.29

Table 2. List of other habitats recorded in the survey area.

Habitat	Extent (ha)
Open water	0.14
Dry ponds	0.12
Russian vine	0.04
Non-native trees	0.03
Arable	1.68

Methodology

National Vegetation Classification Survey

The method used for this survey followed the approach for National Vegetation Classification (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*.).

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.

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. In addition the proportion of bare ground, vegetation height in centimetres and a photograph of each quadrat was recorded.

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.

Table 3. 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

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 here:

I = 1-20% of quadrats

II = 21-40%

III = 41-60%

IV = 61-80%

V = 81-100%

Finally, the NVC community type was determined by comparing the results of the field survey, using both keys and the experience of the field surveyor, with the published accounts and floristic tables given in British Plant Communities (Rodwell et al., 1991 et seq.).

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 MAVIS and other software indicates that it is imperative that the practitioner 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.

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.

Constraints

The NVC survey was undertaken in good weather conditions during the latter part of the optimal time of year. A summer of drought meant that early flowering species and annuals were less apparent, and it was not possible to identify some plants to species level. In particular orchids have often been recorded simply as *Dactylorhiza* sp. Where orchid flowering spikes were present tentative species recording has been undertaken where there was sufficient extant evidence.

Some vegetation communities were not safely accessible due to their proximity to the edge of the cliff or occurrence on steep, unstable substrate. These communities could not be surveyed directly, but with use of binoculars it was possible to attribute them to a sub-community without quadrat survey.

National Vegetation Classification Survey Results

Introduction

An NVC survey of habitats within the survey boundary from Reighton Sands north to Martin's Gill was undertaken between 24th and 26th August 2022 inclusive by Principal Ecologist Gordon Haycock CEcol CEnv FCIEEM.

NVC communities are mapped on Figure 1, and a photograph of each quadrat is attached at Appendix 1.

Appendix 2 is an Excel spreadsheet summarising results and tabulating each NVC sub-community including NVC community, broad habitat, Priority Habitat (where relevant) and maritime status.

Appendix 3 is a Figure taken from our previous report, and an updated table showing NVC sub-communities present in each morphological section.

Community Descriptions

Rationale

The National Vegetation Classification (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 North Yorkshire coast barely appears to have taken place at all. Consequently, vegetation communities encountered do not always readily accord with those described in Rodwell.

In describing the vegetation, the terms Maritime, Sub-maritime and Para-maritime (as defined by Ratcliffe 1977) have been used. Maritime communities show strong and direct influence of sea with markedly saline soils. Sub-maritime vegetation shows less direct effect of sea, however, soils are still more saline than those inland. Para-maritime communities occur in the zone in which special climatic conditions of seacoast are influential but soils are not saline and halophytes not present. All three types of vegetation should be regarded as elements of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts.

Vegetation communities encountered during the survey are described in terms of analogous communities appearing in the NVC published literature and their 'maritime status' stated. 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.

In addition to published NVC communities, wetland vegetation dominated by *Equisetum telmateia* has been recorded as SEt as no analogue for this community currently exists.

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

M10 *Carex dioica – Pinguicula vulgaris* mire

Table 4. M10 Community Attributes

Attribute	NVC code – 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 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Para-maritime

There are a number of base-rich and seepages throughout the soft cliff resource which give rise to M10 flushes characterised by small sedges, predominantly glaucous sedge. Grass of Parnassus is a community constant and was much in evidence during the survey along with colt's-foot, common fleabane, jointed rush and marsh thistle. Marsh arrow-grass is locally frequent. Bryophytes form a hepatic mat in a number of locations featuring greasewort, endive pellia and pointed spear-moss. A good example with whorled tufa moss and well developed tufa deposits occurs at TN8.

The community occurs on soft cliffs throughout the survey area as a dynamic community in time and space depending on constant erosion of the soft cliff to persist. Where the substrate stabilises for long periods more robust species such as rushes, hairy sedge, hairy willowherb and occasionally tall fescue become established and outcompete the more diminutive sedges and bryophytes. Due to their origins expressions of this community can be very limited and numerous examples occur in patches too small to map (e.g. TN10, TN11, TN12, TN28, TN29 and TN31).

Due to their dynamic nature species associations vary considerably and depend on colonisation of flushed bare soil exposed during soft cliff erosion. As such the community is vulnerable to colonisation by INNS. These springs and flushes are of high conservation value and would benefit from regular monitoring.

Table 5. The following species were recorded in this community;

Species	DAFOR
Carex flacca	A
Parnassia palustris	A
Calliergonella cuspidata	LA
Eucladium verticillatum	LA
Tussilago farfara	F / LA
Agrostis stolonifera	F
Aneura pinguis	F
Cirsium palustre	F
Equisetum arvense	F
Festuca rubra	F
Juncus articulatus	F
Leontodon hispidus	F
Pulicaria dysenterica	F
Anthyllis vulneraria	LF
Triglochin palustris	LF
Briza media	O
Prunella vulgaris	O
Trifolium pratense	O
Juncus inflexus	O
Angelica sylvestris	R
Centaurea nigra	R
Dactylorhiza praetermissa	R
Epilobium parviflorum	R
Holcus lanatus	R
Juncus conglomeratus	R
Typha latifolia	R
Festuca ovina	R
Lotus corniculatus	R

Table 6. The following quadrat data was recorded for this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Frequency	Abundance
Quadrat location - OS Grid TA	1403 7643	1196 7959		
Sward height (cm)	10	15		
Bare ground	10	9		
Agrostis stolonifera	5	6	V	(5-6)
Juncus articulatus	5	5	V	(5_)
Festuca rubra	6	4	V	(4-6)
Carex flacca	5	4	V	(4-5)
Aneura pinguis	4	4	V	(4_)
Parnassia palustris	4	3	V	(3-4)
Equisetum arvense	3	3	V	(3_)
Tussilago farfara	2	5	V	(2-5)
Leontodon hispidus	3	2	V	(2-3)
Pulicaria dysenterica	2	3	V	(2-3)
Cirsium palustre	1	1	V	(1_)
Calliergonella cuspidata		4	III	(4_)
Eucladium verticillatum	4		III	(4_)
Anthyllis vulneraria		3	III	(3_)
Triglochin palustris		3	III	(3_)
Briza media		2	III	(2_)
Trifolium pratense		2	III	(2_)
Prunella vulgaris		2	III	(2_)
Centaurea nigra	1		III	(1_)
Dactylorhiza praetermissa		1	III	(1_)
Holcus lanatus		1	III	(1_)
Angelica sylvestris	1		III	(1_)
Juncus conglomeratus		1	III	(1_)
Typha latifolia		1	III	(1_)
Epilobium parviflorum		1	III	(1_)

M22a *Juncus subnodulosus – Cirsium palustre* fen-meadow; Typical sub-community

Table 7. M22a Community attributes

Attribute	NVC code – M22a
Broad habitat type	Fen, Marsh and Swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Lowland Fen
UKHabs code	f2a
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Para-maritime

Blunt-flowered rush was recorded during this survey dominating a large wetland area between Primrose Valley Holiday Park and the foreshore centred on NGR TA 1256 7779. Protected by dense scrub to the seaward side, this species thrives at the site in spite of its intolerance of saline influence (Ellenberg value for Salt Tolerance = 0). The presence of blunt-flowered rush indicates a base-rich water supply.

At this location blunt-flowered rush is joined by a suite of species to form a distinct vegetation sub-community with common valerian, great horsetail, water-mint, square-stalked St John's-wort, hemp agrimony, wild angelica and marsh pennywort. Some areas are very wet with a dense mat of blunt-flowered rush 'quaking' suggesting open water beneath.

The distribution of blunt-flowered rush is decidedly local north of the Humber, with very few records on the eastern side of UK north of the River Tees. This community represents a population of high nature conservation importance for this species.

Table 8. The following species were recorded in this community;

Species	DAFOR
Juncus subnodulosus	D
Brachythecium rivulare	A
Eupatorium cannabinum	A
Kindbergia praelonga	A
Mentha aquatica	A
Juncus inflexus	LA
Angelica sylvestris	F
Cirsium palustre	F
Equisetum telmateia	F
Filipendula ulmaria	F
Hypericum tetrapterum	LF
Pulicaria dysenterica	LF
Valeriana dioica	LF
Hydrocotyle vulgaris	LF
Aneura pinguis	O
Equisetum arvense	O
Galium aparine	R

Table 9. The following quadrat data was recorded for this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Frequency	Abundance
Quadrat location - OS Grid TA	1252 7782	1256 7778		
Sward height (cm)	60	60		
Bare ground	0	0		
Juncus subnodulosus	7	9	V	(7-9)
Brachythecium rivulare	5	5	V	(5_)
Eupatorium cannabinum	4	5	V	(4-5)
Kindbergia praelonga	5	4	V	(4-5)
Mentha aquatica	4	5	V	(4-5)
Equisetum telmateia	3	4	V	(3-4)
Filipendula ulmaria	3	1	V	(1-3)
Cirsium palustre	1	2	V	(1-2)
Angelica sylvestris	1	2	V	(1-2)
Juncus inflexus	7		III	(7_)
Pulicaria dysenterica	4		III	(4_)
Hypericum tetrapterum	4		III	(4_)
Valeriana dioica		4	III	(4_)
Equisetum arvense	3		III	(3_)
Aneura pinguis		3	III	(3_)
Galium aparine	1		III	(1_)

M22b *Juncus subnodulosus – Cirsium palustre* fen-meadow; *Briza media – Trifolium* spp sub-community

Table 10. M22b Community Attributes

Attribute	NVC code – M22b
Broad habitat type	Fen, Marsh and Swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Lowland Fen
UKHabs code	f2a
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Sub-maritime

Further rush dominated wetlands were recorded throughout the survey area on soft cliffs, however, in these blunt-flowered rush is absent, being replaced with the more salt tolerant hard rush. This species favours a somewhat base-rich water supply usually supplied through seepages from the clay overburden. Preferential species are common fleabane, colt's-foot, glaucous sedge, wild angelica and field horse-tail. In more sheltered expressions, a ground layer of bryophytes forms with pointed spear-moss, common feather-moss and fern-leaved hook-moss. Sea arrowgrass was recorded once in this community, a rare plant on the North Yorkshire coast, similarly great burnet was recorded in one expression (TN30) which is a scarce plant on this part of Yorkshire's coast (Sykes 2004).

Expressions of this rush dominated community are dynamic in time and space forming both where M10 mire on seepage lines is colonised by hard rush and in wetlands formed during rotational slippage events. Small expressions have been recorded with Target Notes (TN13).

If stabilised for long enough these rather open M22b wetlands are subject to colonisation by more robust species typically to form S4diii swamp, S12 swamp, MG12 grassland or W1 wet woodland. The community is also at risk of colonisation by INNS, in particular *Leucanthemum x superbum* which is widespread throughout the survey area.

Table 11. The following species were recorded in this community;

Species	DAFOR
Juncus inflexus	D
Agrostis stolonifera	A
Carex flacca	A
Pulicaria dysenterica	A
Tussilago farfara	A
Kindbergia praelonga	LA
Angelica sylvestris	F
Cirsium palustre	F
Equisetum arvense	F
Lathyrus pratensis	F
Leontodon hispidus	F
Plantago lanceolata	F
Calliergonella cuspidata	LF
Equisetum telmateia	LF
Eupatorium cannabinum	LF
Schedonorus arundinaceus	LF
Triglochin palustris	LF
Brachypodium sylvaticum	O
Brachythecium rivulare	O
Briza media	O
Centaurea nigra	O
Ceratodon purpureus	O
Cratoneuron filicinum	O
Eriophorum angustifolium	O
Festuca rubra	O
Filipendula ulmaria	O
Holcus lanatus	O
Jacobaea aquatica	O
Juncus articulatus	O
Juncus conglomeratus	O
Leucanthemum x superbum	O
Parnassia palustris	O
Pellia endiviifolia	O
Prunella vulgaris	O
Rhinanthus minor	O
Typha latifolia	O
Dactylorhiza praetermissa	O
Epilobium parviflorum	R
Rubus fruticosus agg.	R
Trifolium pratense	R
Ulex europaeus	R
Sanguisorba officinalis	R
Cirsium arvense	R
Triglochin maritima	R

Table 12. The following quadrat data was recorded for this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Q3	Frequency	Abundance
Quadrat location - OS Grid TA	1306 7732	1271 7775	1200 7944		
Sward height (cm)	35	40	40		
Bare ground	10	5	3		
Juncus inflexus	6	7	8	V	(6-8)
Agrostis stolonifera	5	4	5	V	(4-5)
Pulicaria dysenterica	5	3	5	V	(3-5)
Tussilago farfara	3	4	3	V	(3-4)
Carex flacca	5	6		IV	(5-6)
Kindbergia praelonga		3	5	IV	(3-5)
Angelica sylvestris		2	3	IV	(2-3)
Equisetum arvense	2		3	IV	(2-3)
Lathyrus pratensis		3	1	IV	(1-3)
Cirsium palustre		1	2	IV	(1-2)
Leontodon hispidus	2		1	IV	(1-2)
Plantago lanceolata		1	2	IV	(1-2)
Schedonorus arundinaceus		2	1	IV	(1-2)
Calliergonella cuspidata			5	II	(5_)
Equisetum telmateia		5		II	(5_)
Eupatorium cannabinum		5		II	(5_)
Brachypodium sylvaticum		4		II	(4_)
Leucanthemum x superbum	4			II	(4_)
Typha latifolia	4			II	(4_)
Juncus articulatus			4	II	(4_)
Cratoneuron filicinum			4	II	(4_)
Brachythecium rivulare		3		II	(3_)
Ceratodon purpureus	3			II	(3_)
Parnassia palustris			3	II	(3_)
Pellia endiviifolia	3			II	(3_)
Briza media			2	II	(2_)
Centaurea nigra		2		II	(2_)
Eriophorum angustifolium	2			II	(2_)
Festuca rubra	2			II	(2_)
Filipendula ulmaria		2		II	(2_)
Jacobaea aquatica			2	II	(2_)
Rhinanthus minor			2	II	(2_)
Juncus conglomeratus			2	II	(2_)
Prunella vulgaris			2	II	(2_)
Holcus lanatus			1	II	(1_)
Rubus fruticosus agg.		1		II	(1_)
Trifolium pratense			1	II	(1_)
Ulex europaeus		1		II	(1_)
Epilobium parviflorum			1	II	(1_)

M27b Filipendula ulmaria – *Angelica sylvestris* mire; *Urtica dioica* – *Vicia cracca* sub-community

Table 13. M27b Community Attributes

Attribute	NVC code – M27b
Broad habitat type	Fen, Marsh and Swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Lowland Fen
UKHabs code	f2a
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Para-maritime

Dominated by meadowsweet, this community is characterised by a number of associates including great willowherb, false oat-grass and marsh thistle. This combination of species in damp areas dominated by meadowsweet is consistent with the NVC description for M27b *Filipendula ulmaria – Angelica sylvestris* mire; *Urtica dioica – Vicia cracca* sub-community.

M27 is characteristic of moist, circum-neutral soils occurring in ungrazed locations in lowland England. A certain amount of eutrophication is tolerated, and exuberant growth is typical where agricultural run-off occurs onto the cliff. Common nettle, goosegrass and curled dock are preferential in these stands.

M27 occurs in very limited expressions in the survey area associated with dynamic wetlands (e.g. TN6).

MC8d *Festuca rubra – Armeria maritima* grassland; *Holcus lanatus* sub-community

Table 14. MC8d Community Attributes

Attribute	NVC code – MC8d
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Sub-maritime

A grassland community, MC8d is found on soft cliffs where slopes are partially stabilised and is one of the natural succession outcomes where there are free-draining substrates on soft cliff colonised by MG11. Critically, this sub-community forms in places where maritime influence is low, and should be viewed as a sub-maritime community at this location. As such, species intolerant of salt such as Yorkshire fog (Ellenberg salt tolerance value = 0) are present. Cock's-foot and ribwort plantain are preferential.

Table 15. The following species were recorded in this community;

Species	DAFOR
Agrostis stolonifera	A
Calliergonella cuspidata	A
Festuca rubra	A
Carex flacca	F
Centaurea nigra	F
Dactylis glomerata	F
Equisetum arvense	F
Heracleum sphondylium	F
Holcus lanatus	F
Jacobaea vulgaris	F
Leontodon hispidus	F
Plantago lanceolata	F
Pulicaria dysenterica	F
Trifolium pratense	F
Tussilago farfara	F
Brachypodium sylvaticum	LF
Kindbergia praelonga	LF
Leucanthemum x superbum	LF
Dactylorhiza praetermissa	LF
Angelica sylvestris	O
Anthoxanthum odoratum	O
Brachythecium rutabulum	O
Cirsium palustre	O
Dactylorhiza sp	O
Linum catharticum	O

Species	DAFOR
Lotus corniculatus	O
Parnassia palustris	O
Plantago maritima	O
Pseudoscleropodium purum	O
Rhytidiadelphus squarrosus	O
Rubus fruticosus agg.	O
Vicia hirsuta	O
Gymnadenia conopsea	O
Euphrasia nemorosa	O
Carlina vulgaris	O
Primula vulgaris	O
Rhytidiadelphus triquetrus	O
Succisa pratensis	O
Anthyllis vulneraria	R
Brachythecium rivulare	R
Cerastium fontanum	R
Cirsium arvense	R
Eurhynchium striatum	R
Gymnadenia conopsea	R
Juncus articulatus	R
Juncus conglomeratus	R
Lathyrus pratensis	R
Lophocolea bidentata	R
Plantago media	R
Prunella vulgaris	R
Rhinanthus minor	R
Schedonorus arundinaceus	R
Thalictrum flavum	R

Table 16. The following quadrat data were recorded for this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid TA	1376 7660	1284 7756	1369 7664	1221 7869	1338 7697		
Sward height (cm)	16	18	18	15	20		
Bare ground	3	2	1	3	2		
Agrostis stolonifera	6	7	6	7	6	V	(6-7)
Festuca rubra	7	5	7	6	7	V	(5-7)
Plantago lanceolata	2	3	3	2	3	V	(2-3)
Holcus lanatus	1	1	4	2	2	V	(1-4)
Calliergonella cuspidata	4	4	5	4		IV	(4-5)
Equisetum arvense	3		3	3	3	IV	(3_)
Centaurea nigra	2	4	2	2		IV	(2-4)
Leontodon hispidus	2	3	4	3		IV	(2-4)
Tussilago farfara	2	4		2	2	IV	(2-4)
Pulicaria dysenterica	2		3	1	4	IV	(1-4)
Trifolium pratense	4	3	3	1		IV	(1-4)
Carex flacca	5	3		5		III	(3-5)
Heracleum sphondylium		2	1		1	III	(1-2)
Jacobaea vulgaris		2	1		1	III	(1-2)
Dactylis glomerata		1	1		1	III	(1_)
Brachypodium sylvaticum	4	5				II	(4-5)
Kindbergia praelonga		3			4	II	(3-4)
Brachythecium rutabulum			3		3	II	(3_)
Lotus corniculatus	2			3		II	(2-3)
Anthoxanthum odoratum	3			2		II	(2-3)
Cirsium palustre			2		2	II	(2_)
Linum catharticum		2		2		II	(2_)
Dactylorhiza sp		3			1	II	(1-3)
Rubus fruticosus agg.	3	1				II	(1-3)
Vicia hirsuta	3	1				II	(1-3)
Parnassia palustris			1		2	II	(1-2)
Angelica sylvestris		1			1	II	(1_)
Plantago maritima	4					I	(4_)
Rhytidiadelphus squarrosus					4	I	(4_)
Pseudoscleropodium purum		3				I	(3_)
Eurhynchium striatum		3				I	(3_)
Prunella vulgaris			3			I	(3_)
Lathyrus pratensis			2			I	(2_)
Lophocolea bidentata			2			I	(2_)
Plantago media		2				I	(2_)
Rhinanthus minor				2		I	(2_)
Juncus conglomeratus				2		I	(2_)
Brachythecium rivulare				2		I	(2_)
Juncus articulatus				2		I	(2_)
Anthyllis vulneraria				1		I	(1_)
Cerastium fontanum		1				I	(1_)

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Schedonorus arundinaceus				1		I	(1_)
Gymnadenia conopsea	1					I	(1_)
Cirsium arvense					1	I	(1_)

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

Table 17. MC8f. Community Attributes

Attribute	NVC code – MC8f
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Maritime

A maritime cliff grassland community, MC8f is found on soft cliffs where slopes are partially stabilised and is a frequent natural succession sere on free-draining substrates on soft cliff colonised by MG11. On soft cliff creeping bent can form a significant part of the graminoid element, however, the sward is generally dominated by red fescue. The sub-community preferential kidney vetch was recorded throughout, often in abundance. Colt's-foot and red clover are often frequent in this community, and the former can appear to have significant coverage in late summer.

In common with MC8f recorded in the section of coast Reighton Gap to Bridlington, no thrift was recorded during these surveys, suggesting that on further analysis this community may well be recognised as a distinct maritime community of Yorkshire's east coast.

In the survey area this maritime grassland community supports a suite of calcicoles including rough hawkbit, glaucous sedge, carline thistle and fairy flax. False brome is sporadic but sometimes frequent in this community.

Due to its often 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 such as kidney vetch, yellow rattle and common centaury. 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. However, this makes the community more at risk of invasion by INNS.

Table 18. The following species were recorded in this community;

Species	DAFOR
Agrostis stolonifera	A
Anthyllis vulneraria	A
Festuca rubra	A
Trifolium pratense	A
Brachypodium sylvaticum	F
Leontodon hispidus	F
Plantago lanceolata	F
Pulicaria dysenterica	F
Tussilago farfara	F
Calliergonella cuspidata	LF
Carex flacca	LF
Lotus corniculatus	LF
Pseudoscleropodium purum	LF
Briza media	O
Carlina vulgaris	O
Centaurea nigra	O
Centaurium erythraea	O
Ceratodon purpureus	O
Dactylis glomerata	O
Equisetum arvense	O
Eurhynchium striatum	O
Lathyrus pratensis	O
Linum catharticum	O
Prunella vulgaris	O
Schedonorus arundinaceus	O
Dactylorhiza sp	O
Potentilla reptans	O
Achillea millefolium	R
Daucus carota	R
Jacobaea vulgaris	R
Rubus fruticosus agg.	R
Trifolium arvense	R
Pilosella officinarum	R
Primula vulgaris	R
Leucanthemum x superbum	R
Holcus lanatus	R
Carex hirta	R
Potentilla anserina	R
Rhinanthus minor	R
Melilotus altissimus	R
Trifolium campestre	R

Table 19. The following quadrat data was recorded in this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Q3	Q4	Q5	Q6	Frequency	Abundance
Quadrat location - OS Grid TA	1359 7676	1299 7738	1226 7859	1338 7698	1193 7972	1194 7969		
Sward height (cm)	11	14	10	10	20	18		
Bare ground	10	15	25	15	30	8		
Agrostis stolonifera	7	5	6	6	8	7	V	(5-8)
Festuca rubra	6	6	4	8	5	5	V	(4-8)
Anthyllis vulneraria	4	3	4	5	3	3	V	(3-5)
Trifolium pratense	5	4	1	2	1	2	V	(1-5)
Tussilago farfara	4	5	1		1	4	V	(1-5)
Leontodon hispidus	3	3	1		2	3	V	(1-3)
Plantago lanceolata	2	2	1		2	3	V	(1-3)
Brachypodium sylvaticum			5		2	5	III	(2-5)
Pulicaria dysenterica		4	1		1		III	(1-4)
Pseudoscleropodium purum					4	5	II	(4-5)
Carex flacca			3			3	II	(3_)
Centaurea nigra					2	3	II	(2-3)
Equisetum arvense		3				2	II	(2-3)
Centaurium erythraea					2	1	II	(1-2)
Dactylis glomerata	2	1					II	(1-2)
Lathyrus pratensis					1	2	II	(1-2)
Prunella vulgaris					1	2	II	(1-2)
Calliergonella cuspidata						4	I	(4_)
Lotus corniculatus			4				I	(4_)
Briza media						3	I	(3_)
Ceratodon purpureus					3		I	(3_)
Eurhynchium striatum						3	I	(3_)
Carlina vulgaris					2		I	(2_)
Linum catharticum		2					I	(2_)
Schedonorus arundinaceus				2			I	(2_)
Daucus carota					1		I	(1_)
Rubus fruticosus agg.					1		I	(1_)
Jacobaea vulgaris						1	I	(1_)
Trifolium arvense			1				I	(1_)
Achillea millefolium						1	I	(1_)

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

Table 20. MC9C Community Attributes

Attribute	NVC Code – MC9c
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Maritime

Community constants red fescue and ribwort plantain are well represented in MC9c encountered during the survey, however, in common with other Yorkshire coast expressions thrift was not recorded in this community. Species preferential in this sub-community and recorded during the survey are yarrow, lady's-bedstraw and black knapweed, suggesting most affinity with MC9c.

MC9c is a maritime cliff grassland community occurring in locations where there is less overt maritime influence, and is characteristic of soft cliffs generally on deeper soils and shallower slopes than MC8. In the current study expressions were recorded predominantly on the cliff top between Reighton Gap and Butcher Haven.

Table 21. The following species were recorded in this community;

Species	DAFOR
Festuca rubra	D
Plantago lanceolata	F
Arrhenatherum elatius	LF
Centaurea nigra	LF
Achillea millefolium	O
Agrostis stolonifera	O
Cirsium arvense	O
Dactylis glomerata	O
Galium verum	O
Veronica chamaedrys	O
Heracleum sphondylium	R
Jacobaea vulgaris	R
Lotus corniculatus	R
Potentilla reptans	R
Taraxacum agg	R
Trifolium campestre	R
Trifolium pratense	R
Holcus lanatus	R
Lathyrus pratensis	R
Jacobaea erucifolia	R
Tussilago farfara	R
Pulicaria dysenterica	R
Ononis repens	R

Table 22. The following quadrat data was collected in this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Q3	Frequency	Abundance
Quadrat location - OS Grid TA	1282 7756	1286 7750	1397 7643		
Sward height (cm)	18	20	4		
Bare ground	0	2	0		
Festuca rubra	10	9	10	V	(9-10)
Plantago lanceolata	3	2	3	V	(2-3)
Arrhenatherum elatius	3	4		III	(3-4)
Centaurea nigra	2	4		III	(2-4)
Dactylis glomerata	1		2	III	(1-2)
Agrostis stolonifera			3	II	(3_)
Galium verum			3	II	(3_)
Achillea millefolium			3	II	(3_)
Cirsium arvense	2			II	(2_)
Veronica chamaedrys			2	II	(2_)
Heracleum sphondylium		1		II	(1_)
Jacobaea vulgaris		1		II	(1_)
Lotus corniculatus			1	II	(1_)
Trifolium pratense	1			II	(1_)
Trifolium campestre		1		II	(1_)
Taraxacum agg		1		II	(1_)
Potentilla reptans			1	II	(1_)

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

Table 23. MC10b Community Attributes

Attribute	NVC code – MC10b
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Maritime

This cliff-top maritime community is characterised by a short, closed, tight sward dominated by an abundance of sea plantain and stag's-horn plantain with ribwort plantain and stolons of creeping bent sporadically through the sward. Red fescue can be prominent, and the presence of bird's-foot trefoil and glaucous sedge suggests most affinity with MC10b. Characteristically there is much bare ground.

The distribution of this vegetation community in the survey area was extremely limited as the coast is not exposed to substantial maritime influence and there are no hard cliffs. Expressions were limited to what appears to be previously developed ground with high trampling by visitors at Reighton Gap, and thin soils by the slipway which are also heavily

trampled by people at Hunmanby Gap. This high visitor pressure is critical to maintenance of this vegetation community at these locations.

Table 24. The following species were recorded in this community;

Species	DAFOR
Plantago maritima	LD
Festuca rubra	A
Plantago coronopus	F / LA
Lotus corniculatus	F
Plantago lanceolata	F
Agrostis stolonifera	LF
Leontodon hispidus	LF
Pilosella officinarum	LF
Carex flacca	O
Centaurea nigra	O
Scorzoneroides autumnalis	O
Trifolium pratense	O
Trichostomum crispulum	O
Achillea millefolium	R
Anthyllis vulneraria	R
Jacobaea vulgaris	R
Linum catharticum	R
Plantago major	R
Prunella vulgaris	R
Taraxacum agg	R
Pulicaria dysenterica	R
Dactylis glomerata	R
Ononis spinosa	R

Table 25. The following quadrat data was recorded in this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Q3	Frequency	Abundance
Quadrat location - OS Grid TA	1310 7727	1394 7644	1407 7636		
Sward height (cm)	0.5	0.5	1		
Bare ground	10	20	75		
Plantago maritima	9	2	1	V	(1-9)
Festuca rubra	5	4	3	V	(3-5)
Plantago lanceolata	2	4	3	V	(2-4)
Lotus corniculatus	3	3	2	V	(2-3)
Agrostis stolonifera		4	4	III	(4_)
Plantago coronopus		3	4	III	(3-4)
Carex flacca		2	4	III	(2-4)
Leontodon hispidus		3	3	III	(3_)
Scorzoneroides autumnalis		1	3	III	(1-3)
Centaurea nigra	2	1		III	(1-2)
Trifolium pratense	1		1	III	(1_)

Pilosella officinarum		4		II	(4_)
Linum catharticum		2		II	(2_)
Prunella vulgaris			2	II	(2_)
Anthyllis vulneraria	1			II	(1_)
Jacobaea vulgaris	1			II	(1_)
Achillea millefolium		1		II	(1_)
Plantago major			1	II	(1_)
Taraxacum agg			1	II	(1_)

MC11c *Festuca rubra – Daucus carota ssp gummifer* maritime grassland *Sanguisorba minor* sub-community

Table 26. MC11c Community Attributes

Attribute	NVC code – MC11c
Broad habitat type	Supralittoral Rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime Cliff and Slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Maritime

Community constants red fescue, cock's-foot and wild carrot are present, however, the latter is not ssp. *gummifer*. In the expressions encountered in the survey area, false brome is abundant largely taking the place of cock's-foot. The frequency of these species gives the vegetation a characteristic physiognomy with a tussocky sward dominated by grasses with flowering heads of wild carrot floating above. Salad burnet, ribwort plantain, bird's-foot trefoil, lady's-bedstraw, yarrow, common centaury and glaucous sedge are all preferential suggesting most affinity with the *Sanguisorba minor* sub-community.

False brome is not mentioned in the NVC description for MC11, however, tor-grass can be abundant in MC11c and it may be fulfilling this niche in the community. This was suggested by Milliken and Pendry (2002) who described this vegetation in terms of a community they defined as BS** *Brachypodium*-rich cliff grassland. Whilst this is a valid choice, the affinity to MC11 in other respects is clear and the current study is content to describe in terms of published text for MC11c.

Notably, saw-wort is frequent in this community finding its niche in the open and constantly eroding vegetation of the soft cliff persisting via its underground stolons. This plant is reaching its northern limit in UK on Yorkshire's east coast, and whilst it is recorded in Northumberland the species is apparently absent from Scotland. Conversely, bloody crane's-bill is also a notable appearance in the sward on the Yorkshire coast and occurs in some profusion (e.g. TN32), however, this species appears common in Northumberland and on the Scottish east coast, and rare on the coast south of the survey area. Nan Sykes (2004) records bloody crane's-bill on North Yorkshire coast as 'known only on lower cliffs

at Primrose Valley where it grows with saw-wort'. The species persists at this location but appears to be in jeopardy due to coastal erosion.

The community was recorded extensively in the north of the survey area between Mile Haven and Martin's Gill on base-rich clay deposits where maritime influence is low, however, exposure to sun and wind clearly have an impact on the floristics and community structure. The community was also recorded in limited stands on the soft cliff at Reighton Gap.

Table 27. The following species were recorded in this community;

Species	DAFOR
Brachypodium sylvaticum	D
Agrostis stolonifera	A
Carex flacca	A
Centaurea nigra	A
Festuca rubra	A
Lotus corniculatus	F / LA
Daucus carota	F
Heracleum sphondylium	F
Holcus lanatus	F
Lathyrus pratensis	F
Leontodon hispidus	F
Linum catharticum	F
Plantago lanceolata	F
Pulicaria dysenterica	F
Serratula tinctoria	F
Tussilago farfara	F
Kindbergia praelonga	LF
Plantago media	LF
Pseudoscleropodium purum	LF
Geranium sanguineum	LF
Rhytidiadelphus squarrosus	O
Achillea millefolium	O
Anthyllis vulneraria	O
Betonica officinalis	O
Calliergonella cuspidata	O
Carlina vulgaris	O
Cirsium palustre	O
Sanguisorba minor	O
Centaurium erythraea	O
Dactylis glomerata	O
Dactylorhiza sp	O
Equisetum arvense	O
Euphrasia nemorosa	O
Plantago maritima	O
Primula vulgaris	O
Rubus fruticosus agg.	O

Species	DAFOR
Schedonorus arundinaceus	O
Scorzoneroides autumnalis	O
Succisa pratensis	O
Agrimonia eupatoria	O
Rhinanthus minor	O
Galium verum	O
Cirsium vulgare	R
Crataegus monogyna (seedling)	R
Filipendula ulmaria	R
Jacobaea erucifolia	R
Jacobaea vulgaris	R
Knautia arvensis	R
Leucanthemum x superbum	R
Luzula campestris	R
Potentilla reptans	R
Prunella vulgaris	R
Trifolium arvense	R
Trifolium campestre	R
Vicia cracca	R
Viola riviniana	R
Arrhenatherum elatius	R
Angelica sylvestris	R
Trifolium pratense	R
Parnassia palustris	R
Pinus sylvestris (seedling)	R

Table 28. The following quadrat data was recorded in this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid TA	1208 7903	1203 7912	1203 7921	1205 7919	1395 7642		
Sward height (cm)	25	18	24	18	12		
Bare ground	0	0	0	2	5		
Brachypodium sylvaticum	7	8	7	5	7	V	(5-8)
Festuca rubra	7	4	4	5	7	V	(4-7)
Agrostis stolonifera	3	5	4	7	4	V	(3-7)
Centaurea nigra	4	3	4	2	1	V	(1-4)
Carex flacca		4	4	4	4	IV	(4_)
Tussilago farfara	3	4	2	3		IV	(2-4)
Lathyrus pratensis	3	2	2	1		IV	(1-3)
Linum catharticum		2	1	2	3	IV	(1-3)
Holcus lanatus		2	2	1	2	IV	(1-2)
Lotus corniculatus		2		6	3	III	(2-6)

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Leontodon hispidus			2	2	3	III	(2-3)
Plantago lanceolata	3		2	3		III	(2-3)
Pulicaria dysenterica		2	2	2		III	(2_)
Daucus carota		2	1	2		III	(1-2)
Heracleum sphondylium	1		1		1	III	(1_)
Pseudoscleropodium purum		5	5			II	(5_)
Kindbergia praelonga	3		4			II	(3-4)
Serratula tinctoria	3		2			II	(2-3_
Achillea millefolium	2	2				II	(2_)
Carlina vulgaris			2	2		II	(2_)
Dactylis glomerata	2				2	II	(2_)
Equisetum arvense	2	2				II	(2_)
Potentilla reptans			2	2		II	(2_)
Schedonorus arundinaceus	2		2			II	(2_)
Primula vulgaris	2		1			II	(1-2)
Succisa pratensis	2		1			II	(1-2)
Cirsium palustre			1		1	II	(1_)
Rubus fruticosus agg.		1	1			II	(1_)
Calliergonella cuspidata				5		I	(5_)
Betonica officinalis			4			I	(4_)
Anthyllis vulneraria					3	I	(3_)
Euphrasia nemorosa					3	I	(3_)
Scorzoneroides autumnalis					3	I	(3_)
Dactylorhiza sp				2		I	(2_)
Filipendula ulmaria			2			I	(2_)
Prunella vulgaris				2		I	(2_)
Trifolium arvense	2					I	(2_)
Trifolium campestre				2		I	(2_)
Vicia cracca			2			I	(2_)
Crataegus monogyna (seedling)					2	I	(2_)
Cirsium vulgare					2	I	(2_)
Luzula campestris					2	I	(2_)
Viola riviniana					2	I	(2_)
Agrimonia eupatoria				1		I	(1_)
Jacobaea erucifolia			1			I	(1_)
Jacobaea vulgaris				1		I	(1_)
Knautia arvensis		1				I	(1_)
Leucanthemum x superbum					1	I	(1_)

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

Table 29. MG1a Community Attribute

Attribute	NVC code – MG1a
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c5
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Supporting habitat / May form an element
Status	Para-maritime

This community is dominated by coarse grasses including false oat-grass and cock's foot, and hogweed is also a community constant. Yorkshire fog is locally frequent and red fescue may be prominent. Overall, the combination of species is consistent with the description for MG1a in Rodwell 1992.

The community develops throughout the site on the fertile, moisture retentive clay soils, predominantly on the cliff top where maritime influence is minimal.

Where eutrophication occurs adjacent to intensively managed farmland the usual preferential species are frequent, namely common nettle and creeping thistle. Stands of MG1 in the survey area tend to be unmanaged, with neither grazing nor cutting, and a tussocky sward generally develops.

An area of relatively species-rich MG1a grassland is present on the periphery of Primrose Valley Holiday Park (TN22) with much black knapweed, agrimony, common fleabane, cock's-foot and colt's-foot. In damper areas tufted hair-grass is present with wild angelica.

Table 30. The following species were recorded in this community;

Species	DAFOR
Arrhenatherum elatius	D
Festuca rubra	LA
Centaurea nigra	F / LA
Dactylis glomerata	F / LA
Agrostis stolonifera	F
Holcus lanatus	F
Plantago lanceolata	F
Cirsium arvense	LF
Trifolium pratense	LF
Hypochaeris radicata	LF
Lolium perenne	LF
Deschampsia cespitosa	LF
Heracleum sphondylium	O
Jacobaea vulgaris	O
Lotus corniculatus	O
Potentilla reptans	O
Leucanthemum x superbum	O
Schedonorus arundinaceus	O
Rubus fruticosus agg	R
Tussilago farfara	R
Potentilla anserina	R
Pulicaria dysenterica	R
Angelica sylvestris	R
Agrimonia eupatoria	R
Jacobaea erucifolia	R
Daucus carota	R

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

Table 31. MG5b Community Attributes

Attribute	NVC code – 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 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Para-maritime / Sub-maritime

Community constants for MG5 are well represented with black knapweed, red fescue, sweet vernal-grass and ribwort plantain, other community constants are represented by cock's-foot, Yorkshire fog and red clover.

Preferential species include creeping bent, yarrow and glaucous sedge; the latter indicating influence of base-rich sub-soils and placing in the *Galium verum* sub-community (MG5b).

The community has a rather sporadic distribution and is present in five limited stands on mesotrophic soils in sheltered locations on the soft cliff. The community was recorded at Hunmanby Gap, Reighton Gap, on the cliff top at Reighton Gap (where the grassland appears to be a former garden) and two places on the cliff top at Primrose Valley Holiday Park on the edge of unmanaged MG1 grassland. Due to the limited distribution of this community, and poor accessibility only two quadrats were possible.

Table 31. The following species were recorded in this community;

Species	DAFOR
Festuca rubra	D
Centaurea nigra	A
Agrostis stolonifera	F
Heracleum sphondylium	F
Holcus lanatus	F
Lotus corniculatus	F
Agrostis capillaris	LF
Pseudoscleropodium purum	LF
Achillea millefolium	O
Anthoxanthum odoratum	O
Arrhenatherum elatius	O
Carex flacca	O
Cerastium fontanum	O
Equisetum arvense	O
Plantago lanceolata	O
Prunella vulgaris	O
Medicago lupulina	O
Dactylorhiza sp	O
Rubus fruticosus agg	O
Trifolium pratense	O
Cirsium arvense	R
Dactylis glomerata	R
Scorzoneroides autumnalis	R
Tussilago farfara	R
Angelica sylvestris	R
Jacobaea vulgaris	R

Table 32. The following quadrat data was recorded in this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Frequency	Abundance
Quadrat location - OS Grid TA	1386 7636	1405 7636		
Sward height (cm)	20	25		
Bare ground	0	0		
Festuca rubra	8	7	V	(7-8)
Centaurea nigra	4	6	V	(4-6)
Holcus lanatus	4	5	V	(4-5)
Agrostis stolonifera	3	2	V	(2-3)
Lotus corniculatus	3	2	V	(2-3)
Heracleum sphondylium	1	1	V	(1_)
Agrostis capillaris	8		III	(8_)
Pseudoscleropodium purum		4	III	(4_)
Plantago lanceolata	3		III	(3_)
Prunella vulgaris	3		III	(3_)
Anthoxanthum odoratum	2		III	(2_)
Arrhenatherum elatius		2	III	(2_)
Carex flacca		2	III	(2_)
Cerastium fontanum	2		III	(2_)
Equisetum arvense		2	III	(2_)
Achillea millefolium		2	III	(2_)
Cirsium arvense	1		III	(1_)
Dactylis glomerata	1		III	(1_)
Tussilago farfara		1	III	(1_)
Scorzoneroides autumnalis	1		III	(1_)

MG5 *Cynosurus cristatus – Centaurea nigra* grassland Species-poor

Table 33. MG5 Community Attributes

Attribute	NVC code – MG5
Broad habitat type	Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Neutral grassland
UKHabs code	g3c
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Supporting habitat / May form an element
Status	Para-maritime

An area of species-poor neutral grassland is present on the cliff top between Reighton and Hunmanby Gap featuring much red fescue, ribwort plantain, ox-eye daisy and bird's-foot trefoil. It is considered likely this is the result of a sewing a 'wildflower mix' onto arable land.

Table 34. The following species were recorded in this community;

Species	DAFOR
Festuca rubra	D
Agrostis stolonifera	F
Holcus lanatus	F
Lotus corniculatus	F
Leucanthemum vulgare	F
Plantago lanceolata	F
Cirsium palustre	O
Cirsium vulgare	O
Jacobaea vulgaris	R

MG6a *Lolium perenne-Cynosurus cristatus* grassland; Typical sub community

Table 35. MG6a Community Attributes

Attribute	NVC code – MG6a
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	No
Maritime Status	None

This is a species-poor improved grassland dominated by perennial rye-grass *Lolium perenne*, usually with an abundance of white clover *Trifolium repens*, and occurrence of ribwort plantain *Plantago lanceolata*, creeping buttercup *Ranunculus repens* and daisy *Bellis perennis* at low cover, indicating that this grassland is best described as the Typical MG6 sub-community. This grassland is maintained by regular mowing and forms amenity grassland on the cliff top at the golf course, Primrose Valley Holiday Park, the car park at Hunmanby Gap and other such locations.

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

Table 36. MG11b Community Attributes

Attribute	NVC code – MG11b
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Maritime / Para-maritime / Sub-maritime

The community present on eroding cliffs of this 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, and the maritime influence is variable dependent on exposure to salt spray rather than direct inundation.

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, however, maritime species are not usually prominent.

At a distance, areas supporting 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. The other community constant is colt's-foot which can be abundant in some stands, both species colonising vegetatively.

MG11 is widespread throughout the site on soft cliffs, particularly where active erosion is taking place exposing large areas of bare soil and subsoil. Kidney vetch is preferential in MG11 in this survey area, and when cliffs stabilise temporarily this may be the first sign of succession to MC11c.

MG11b grassland is present at two positions on the cliff corresponding with erosion features. Where rotational slippage has taken place, a steep face of recently exposed clay forms at the top of the cliff which is colonised by creeping bent and colt's-foot to form MG11b grassland. These expressions tend to be more diverse as plants from the vegetation community at the top of the cliff persist, in particular when vegetative reproduction is possible (e.g. creeping thistle) or the plant is robust (e.g. tufted hair grass). The other position for this vegetation community is at the erosion face by the sea at the toe of the cliff. These tend to be less species-rich expressions dominated by creeping bent and colt's-foot, but with an increase in species which rely on seeding into bare ground such as prickly sow-thistle, rough hawkbit and kidney vetch.

Table 37. The following species were recorded in this community;

Species	DAFOR
Tussilago farfara	F
Agrostis stolonifera	F
Plantago lanceolata	F
Festuca rubra	F
Sonchus asper	F
Cirsium arvense	O
Dactylis glomerata	O
Leontodon hispidus	O
Anthyllis vulneraria	O
Centaurea nigra	O
Daucus carota	O
Jacobaea vulgaris	O
Pulicaria dysenterica	O
Rubus fruticosus agg.	R
Trifolium pratense	R
Cirsium vulgare	R
Deschampsia cespitosa	R

Table 38. The following quadrat data was recorded for this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid TA	1380 7659	1295 7742	1192 7981	1368 7662	1292 7748		
Sward height (cm)	5	2	5	4	1		
Bare ground	95	98	95	96	99		
Tussilago farfara	2	3	5	3	2	V	(2-5)
Agrostis stolonifera	3	3	4	4	2	V	(2-4)
Plantago lanceolata		2	1	1		III	(1-2)
Festuca rubra		1	1	1		III	(1_)
Sonchus asper	3	2				II	(2-3)
Cirsium arvense	1	2				II	(1-2)
Dactylis glomerata		1		1		II	(1_)
Leontodon hispidus	1		1			II	(1_)
Anthyllis vulneraria		1				I	(1_)
Centaurea nigra				1		I	(1_)
Daucus carota			1			I	(1_)
Jacobaea vulgaris				1		I	(1_)
Pulicaria dysenterica			1			I	(1_)
Rubus fruticosus agg.			1			I	(1_)
Trifolium pratense				1		I	(1_)
Cirsium vulgare	1					I	(1_)
Deschampsia cespitosa	1					I	(1_)

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

Table 39. MG12a Community Attributes

Attribute	NVC code – MG12a
Broad habitat type	Neutral Grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	g3c8
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Para-maritime / Sub-maritime

This grassland community develops on moist but generally free-draining soils on coastal soft cliffs, and is characteristic of the Yorkshire coast. In the survey area the community is dominated by tussocks of tall fescue with creeping bent and red fescue, the three community constants for MG12. The frequency of Yorkshire fog and false oat-grass coupled with forbs such ribwort plantain and meadow vetchling is consistent with MG12a *Lolium perenne – Holcus lanatus* sub-community, although there are clearly some elements associated with coastal communities of the east coast (colt's-foot and common fleabane).

The community was encountered sporadically on soft cliffs usually as limited stands where tall fescue has become established when erosion events have stabilised for a time. False fox-sedge is present in a number of expressions, particularly where the community is close to the shore.

On stabilised soft cliff, tall fescue can become prominent in a wide range of soil moisture conditions, typically where erosion cracks appear in dry grassland tall fescue colonises the cracks which represent pockets of moist, bare ground and the tussocks become dominant over time. Alternatively, tall fescue colonises flushed areas of thinly vegetated soft cliff after erosion events. Consequently, MG12 may feature dry grassland species and species of early succession flushes.

The situation is further complicated by the onset of incremental erosion once MG12b is established which opens up cracks where conditions suitable for further colonising species (including INNS) and species of humid sheltered spots including small liverworts. Overall this grassland can represent a species-rich element of the soft cliff flora.

Table 40. The following species were recorded in this community;

Species	DAFOR
Schedonorus arundinaceus	D
Agrostis stolonifera	A
Centaurea nigra	A
Pulicaria dysenterica	A
Tussilago farfara	A
Brachypodium sylvaticum	F
Carex flacca	F
Equisetum arvense	F
Festuca rubra	F
Holcus lanatus	F
Lathyrus pratensis	F
Plantago lanceolata	F
Arrhenatherum elatius	O
Calliergonella cuspidata	O
Cirsium palustre	O
Dactylis glomerata	O
Dactylorhiza sp	O
Heracleum sphondylium	O
Juncus conglomeratus	O
Kindbergia praelonga	O
Ononis spinosa	O
Rubus fruticosus agg.	O
Parnassia palustris	O
Angelica sylvestris	R
Brachythecium rutabulum	R
Cirsium arvense	R
Cirsium vulgare	R
Daucus carota	R
Dipsacus fullonum	R
Jacobaea erucifolia	R
Jacobaea vulgaris	R
Juncus articulatus	R
Lotus corniculatus	R
Prunella vulgaris	R
Rhinanthus minor	R
Silene dioica	R
Urtica dioica	R
Vicia hirsuta	R
Trisetum flavescens	R
Achillea millefolium	R
Carex otrubae	R

Table 41. The following quadrat data was collected in this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid TA	1266 7783	1195 7970	1224 7870	1220 7871	1193 7969		
Sward height (cm)	60	45	40	60	55		
Bare ground	15	10	0	4	1		
Schedonorus arundinaceus	8	7	7	8	9	V	(7-9)
Agrostis stolonifera	6	4	5	5	5	V	(4-6)
Tussilago farfara	5	6	3	3	5	V	(3-6)
Centaurea nigra		2	2	4	2	IV	(2-4)
Pulicaria dysenterica	4	3	4		2	IV	(2-4)
Equisetum arvense	2	3		1	3	IV	(1-3)
Lathyrus pratensis		3	1	2	1	IV	(1-3)
Plantago lanceolata	3	2	1		2	IV	(1-3)
Festuca rubra		6	4	4		III	(4-6)
Carex flacca		2	3		4	III	(2-4)
Brachypodium sylvaticum	2	1			2	III	(1-2)
Holcus lanatus		1	2		2	III	(1-2)
Arrhenatherum elatius	3	2				II	(2-3)
Rubus fruticosus agg.	2				2	II	(2_)
Cirsium palustre	2				1	II	(1-2)
Dactylorhiza sp			1		1	II	(1_)
Heracleum sphondylium	1			1		II	(1_)
Calliergonella cuspidata			6			I	(6_)
Juncus conglomeratus			5			I	(5_)
Dactylis glomerata				4		I	(4_)
Ononis spinosa			4			I	(4_)
Kindbergia praelonga				4		I	(4_)
Brachythecium rutabulum				3		I	(3_)
Vicia hirsuta	3					I	(3_)
Juncus articulatus					3	I	(3_)
Cirsium vulgare	2					I	(2_)
Dipsacus fullonum	2					I	(2_)
Jacobaea erucifolia	2					I	(2_)
Rhinanthus minor	2					I	(2_)
Prunella vulgaris					2	I	(2_)
Daucus carota		1				I	(1_)
Jacobaea vulgaris					1	I	(1_)
Lotus corniculatus				1		I	(1_)
Silene dioica	1					I	(1_)
Urtica dioica	1					I	(1_)
Cirsium arvense	1					I	(1_)
Angelica sylvestris		1				I	(1_)

S4diii *Phragmites australis* reedbed *Atriplex prostrata* sub-community *Agrostis stolonifera* variant

Table 42. S4diii Community Attributes

Attribute	NVC code – S4diii
Broad habitat type	Supra-littoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slopes
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Maritime

Dominated by common reed, S4diii swamp was recorded in eight flushed areas on soft cliff between Butcher Haven and Martin's Gill. As is typical in these situations, common reed is short in stature and forms an open sward. A ground layer with creeping bent and colt's-foot is present, with soft cliff preferentials such as kidney vetch and common fleabane. The presence of sea plantain indicates most affinity with S4diii *Atriplex prostrata* sub-community *Agrostis stolonifera* variant.

Table 43. The following species were recorded in this community'

Species	DAFOR
Phragmites australis	D
Tussilago farfara	F
Agrostis stolonifera	F
Leontodon hispidus	F
Plantago lanceolata	F
Festuca rubra	LF
Anthyllis vulneraria	O
Pulicaria dysenterica	O
Lotus corniculatus	O
Cirsium arvense	O
Carex flacca	O
Pellia endiviifolia	O
Equisetum arvense	R
Centaurea nigra	R
Cirsium palustre	R
Holcus lanatus	R
Plantago maritima	R
Jacobaea vulgaris	R
Trifolium pratense	R
Acer pseudoplatanus (seedling)	R
Taraxacum officinale agg	R

Table 44. The following quadrat data was recorded in this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Q3	Frequency	Abundance
Quadrat location - OS Grid TA	1281 7763	1287 7753	1260 7794		
Sward height (cm)	60	55	50		
Bare ground	2	15	30		
Phragmites australis	9	8	9	V	(8-9)
Tussilago farfara	2	4	3	V	(2-4)
Agrostis stolonifera	3	5	1	V	(1-5)
Leontodon hispidus	1	2	1	V	(1-2)
Plantago lanceolata	1	2	1	V	(1-2)
Festuca rubra	7	2		III	(2-7)
Anthyllis vulneraria	2	2		III	(2_)
Pulicaria dysenterica	2	2		III	(2_)
Lotus corniculatus	2		1	III	(1-2)
Cirsium arvense		2	1	III	(1-2)
Carex flacca	3			II	(3_)
Pellia endiviifolia		3		II	(3_)
Equisetum arvense		2		II	(2_)
Centaurea nigra		1		II	(1_)
Cirsium palustre	1			II	(1_)
Holcus lanatus		1		II	(1_)
Plantago maritima	1			II	(1_)
Jacobaea vulgaris		1		II	(1_)
Trifolium pratense			1	II	(1_)
Acer pseudoplatanus (seedling)	1			II	(1_)
Taraxacum officinale agg			1	II	(1_)

S12b *Typha latifolia* swamp *Mentha aquatica* sub-community

Table 45. S12b Community Attributes

Attribute	NVC code – S12b
Broad habitat type	Supra-littoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slopes
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Maritime

Where major slumps have taken place on soft cliff, water often accumulates behind ridges created by rotational slippage. These perched wetlands are then rapidly colonised by wetland species with high dispersal capabilities (wind borne seed). These wetland communities persist until wet woodland forms or the sea erodes the feature before succession can take place.

Common reedmace can become dominant, however, stands of this community were very limited being recorded in small amount on soft cliff at Reighton Gap and Primrose Valley Holiday Park. Further limited expressions were recorded at TN4, TN5 and TN33. In addition a man-made pond at Primrose Valley also supports S12b.

Table 46. The following species were recorded in this community;

Species	DAFOR
Typha latifolia	D
Agrostis stolonifera	F
Equisetum arvense	F
Pulicaria dysenterica	F
Juncus articulatus	F

S28 *Phalaris arundinacea* tall-herb fen

Table 47. S28 Community Attributes

Attribute	NVC code – S28
Broad habitat type	Fen Marsh and Swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Lowland Fen
UKHabs code	f2a
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Para-maritime

Associated with one pond with peripheral S28 wetland on the soft cliffs at Primrose Valley Holiday Park. Whilst the water body may be natural in origin it is heavily modified.

SD3 *Matricaria maritima – Galium aparine* strandline community

Table 48. SD3 Community Attributes

Attribute	NVC code – SD3
Broad habitat type	Supralittoral sediment
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Coastal vegetated shingle
UKHabs code	s3b
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Supporting habitat
Status	Maritime

The strand-line community, SD3 is mobile in time and space occurring on shingle and sand which has stabilised sufficiently to allow establishment. The community is a loose association of species on the strandline characterised by Babington's orache *Atriplex glabriuscula,* and sea mayweed *Tripleurospermum maritimum*. Limited expressions were recorded at TN14 and TN19.

SD5 *Leymus arenarius* mobile dune community

Table 49. SD5 Community Attributes

Attribute	NVC code – SD5
Broad habitat type	Supralittoral sediment
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Coastal sand dunes
UKHabs code	s3a5
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Supporting habitat
Status	Maritime

One patch of lyme-grass was recorded within the survey area with Babington's orache above high water mark at Butcher Haven, which if undisturbed will start to form a dune system (TN18). This species has a northerly distribution and is characteristic of dune systems in Northumberland and Scotland.

SEt *Equisetum telmateia* mire

Table 50. SEt Community Attributes

Attribute	NVC code – none
Broad habitat type	Fen, Marsh and Swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Lowland Fen
UKHabs code	f2a
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Para-maritime

This community does not appear to be recorded in NVC published texts, however, is difficult to place elsewhere. Dominated by great horsetail, this community is extensive at Butcher Haven and around the M22b fen meadow at nearby Primrose Valley Holiday Park (TN17).

The flushed ground supports a well-developed layer of bryophytes, whilst associated vascular plants include hemp agrimony, wild angelica and male fern. Square-stalked St John's wort and meadowsweet are present in small amounts creating a species rich sward. Whilst appearing well established, it is not clear whether this community will persist. Similar vegetation communities where great horsetail is prominent usually have sufficient sharp-flowered rush, jointed rush and / or tall fescue to place them elsewhere in NVC phytosociological framework.

There appears to be little maritime influence on this vegetation, however, great horsetail is known to occur on sheltered soft cliff on other parts of the coast.

Table 51. The following species were recorded in this community;

Species	DAFOR
Equisetum telmateia	D
Brachythecium rivulare	A
Angelica sylvestris	F
Dryopteris filix-mas	LF
Eupatorium cannabinum	LF
Kindbergia praelonga	LF
Pulicaria dysenterica	LF
Arrhenatherum elatius	O
Cirsium arvense	O
Elymus repens	O
Phalaris arundinacea	O
Galeopsis tetrahit	O
Cirsium palustre	O
Dryopteris dilatata	R
Filipendula ulmaria	R
Galium aparine	R
Geranium robertianum	R
Heracleum sphondylium	R
Hypericum tetrapterum	R
Rubus fruticosus agg.	R
Urtica dioica	R
Juncus subnodulosus	R
Chamerion angustifolium	R
Deschampsia cespitosa	R
Holcus lanatus	R

Table 52. The following quadrat data was recorded in this community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Frequency	Abundance
Quadrat location - OS Grid TA	1261 7771	1251 7781		
Sward height (cm)	90	115		
Bare ground	0	0		
Equisetum telmateia	9	10	V	(9-10)
Brachythecium rivulare	5	7	V	(5-7)
Kindbergia praelonga	5		III	(5_)
Pulicaria dysenterica		4	III	(4_)
Angelica sylvestris	4		III	(4_)
Dryopteris filix-mas	4		III	(4_)
Eupatorium cannabinum		4	III	(4_)
Arrhenatherum elatius	3		III	(3_)
Cirsium arvense	3		III	(3_)
Elymus repens	3		III	(3_)
Phalaris arundinacea		3	III	(3_)
Rubus fruticosus agg.	2		III	(2_)
Urtica dioica	2		III	(2_)
Galium aparine	2		III	(2_)
Geranium robertianum	2		III	(2_)
Heracleum sphondylium	1		III	(1_)
Dryopteris dilatata	1		III	(1_)
Filipendula ulmaria		1	III	(1_)
Hypericum tetrapterum		1	III	(1_)

OV24 *Urtica dioica* / *Galium aparine* community; OV25 *Urtica dioica* – *Cirsium arvense* community, OV26 *Epilobium hirsutum* community and OV27 *Chamerion angustifolium* community

Table 53. OV24 Community Attributes

Attribute	NVC code – OV24
Broad habitat type	Modified grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	G4, Secondary code: 16
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	May be supporting habitat
Status	Para-maritime

Table 53. OV25 Community Attributes

Attribute	NVC code – OV25
Broad habitat type	Modified grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	G4, Secondary code: 16
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	May be supporting habitat
Status	Para-maritime

Table 54. OV26 Community Attributes

Attribute	NVC code - OV26
Broad habitat type	Fen, Marsh and Swamp
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	F2, Secondary code: 17
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Sub-maritime

Table 55. OV27 Community Attributes

Attribute	NVC code – OV27
Broad habitat type	Modified grassland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	G4, Secondary code: 16
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	May be supporting habitat
Status	Para-maritime

Dominated by great willowherb, OV26 forms where moist but well-aerated soils occur in the soft cliff matrix and on watercourses. The community forms limited stands throughout the soft cliff resource.

The expressions of OV26 were found to be relatively species rich and on the soft cliff have a sub-maritime feel with the occurrence of common fleabane. OV26 can form one of the seral stages for wetlands on soft cliff representing wetlands which have been stable for some time allowing growth of great willowherb which out competes smaller, less vigorous species.

Common nettle is usually overwhelmingly dominant in OV25 which has a restricted distribution in the study area occurring only in fertile, well-drained soils on the cliff where eutrophication has occurred. Associates include creeping thistle, common couch, false oat-grass, bramble, tall fescue and goosegrass. Eutrophication due to nearby habitation (probably through tipping of garden waste) was apparent at Flat Cliff and to a lesser extent at Reighton Gap.

Rose-bay willowherb characterises OV27 and formed limited stands as part of the matrix of communities on soft cliff throughout the survey area.

Table 56. The following species were recorded in the OV26 community;

Species	DAFOR
Epilobium hirsutum	D
Pulicaria dysenterica	A
Angelica sylvestris	F
Arrhenatherum elatius	F
Cirsium arvense	F
Kindbergia praelonga	F
Rubus fruticosus agg.	F
Schedonorus arundinaceus	F
Silene dioica	F
Urtica dioica	F
Juncus inflexus	LF
Carex hirta	LF
Agrostis stolonifera	O
Heracleum sphondylium	O
Ranunculus repens	O
Equisetum arvense	O
Cirsium palustre	O
Asplenium scolopendrium	R
Dryopteris filix-mas	R
Galium aparine	R
Rumex obtusifolius	R
Carex otrubae	R
Carex pendula	R

Table 57. The following quadrat data was recorded in the OV26 community (cells left blank indicate this species was not recorded in this quadrat);

Species	Q1	Q2	Frequency	Abundance
Quadrat location - OS Grid TA	1393 7650	1278 7759		
Sward height (cm)	45	50		
Bare ground	0	0		
Epilobium hirsutum	8	9	V	(8-9)
Pulicaria dysenterica	7	2	V	(2-7)
Rubus fruticosus agg.	4	2	V	(2-4)
Cirsium arvense	2	3	V	(2-3)
Arrhenatherum elatius		4	III	(4_)
Schedonorus arundinaceus	4		III	(4_)
Angelica sylvestris	4		III	(4_)
Silene dioica	4		III	(4_)
Urtica dioica		3	III	(3_)
Kindbergia praelonga		3	III	(3_)
Agrostis stolonifera	2		III	(2_)
Ranunculus repens		2	III	(2_)
Heracleum sphondylium		1	III	(1_)
Rumex obtusifolius	1		III	(1_)

Species	Q1	Q2	Frequency	Abundance
Dryopteris filix-mas	1		III	(1_)
Asplenium scolopendrium	1		III	(1_)
Galium aparine		1	III	(1_)

W1 *Salix cinerea – Galium palustre* woodland

Table 58. W1 Community Attributes

Attribute	NVC code – W1
Broad habitat type	Wet Woodland
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Wet Woodland
UKHabs code	w1d
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Supporting habitat
Status	Sub-maritime / Para-maritime

W1 wet woodland was recorded as an element of the soft cliff vegetation between Flat Cliff and Martin's Gill and is a part of the dynamic mosaic of habitats on these cliffs. Grey willow is an opportunist invading moist mineral soils in situations where there is a period free of standing surface water in early summer which facilitates germination of the windborne seeds. Thus W1 wet woodland can readily form where rotational slippage has allowed formation of seasonal wetlands and there is much bare ground. Willow has also been planted into the soft cliff below habitation on Flat Cliff presumably in an effort to stem erosion.

Groundflora associations on soft cliff are varied and much of the variation is due to chance. Early succession can involve jointed-rush, common fleabane, grass-of-Parnassus, creeping bent and colt's-foot, however, light demanding species wane as the trees develop. Once a canopy has formed shade tolerant species such as soft rush, wild angelica and meadowsweet become more prominent.

W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland

Table 59. W8 Community Attributes

Attribute	NVC code – W8
Broad habitat type	Other woodland - broadleaved
UK BAP Habitat (UK Habitat Classification Working Group (2018))	No
UKHabs code	w1g7
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Supporting habitat
Status	Para-maritime

Woodland with characteristics of W8 was recorded in a limited number of locations with main extents being at Mile Haven and upper reaches of Butcher Haven. There are also two other expressions on the soft cliff itself where a sycamore canopy has formed over limited areas.

The woodland has a canopy dominated by sycamore *Acer pseudoplatanus* with some ash *Fraxinus excelsior* and occurs in a sheltered position behind the soft cliffs at Mile Haven. The community is better developed at Butcher Haven where a canopy of ash and wych elm *Ulmus glabra* exists over an understory of hawthorn *Crataegus monogyna*. Groundflora features hart's-tongue fern *Asplenium scolopendrium*, wood avens *Geum urbanum*, bramble *Rubus fruticosus* and red campion *Silene dioica*. Woodland groundflora has much affinity with W8e *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland *Geranium robertianum* sub-community.

W21 *Crataegus monogyna – Hedera helix* scrub

Table 60. W21 Community Attributes

Attribute	NVC code – W21
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Sub-maritime

The community is extensive in less exposed locations, notably Primrose Valley Holiday Park and on the cliff top at Reighton Gap. On soft cliff ground flora can be well developed and fern-rich. At Butcher Haven occasional mature English oak *Quercus robur* occur (e.g. TN17) and woodland groundflora is in evidence locally here with red campion, herb Robert *Geranium robertianum*, lady fern *Athyrium filix-femina* and hart's-tongue fern.

Table 61. The following canopy species were recorded in the W21 scrub;

Species	DAFOR
Crataegus monogyna	D
Rubus fruticosus agg	O
Fraxinus excelsior	O
Acer pseudoplatanus	R
Sambucus nigra	R

Table 62. The following groundflora species were recorded associated with W21 scrub;

Species	DAFOR
Asplenium scolopendrium	F
Dactylis glomerata	F
Dryopteris filix-mas	F
Geranium robertianum	F
Kindbergia praelonga	LF
Urtica dioica	O
Brachythecium rutabulum	O
Holcus lanatus	O

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

Table 63. W22c Community Attributes

Attribute	NVC code – W22c
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Sub-maritime

Thickets of wind-clipped blackthorn *Prunus spinosa* occur regularly throughout the survey area, and are often extensive (e.g. at Reighton Gap, Butcher Haven / Primrose Valley Holiday Park and north of Mile Haven).

Groundflora tends to be species poor in the dense shade. In some expressions sycamore *Acer pseudoplatanus* is established and it is likely these stands will develop into woodland over time unless an erosion event occurs.

Table 64. The following canopy species were recorded in W22 scrub;

Species	DAFOR
Prunus spinosa	D
Rubus fruticosus agg	LF
Crataegus monogyna	O / LF
Fraxinus excelsior	O
Acer pseudoplatanus	O
Sambucus nigra	O
Malus sylvestris	R
Cotoneaster sp	R
Lonicera periclymenum	R

Table 65. The following groundflora species were recorded associated with W22 scrub;

Species	DAFOR
Asplenium scolopendrium	F / LA
Dryopteris filix-mas	LF
Kindbergia praelonga	LF
Silene dioica	O / LF
Dactylis glomerata	O
Heracleum sphondylium	O
Centaurea nigra	O
Dryopteris dilatata	O
Jacobaea vulgaris	R
Ilex aquifolium (seedling)	R

W23 *Ulex europaeus – Rubus fruticosus* scrub

Table 66. W23 Community Attributes

Attribute	NVC code – W23
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Sub-maritime

Limited stands of European gorse *Ulex europaeus* are present throughout the soft cliff resource. Where continuous gorse scrub occurs it is periodically is broken up through soft cliff erosion creating a complex array of micro-niches quickly colonised by soft cliff species.

W24 *Rubus fruticosus – Holcus lanatus* underscrub

Table 67. W24 Community Attributes

Attribute	NVC code – W24
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Sub-maritime

There are numerous bramble thickets on the soft cliff throughout the survey area as part of the mosaic of soft cliff communities. More extensive expressions occur at Primrose Valley Holiday Park and disturbed ground around the man made ponds at Reighton Gap.

W25 *Pteridium aquilinum – Rubus fruticosus* underscrub

Table 68. W25 Community Attributes

Attribute	NVC code – W25
Broad habitat type	Supralittoral rock
UK BAP Habitat (UK Habitat Classification Working Group (2018))	Maritime cliff and slope
UKHabs code	s2a6
Element of H1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts	Yes
Status	Sub-maritime / Paramaritime

Bracken occurs in sheltered areas, notably at Hunmanby Gap where the watercourse has created a steep sided valley parallel to the foreshore. There are also notable extents at Primrose Valley Holiday Park with limited expressions in sheltered spots elsewhere.

Invasive Non-native Species

Scrub

Japanese rose *Rosa rugosa* was noted (TN34 and TN35) in what appear to be former gardens at Reighton Gap.

The soft cliff is vulnerable to invasion, and *Buddleia davidii* was observed in some profusion as a garden escape at Hunmanby Gap (TN25).

Perennial Vegetation

Shasta daisy *Leucanthemum x superbum* is well established as garden escapes throughout the soft cliff survey area often with Montbretia below habitation at Mile Haven, Primrose Valley Holiday Park and Flat Cliff (e.g. TN1, TN2 and TN15). Whilst not all occurrences of Shasta daisy were recorded, a notable population was recorded at Reighton Gap (TN20). Montbretia is present near the golf course at Filey (e.g. TN37), and former gardens at Reighton Gap (e.g. TN36) from where it is colonising soft cliff (e.g. TN21).

The habitation at Flat Cliff appears to be a particular centre for establishment of garden escapes. Large areas are covered by Russian vine (as mapped). Tipped garden waste was observed on the soft cliff at TN3 and TN38, the latter also with a substantial patch of Japanese knotweed. Japanese knotweed is also present here at TN16.

Similarly, habitation adjacent to the cliff at Hunmanby Gap is associated with much tutsan, pampas grass, Canadian goldenrod and red valerian on the slopes below gardens (e.g. TN23, TN24, TN25, TN26). Russian vine also covers approximately 30m^2 native scrub at Hunmanby Gap (TN27) and will continue to spread if left unchecked.

One further INNS likely to be a garden escape is non-native yellow loosestrife at Reighton Gap (TN35).

Ponds

Two artificial ponds are present at Reighton Gap. Both were dry at the time of the survey, with the periphery of each vegetated with reedmace, hard rush, lesser pond-sedge, flag iris and galingale Cyperus longus. These plants are considered likely to have been introduced.

There is much *Leucanthemum x superbum* and *Montbretia* at the ponds.

Incidental Records

One badger sett was encountered at TN9.

Grasshoppers were observed on a number of occasions; further study of the soft cliff invertebrate fauna is recommended.

Target Notes

Table 69. Target notes are tabulated below;

Target note	NGR	Type	Description
1	TA12147888	INNS	Much *Leucanthemum x superbum* and *Montbretia* in the sward.
2	TA12217876	INNS	*Montbretia* and *Leucanthemum x superbum* present.
3	TA12437827	Tipped waste	Much garden waste.
4	TA13847657	S12b	Seepage with *Typha latifolia*
5	TA13827658	S12b	Seepage with *Typha latifolia*
6	TA13727666	M27	Seepage dominated by *Filipendula ulmaria*
7	TA12607756	SEt	Wetland dominated by *Equisetum telmateia*
8	TA14037642	M10	Good example with tufa
9	TA13857655	Species	Badger sett
10	TA13867656	M10	Limited expression
11	TA13847657	M10	Limited expression
12	TA12177877	M10	Limited expression
13	TA12397800	M22b	Limited expression
14	TA12537807	SD3	Strandline community with *Atriplex glabriuscula* and *Tripleurospermum maritimum*
15	TA12347845	INNS	Montbretia and *Leucanthemum x superbum* present.
16	TA12317849	INNS	*Reynoutria japonica* present.
17	TA12587746	W8	W8 woodland characteristics
18	TA12777767	SD5	*Leymus arenarius* mobile due community
19	TA12587797	SD3	Limited expression - community is mobile in space and time.
20	TA14117637	INNS	*Leucanthemum x superbum* present.
21	TA13797659	INNS	Montbretia present.
22	TA12407793	MG1	Species-rich MG1 grassland
23	TA13117719	INNS	*Hypericum androsaemum* (tutsan) and *Centranthus rube*r (red valerian) present
24	TA13137711	INNS	Much *Hypericum androsaemum* (tutsan) and two clumps of *Cortaderia selloana* (pampas grass)

Target note	NGR	Type	Description
25	TA13137707	INNS	*Buddleia davidii* (butterfly bush), *Cortaderia selloana* (pampas grass) and *Hypericum androsaemum* (tutsan) present.
26	TA13217700	INNS	*Solidago canadensis* (Canadian goldenrod) and *Cortaderia selloana* (pampas grass) present. Access from adjacent gardens noted.
27	TA13257700	INNS	*Fallopia baldschuanica* (Russian vine) noted growing over approximately 30 square metres of native scrub.
28	TA12057911	M10	Limited expression
29	TA11957965	M10	Limited expression
30	TA11947966	Species	Great burnet present
31	TA11927978	M10	Limited expression
32	TA12067918	Species	*Geranium sanguineum* in profusion.
33	TA13407696	S12b	Limited expression
34	TA13887636	INNS	*Rosa rugosa* (Japanese rose) present.
35	TA13897633	INNS	*Lysimachia punctata* (yellow loosestrife) and *Rosa rugosa* (Japanese rose) present.
36	TA13817643	INNS	Montbretia present.
37	TA11927961	INNS	Montbretia present.
38	TA12267852	INNS	*Reynoutria japonica* (Japanese knotweed) present with tipped garden waste.

Mosaic Data

Table 70. Where mosaics are shown on the figures they are coded as such an the following data recorded in the attribute table. The sub-communities present and percentages are as indicated below;

Mosaic	Communities	Per centage
M22b/MC8f	*Juncus subnodulosus - Cirsium palustre* fen-meadow / *Festuca* rubra - A*rmeria maritima* maritime grassland	80/20
MC8d/MC8f/MG11/M22b	*Festuca* rubra - A*rmeria maritima* maritime grassland / *Festuca rubra - Agrostis stolonifera - Potentilla anserina* grassland / *Juncus subnodulosus - Cirsium palustre* fen-meadow	60/30/5/5
MC8f/MG11	*Festuca* rubra - A*rmeria maritima* maritime grassland / *Festuca rubra - Agrostis stolonifera - Potentilla anserina* grassland	40/60
MC8f/MG11/MC8d	*Festuca* rubra - A*rmeria maritima* maritime grassland / *Festuca rubra - Agrostis stolonifera - Potentilla anserina* grassland	65/20/15
MC8f/MC8d/MG12	*Festuca* rubra - A*rmeria maritima* maritime grassland / *Festuca arundinacea* grassland	15/65/20
MC8f/MC8d/MG11	*Festuca* rubra - A*rmeria maritima* maritime grassland / *Festuca rubra - Agrostis stolonifera - Potentilla anserina* grassland	55/30/15
MC8f/W24/OV26	*Festuca* rubra - A*rmeria maritima* maritime grassland / *Rubus fruticosus - Holcus lanatus* underscrub / *Epilobium hirsutum* community	70/25/5
MG11/MC8f	*Festuca rubra - Agrostis stolonifera - Potentilla anserina* grassland / *Festuca rubra - Armeria maritima* maritime grassland	80/20
W22/MC8f	*Prunus spinosa - Rubus fruticosus* scrub / *Festuca rubra - Armeria maritima* maritime grassland	40/60
W22/MC8f/W25	*Prunus spinosa - Rubus fruticosus* scrub / *Festuca rubra - Armeria maritima* maritime grassland / *Pteridium aquilinum - Rubus fruticosus* underscrub	60/15/25
W23/MC8f/M22b	*Ulex europaeus - Rubus fruticosus* scrub / *Festuca rubra - Armeria maritima* maritime grassland / *Juncus subnodulosus - Cirsium palustre* fen-meadow	65/25/10

Discussion

Comparison with previous vegetation survey

Previous vegetation survey of this study area was undertaken by Haycock and Jay (2013) on behalf of Natural England. Reference to this report has been made to compare the results of the current survey with vegetation recorded in 2012. Comparisons correspond to Morphological Sections (MS) as described in Haycock and Jay (2013).

Placing of vegetation communities in NVC continuum

In section MS17, one apparent change is due to the reclassification of a vegetation community based on a revision in understanding of application of NVC notation. In 2012 the notation CG2c *Festuca ovina – Avenula pratensis* grassland *Holcus lanatus – Trifolium repens* sub-community was used as a basis for describing grassland on base-rich substrate on the soft cliff. This placing is tenuous but was based on the calcicolous flora; this includes much false-brome, a grassland community not represented in published NVC. Wild carrot is present, but is not sub-species *gummifer*, which was considered at the time to exclude description based on reference to MC11 *Festuca rubra – Daucus carota* ssp *gummifer* maritime grassland. Subsequent work on the Yorkshire coast and other soft cliff has now made it clear that the species-rich grassland on base-rich substrate of the soft cliffs of Yorkshire can be best described in terms of MC11c *Sanguisorba minor* sub-community. Following examination of the floristics and physiognomy, this placing is considered more appropriate and the community has been labelled as such in this treatment. It should be noted that the change of notation from CG2c to MC11c does not reflect a change in the actual grassland community, merely a change in the way that it is described using the NVC published accounts. Similarly some grassland considered to have most affinity with MG5b grassland in 2012 is now considered to be best described in terms of similarities with MC8f although floristics remain constant.

Martin's Gill to Mile Haven (MS17)

The vegetation communities present are the same as in 2012, however, their location is different based on changes in the physical structure of the soft cliff due to ongoing erosion. In areas of stabilisation it is notable that maritime grassland MC8f has been replaced by W24 bramble underscrub and M22 wetland has been replaced by wet woodland. Similarly, areas defined as dense scrub in 2012 are now considered to represent W8 woodland, and areas described as M10 calcareous flush in 2012 are now recorded as M22 rush dominated wetland. MG12 tall fescue grassland is observed as undergoing succession to dense blackthorn scrub.

In 2012, erosion of MC11c grassland was noted as threatening bloody crane's-bill in this community, and this still appears to be the case in 2022, however, the plant is extant. This

may indicate that it is successfully colonising upslope and holding its own in the absence of intervention.

There has been an apparent increase in MG11b at the top of the soft cliff which would indicate a period of active rotational slippage in the period 2012-22 creating bare soil at the head of the cliff. There is also a suggestion of increased occurrence of small wetlands towards the toe of the cliff which would also point to rotational slippage and slumping events.

Overall the proportions of vegetation communities appears remarkably stable, and notable vascular plant species in 2012 are extant

Mile Haven to Butcher Haven (MS18)

The 2022 survey allowed considerably more access to the cliff top and the soft cliffs themselves which has allowed a fuller survey and understanding of soft cliff vegetation at this location.

The portion of soft cliff from Mile Haven to Flat Cliff appears to have gone through a period of stabilisation with the spread of scrub and wet woodland communities at the expense of MC8f maritime grassland and MG12 tall fescue grassland. It is considered likely that this change is within the normal limits for erosion and stabilisation on soft cliff, however, longer periods of stabilisation are considered likely to precede larger erosion events.

Whilst the habitation at Flat Cliff was not surveyed, vegetation above and below the enclave was recorded. This is in contrast to 2012 when access was not possible. The soft cliff vegetation below Flat Cliff was previously recorded as MG1 grassland, scrub and MG11b grassland on eroding cliff. There appears to have been considerable change since then with stabilisation of cliff slope and a large increase in invasive non-native species both through tipped garden waste and garden escapes. Russian vine was noted covering considerable areas, and Japanese knotweed is present at a number of locations. Eutrophication due to garden waste is apparent. Willow spiling has been used at one location in an effort to reduce erosion, however, it is clear that several buildings show signs of collapse due to erosion of soft cliff material from beneath them.

Likewise Primrose Valley Holiday Park was not accessible in 2012, and access in 2022 led to the thrilling discovery of a large area of M22 rush dominated wetland with much blunt-flowered rush. An enigmatic wetland community dominated by great horsetail is also present covering a considerable area, and includes an inaccessible area on the south-facing aspect of Butcher Haven previously described as M27 meadowsweet mire. This may represent a change in dominance in this community.

Great willowherb community continues to persist in Butcher Haven, however, in other locations the community has been subsumed by scrub and bramble.

Butcher Haven to Reighton Gill (MS19)

Erosion south of Butcher Haven appears to have been active since 2012, with more MG11b grassland (characteristic of recently exposed bare ground), and less maritime grassland recorded in 2022. Exposed bare ground appears to be both at the head and toe of the cliff suggesting active erosion at the toe of the cliff combined with rotational slippage.

Bracken continues to be prominent north of Hunmanby Gap, however, in more sheltered areas to the south much bracken has been replaced by blackthorn scrub.

South of Hunmanby Gap a period of stabilisation has allowed maritime grassland MC8f to establish on much of what recorded as MG11b grassland in 2012, which is a positive development providing evidence of the power of colonisation by species associated with soft cliff maritime grassland communities.

An increase in INNs is apparent at Hunmanby Gap.

Reighton Gill to Reighton Gap (MS20)

The vegetation of this relatively short section of coast seems remarkably unchanged between 2012 and 2022. Extent of MC10b has been maintained in its only station on this survey area, partly through visitor trampling, partly through occurrence on extremely thin, free draining soil on previously developed land. Bramble has increased at the expense of M22 wetland at this location.

An increase in INNs is apparent at Reighton Gap.

Comments on coastal erosion

Martin's Gill to Mile Haven (MS17)

An apparent increase in rotational slippage erosion was recorded in this section amongst a generally mixed picture consistent with the stochastic nature of soft cliff erosion.

Mile Haven to Butcher Haven (MS18)

Erosion processes do not appear to be as active here with vegetation showing a general picture of stabilisation. This may be a natural phenomenon, however, efforts at slope stabilisation through use of vegetation (willow and Russian vine) may be having an impact. There was also some evidence of concrete and other ballast being tipped onto the cliff foreshore to reduce erosion at Flat Cliff.

Butcher Haven to Reighton Gill (MS19)

Erosion processes between Butcher Haven and Hunmanby Gap appear to be active with evidence of both erosion at the toe of the cliff and at the head of the cliff evidenced by bare ground and early succession vegetation communities. South of Hunmanby Gap a period of stability is evidenced through development of maritime grassland.

Reighton Gill to Reighton Gap (MS20)

Dynamic vegetation processes have continued in this section indicating a landscape of small scale, active erosion. Stabilisation around Reighton Gap is evident with much blackthorn scrub.

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Appendices

FIGURE 1 - NVC 2022 SURVEY MAPS (attached as a separate document)

APPENDIX 1 - QUADRAT PHOTOGRAPHS (attached as a separate document)

APPENDIX 2 - OVERVIEW OF VEGETATION DATA (attached as separate spreadsheet)

APPENDIX 3 - NVC COMMUNITIES LISTED BY MORPHOLOGICAL SECTION (attached as a separate document)

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