Haycock & Jay Associates Ltd

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Flamborough and Scarborough Coast

Project ID: LB12/13-182

Maritime Cliff and Slope Vegetation Survey

Detailed SSSI Notification Review

Submitted to:

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November 2012 NEY014

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TABLE OF CONTENTS

FIGURES

LIST OF APPENDICES

1.0 SUMMARY

1.1 Review and Survey

1.1.1 Haycock and Jay Associates Ltd was commissioned by Natural England in June 2012 to undertake a review of maritime cliff and slope vegetation along the Flamborough and Scarborough coast, North Yorkshire in order to inform a detailed SSSI notification review.

1.1.2 The resulting review incorporates three sections of coastline where; northern Section 1 comprises Cayton, Cornelian and South Bays SSSI; the central Section 2 includes the coast in between Cayton, Cornelian and South Bays SSSI and Flamborough Head SSSI, including Filey Brigg SSSI; and, the southern Section 3 comprises Flamborough Head SSSI.

1.1.3 Field survey data from earlier Phase 1 and NVC surveys at Sections 1 and 3 (Cayton Bay and Flamborough Head respectively) had already been collated and is available in the Haycock and Jay Associates, '*Cayton Bay SSSI Condition Monitoring of the Vegetated Sea Cliff Feature (Units 1, 2 & 4)*' (October 2010) and Milliken and Pendry, '*Maritime Cliff Vegetation of Flamborough Head – Survey undertaken for English Nature'* (October 2002) reports.

1.2 Overview of Section 2

1.2.1 Phase 1 habitat and NVC surveys for Section 2 were carried out during 2012 and are detailed below. Section 2 surveys identified a complex interplay of factors were found to be influencing grassland and maritime vegetation communities. These include soils and underlying geology, aspect, slope, amount of input from salt-spray, drainage and locally on hard-cliffs, enrichment by sea birds. The major influence is the dynamic nature of the soft cliffs which are slipping and eroding at varying rates in different parts of the site. The degree of maritime influence was found to small, though present on some more exposed slopes, notably at Filey Brigg.

1.2.2 The following brief description starts at the north of Section 2 working south.

1.2.3 Hard cliff zones are eroding less rapidly, and consequently provide a more stable environment for vegetation communities to develop. Consequently there are large areas of unimproved calcareous grassland on steep slopes below hard cliffs at Gristhorpe. Maritime cliff and ledge communities also occur, often associated with nesting seabirds, and in sheltered inlets strandline vegetation can be well-developed.

1.2.4 However, east of the Wyke cliffs are very steep, and steep slopes of eroded material below these cliffs appear to be suffering a degree of eutrophication, possibly due to percolation of water from adjacent intensively managed arable fields. This has led to the development of semi-improved grassland dominated by coarse grasses with a narrow band of maritime grassland by the sea. Where eroded slopes at the top of the hard cliff have stabilised, unimproved neutral grassland occurs.

1.2.5 Filey Brigg is the next feature on the coast. This rocky peninsula supports some of the most species-rich vegetation encountered during the current survey. Maritime grassland is abundant, along with unimproved neutral grassland. The exposed north-facing slopes provide habitat for a type of maritime grassland more usually encountered on north-west coast of Scotland! The sheltered southern slopes of Filey Brigg and stabilised slopes above Filey Sands support both calcareous and neutral species-rich grassland, often with large ant hills suggesting grasslands of some antiquity.

1.2.6 Between Filey town and Reighton Gap the coast is dominated by soft cliffs, and erosion is rapid. The soft cliff is punctuated by sheltered valleys where becks go out to sea. These steep sided valleys occur at Mile Haven, Butcher Haven, Hunmanby Gap and, to a certain extent, at Reighton Gap and can be important areas for species rich grassland. The eroding sea cliffs themselves create a complex mosaic of maritime grassland, unimproved grassland, base-rich flushes and ruderal vegetation.

1.2.7 The following communities were recorded in Section 2 of the coast;

NVC Community	**Area (Ha)**
CG2c *Festuca ovina – Helictotrichon pratense* grassland; *Holcus lanatus – Trifolium repens* sub-community	2.39
M10b *Carex dioica – Pinguicula vulgaris* mire; *Briza media – Primula farinosa* sub-community	0.47
M27b *Filipendula ulmaria – Angelica sylvestris* mire; *Urtica dioica – Vicia cracca* sub-community	0.92
MC4a *Brassica oleracea* maritime cliff-ledge community *Beta vulgaris ssp. Maritima* sub-community	<0.10
MC8d *Festuca rubra – Armeria maritima* grassland; *Holcus lanatus* sub-community	0.65
MC8f *Festuca rubra – Armeria maritima* grassland; *Anthyllis vulneraria* sub-community	9.70
MC9a *Festuca rubra – Holcus lanatus* maritime grassland; *Plantago maritima* sub-community	5.95
MC10b *Festuca rubra – Plantago* spp. maritime grassland *Carex panicea* sub-community	1.67
MG1b *Arrhenatherum elatius* grassland; *Urtica dioica* sub-community	27.12
MG5b *Cynosurus cristatus – Centaurea nigra* grassland *Galium verum* sub community	11.43

NVC Community	Area (Ha)
M22 *Juncus subnodulosus – Cirsium palustre* fen-meadow *Briza media – Trifolium spp* sub community	0.42
MG11b *Festuca rubra – Agrostis stolonifera – Potentilla anserina* grassland, *Atriplex prostrata* sub-community	14.30
MG12a – *Festuca arundinacea* grassland *Lolium perenne – Holcus lanatus* sub-community	1.89
OV25 *Urtica dioica – Cirsium arvense* community	0.78
OV26 *Epilobium hirsutum* community	1.21
S4diii *Phragmites australis* reedbed *Atriplex prostrata* sub-community *Agrostis stolonifera* variant	0.07
S26 *Phragmites australis – Urtica dioica* tall-herb fen	0.01
S12b *Typha latifolia* swamp *Mentha aquatica* sub-community	0.05
SD2 *Honkenya peploides – Cakile maritima* strandline community	0.23
SM28 *Elytrigia repens* salt-marsh community	0.01
U4b *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland; *Holcus lanatus – Trifolium repens* sub-community	1.74
Woodland, bracken and scrub	14.11

1.3 Threats

1.3.1 Where agricultural intensification has taken place habitats on the slope top are considerably modified and vegetation communities simplified. This ultimately reduces species diversity on the soft cliff. The process of simplification was noted with species-rich turfs on lower slopes and being engulfed by the sea whilst species-poor turfs eroded at the top of the cliff.

1.3.2 The other main anthropogenic factor affecting the site is considered to be invasive non-native plants, derived from garden waste. These species tend to become opportunists, rapidly expanding to form dense stands to the detriment of native species.

1.3.3 In order to maintain biodiversity in such a dynamic system, it is important to ensure natural processes are allowed to occur and manage these processes through understanding the system as a whole. The diversity of vegetation communities does, to a certain extent, depend on the quality of vegetation communities immediately inland. Species-rich grassland will contribute much to the soft cliff ecosystem, species-poor grassland contributes little to diversity on the cliff, and invasive non-native species introduced via cliff top has the power to significantly alter communities on the soft cliff as these 'opportunists' fill the niche of native opportunists adapted to soft cliff habitats.

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

1.3.5 The squeeze is exacerbated by encroachment on to species-rich grassland by scrub, bracken and tall ruderal vegetation. Thus in steep sided valleys where agricultural improvement has not been possible, the squeeze continues as unmanaged grassland becomes rank and is then replaced by scrub.

1.3.6 Traditionally steep-sided valleys and much of the cliff top would have been grazed, and in order to address this form of coastal squeeze the following recommendations are made;

- Creation of a wide buffer inland using locally sourced seed from species-rich grasslands; possibly using green hay strewing to establish these;
- Consider methods to reduce the impact of persistent fertilisers in soil, in particular phosphate. Deep ploughing can help to bring less contaminated sub-soil to the surface;
- Targeted collection of seed from critically endangered communities (e.g. CG2c Geranium sanguineum variant to be propagated and young plants introduced to well managed cliff top permanent grasslands; and
- Manage new grasslands as low input system permanent grassland by grazing and hay making as appropriate.

1.3.7 Along the soft cliffs south of Filey species-rich calcareous grassland was recorded on soft cliff but was not encountered on the cliff top, and it's persistence in this area (including the two stands with bloody crane's-bill) is unlikely in the medium-term due to erosion.

1.3.8 Where calcareous grassland occurs on the soft cliff south of Filey in stabilised situations, it is generally surrounded by tall ruderal, bracken and scrub which is likely to overwhelm the grassland in the short to medium term.

1.3.9 In terms of conservation of calcareous grassland on soft cliff resource south of Filey we appear to be at a critical point with imminent loss likely if no conservation action is taken.

1.4 Assessment of the Survey Methodology

1.4.1 The survey methodology was sound and the level of detail and sampling frequency is considered commensurate with that required to accurately record the vegetation communities present. Aerial photographs were invaluable for indicating the extent of some communities.

1.4.2 For soft cliff areas, future survey should aim to record vegetation communities with the characteristics of those recorded on this occasion rather than attempt to record the same communities in the same places, due to the dynamic nature of the habitat. An exception to this may be woodland, however, even here wet woodland is dynamic and forms in response to minor slumps and depressions.

1.4.3 The Maritime NVC (Rodwell et al 2000) acknowledges under-sampling of soft cliffs in Yorkshire; consequently although the communities recorded can be described in terms of their affinities with analogous NVC communities, there is clearly a body of work to be undertaken in order to adequately describe the communities in definitive terms for soft cliffs of Yorkshire's east coast.

2.0 INTRODUCTION

2.1 Haycock and Jay Associates Ltd was commissioned in June 2012 to undertake a review on behalf of Natural England in order to inform a detailed SSSI notification review for the Flamborough to Scarborough coast.

2.2 The resulting review using earlier survey reports[1], desk study data and a Phase 1 habitat survey and NVC survey of the cliff vegetation between the existing SSSIs, provides evidence in order to assess the presence of existing features of interest and ascertains the main vegetation communities present.

2.3 Phase 1 habitat surveys were undertaken between 1st- 3rd August 2012 followed by NVC surveys carried out between 21st- 31st August 2012.

2.4 A data review of earlier NVC survey reports of maritime cliff and slope habitat at the Cayton, Cornelian and South Bays SSSI (Section 1) and Flamborough Head SSSI (Section 3) stretches of coastline was undertaken for conversion of these areas to Phase 1 habitat mapping and to relate morphological characteristics to NVC data.

2.5 A desk study exercise to obtain botanical records for Section 2 was undertaken to enable identification of maritime cliff habitats with biological interest as well as to recognise areas where data are scarce.

2.6 In addition, a Phase 1 habitat survey and National Vegetation Classification (NVC) survey carried out using standard habitat assessment protocol were undertaken in Section 2.

2.7 Target notes were recorded where habitat features were too small to map. Parts of Section 2 could not be accessed due to the steepness and instability of the slopes. Notes referring to NVC survey are termed NVC Notes to avoid confusion.

2.8 The entire study area (Sections 1, 2 and 3) was split into morphological sections based on the character of the maritime cliff and slope. These sections are shown in Figure 7.

2.9 To provide an overview each morphological section has been tabulated with the NVC communities present within it. This is attached at Appendix 3.

[1] Haycock and Jay Associates, '*Cayton Bay SSSI Condition Monitoring of the Vegetated Sea Cliff Feature (Units 1, 2 & 4)*' (October 2010) and Milliken and Pendry, '*Maritime Cliff Vegetation of Flamborough Head – Survey undertaken for English Nature'* (October 2002).

3.0 METHODOLOGY

3.1 Desk Study

3.1.1 Desk studies can be important as they can indicate the presence/potential presence of legally protected and/or other notable species, including habitat indicators that could occur along the coastline and which could remain undetected during a single site visit.

3.1.2 A desk study was undertaken in order to gather botanical records up to 500m inland from mean high water for Section 2. As earlier NVC survey data is available for northern Section 1 and southern Section 3 the desk study did not include these areas.

3.1.3 The following sources of information were consulted:

- North and East Yorkshire Ecological Data Centre (NEYEDC);
- Multi Agency Geographic Information for the Countryside (MAGIC) at www.magic gov.uk; and,
- National Biodiversity Network (NBN) Gateway at www.data.nbn.org.uk.

3.2 Phase 1 Habitat Survey

3.2.1 A Phase 1 habitat survey was carried out between 1st- 3rd August 2012 by Ecologist Jennie Caddick BSc (Hons), MIEEM, AIEMA. The survey area comprised habitats along the coast which are present between the sea shore, including cliff vegetation, and inland to include the extents of semi-natural habitats.

3.2.2 The survey method was based on the standard Phase 1 habitat survey methodology which is concerned only with vegetation communities (JNCC 2007). Phase 1 habitat survey is a standard technique for obtaining baseline ecological information for areas of land. Phase 1 is primarily a mapping technique which uses a standard set of habitat definitions for classification on the basis of the vegetation present.

3.2.3 Within each survey section, distinct habitats were identified and mapped. The survey area was assessed for:

- The potential presence of previously unrecorded areas or features of ecological interest; and,
- Evidence of the presence of legally protected species and other species of notable nature conservation value.

3.3 National Vegetation Classification Survey

3.3.1 NVC surveys were undertaken between 21st- 31st August 2012 by Gordon Haycock BSc (Hons), MIEEM, CEnv, 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).

3.3.2 An initial walkover survey was undertaken across the site to determine variation in the vegetation over the whole site and delimit homogenous stands.

3.3.3 For each homogenous stand of vegetation identified, up to ten 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.

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

3.3.5 The figure for percentage cover for each species in each quadrat was recorded as a DOMIN value. DOMIN values are as follows;

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

<4 with several individuals	2
<4 with few individuals	1

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

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

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

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

3.4 Limitations

3.4.1 Access to steep and/or loose areas of cliff face were not carried out during these surveys due to the risk to Health and Safety posed. However, where safe access was possible steep cliff faces were viewed from the top/bottom.

3.4.2 Only limited access into 'The Bay' holiday village was available during surveys due to lack of permission for current access from the landowner. As such, NVC surveying was unable to include this area.

4.0 RESULTS

4.1 Desk Study

4.1.1 Botanical records obtained during the desk study were reviewed prior to commencing field surveys and informed the extents of the NVC field surveying. Full results of NVC surveys are provided in Section 4.3, below.

4.2 Phase 1 Habitat Survey

4.2.1 Vegetation communities described below are mapped on Phase 1 Habitat Maps attached at Figures 1 to 3. Target Notes are provided at Appendix 1 and full plant species lists are provided at Appendix 2.

4.2.2 Arable Farmland

4.2.3 Arable farmland planted with cereal crops was common along the coast, inland of the cliff-top coastal path, and most frequent along the top of Newbiggin and North Cliffs, to the north of Filey Brigg.

4.2.4 Farmland on the south side of the Brigg was present adjacent to the settlements at Hunmanby Gap and Reighton Sands.

4.2.5 Amenity Grassland

4.2.6 Amenity grassland was identified at four locations along central Section 2 and comprises a short, managed sward of predominantly perennial rye-grass.

4.2.7 This habitat is present to the north of Filey Brigg SSSI at the Flower of May caravanning park; and to the south of the Brigg at Filey Country Park and miniature golf course, Filey Golf Course and bordering a large pond at The Bay holiday village.

4.2.8 Poor Semi-improved Neutral Grassland

4.2.9 Poor semi-improved neutral grassland is present along the inland side of the coastal path at the Blue Dolphin Holiday Park, to the north of the Brigg.

4.2.10 The grassland at this location is a managed open space inside the holiday park boundary and is approximately 100m wide providing a buffer between the caravan parking area and coastal path.

4.2.11 Although the grassland here is managed, having recently been mown, the sward shows some diversity beyond the dominant presence of perennial rye-grass.

4.2.12 Two cattle-grazed fields are present on the west, inland side of the Filey Brigg SSSI. As for other poor semi-improved neutral grassland areas, the sward is slightly more diverse than for amenity grassland with cock's foot grass, white clover, hogweed, Yorkshire fog, perennial rye-grass, encroaching spear thistle and common thistle and isolated common ragwort recorded.

4.2.13 Poor semi-improved neutral grassland fields buffer the cliff edge to the south of Primrose Valley, at the Primrose Valley Holiday Park. As for other heavily used grassland areas recorded at caravanning parks along the coast, it is almost certainly that this grassland was formerly of higher diversity but is now heavily managed as part of the park development.

4.2.14 Isolated fields of poor semi-improved neutral grassland were noted in the south of Section 2, near to Hunmanby Gap and Reighton Sands. These fields are bordering arable farmland and are likely set-aside of former arable crops.

4.2.15 Poor semi-improved neutral grassland along the Section 2 coast frequently occurs adjacent to more diverse semi-improved and unimproved neutral grassland areas (detailed below) and is likely a former remnant of these higher value habitats which has reduced in quality due to disturbance, nutrient enrichment from dog fouling and soil slippage/coastal erosion processes.

4.2.16 The coastal path follows the cliff top to the north of Filey Brigg SSSI and parts of the coast to the south of the Brigg. Grassland immediately bordering the path is poor semi-improved neutral grassland, also likely to have previously been semi-improved neutral grassland, is highly disturbed by walkers reducing its diversity and value.

4.2.17 <u>Semi-improved and Unimproved Neutral Grasslands</u>

4.2.18 Semi-improved neutral grassland and unimproved neutral grassland are the most abundant habitats along central Section 2 of the coast, occurring almost continuously along this Section, with exception of built up areas bordering Filey, Hunmanby Gap and Reighton Sands. Several of the grassland areas are interspersed with tall ruderal vegetation and bare ground (on the cliff faces), which is detailed where present.

4.2.19 Grassland along the cliff top at the northern extent of central Section 2 comprises majority unimproved neutral grassland with a semi-improved neutral grassland field bordered by arable farmland to the north and extending south into the area

immediately adjacent, on the south side of the Flower of May Holiday Park access path.

4.2.20 Species recorded within these grasslands include yarrow, white and red clover, knapweed, colt's foot, birds foot trefoil, lady's bedstraw and red fescue, Yorkshire fog, false oat-grass, wavy-hair grass, foxglove and common sorrel with tall ruderal vegetation also frequent in some patches.

4.2.21 Down the cliff face ledges of unimproved neutral grassland, likely to be present due to a slippage of the topsoil turf from the cliff top, were noted. These areas comprise common spotted orchid, kidney vetch, hoary plantain, *Potentilla* species, hawkbit, knapweed and several grasses and apparently continue to flourish despite their relocation. On Filey Brigg SSSI ledges also included birds foot trefoil, mayweed, common sorrel, colt's foot, wild carrot, red fescue and Yorkshire fog.

4.2.22 Ledges are frequently surrounded by bare ground and short ephemeral growth where habitats have been lost/disturbed by adjacent slippage or where the cliff face is too steep or mobile to support more densely growing/mature vegetation (Target Note 1).

4.2.23 Unimproved neutral grassland more frequently occurs away from the footpath and those areas where public access is relatively easy. It is particularly of note on the cliff edges, at locations part way down the cliff and at the cliff base, inhabiting areas of soil slippage which have fallen from the cliff top.

4.2.24 Next to the Blue Dolphin Holiday Park and travelling south along the top of the Newbiggin and North Cliffs semi-improved neutral grassland is common adjacent to the coastal path, beyond the path edge itself where only poor semi-improved grassland remains. False oat-grass, Yorkshire fog, cocks foot, yarrow, red clover, Timothy, perennial rye-grass and ribwort plantain were recorded here. Ragwort and ornamental yellow loosestrife were also noted at isolated locations along the cliff top.

4.2.25 Transitional areas occur toward the cliff edge and further down the cliff face at this location where the habitat type changes to unimproved neutral grassland and knapweed, red and white clover, red fescue, mayweed, birds foot trefoil, hawkbit, creeping buttercup, horsetail, harebell, tufted hair-grass, vetches, hoary plantain, mayweed, Lady's bedstraw were recorded.

4.2.26 A small field containing unimproved neutral grassland was recorded at the east end of the Blue Dolphin Holiday Park. The grassland composition here included self-heal, cock foot, knapweed, red and white clover, hawkbit, ribwort plantain, Yorkshire fog, frequent red fescue and isolated ragwort supporting cinnabar moths.

4.2.27 A narrow cutting with a notable number of flowering grassland plants is present at the west end of the Newbiggin and North Cliff face (Target Note 4). The cutting runs down the cliff face, from the direction of the Blue Dolphin Holiday Park, with the slopes to either side supporting field scabious, hawkbit, knapweed, yarrow, pignut, common spotted orchid, ribwort and broadleaved plantains, eyebright, yellow bedstraw, colt's foot, horsetail, yellow rattle, harebell, red fescue, Yorkshire fog, southern marsh orchid, agrimony, restharrow and hoary plantain.

4.2.28 Semi-improved neutral grassland was recorded along the top of Filey Brigg SSSI where species recorded include common sorrel, Yorkshire Fog, pineapple weed, yarrow, ribwort plantain, white clover, hoary plantain, perennial rye-grass, dandelion, silver weed, isolated birds foot trefoil and dominant knapweed. Some tall ruderal growth was also recorded amongst the grassland.

4.2.29 On the southern, soft cliff faces of the Brigg and moving south around to the mainland cliffs the grassland was unimproved with hoary plantain, red clover, yellow melilot, wild carrot, common thistle, knapweed, birds foot trefoil , tufted hair-grass and isolated ragwort. Some areas supported a shorter, more sparse sward with red fescue, bucks-horn plantain and dominant hoary plantain while colt's foot was common on areas with a more bare substrate.

4.2.30 To the south of the Brigg beach access from the Filey Country Park down a concrete lane is present. The lane is bordered by semi-natural broadleaved woodland and dense scrub (described below) with unimproved neutral grassland at the beach end (Target Note 8). Species recorded include restharrow, ox-eye daisy, yellow melilot, horsetail, knapweed, tufted hair-grass, yellow kidney vetch, wild carrot, yarrow, field scabious and black medic.

4.2.31 Unimproved neutral grassland occurs to the south of Filey Country Park, beneath the Pampletine Cliffs. The grassland here is patchy with bare soil visible amongst the low sward of colt's foot, tufted hair-grass, knapweed, yellow melilot, wild carrot and ragwort, with a small area of sycamore growth was recorded in the centre.

4.2.32 Unimproved neutral grassland is also present along the cliff face at the southern end of the Filey sea defence wall. Meadowsweet grows along the ridge immediately to the south of Martins Gill broadleaved semi-natural woodland with colt's foot, red clover, wild carrot, hawkbit, bird's foot trefoil and isolated ragwort growing. Bare ground is visible beneath the vegetation across this area.

4.2.33 Travelling south again, adjacent to the Filey Golf Course, the cliff face is vegetated with hoary plantain, colt's foot, common spotted orchid, wild carrot, knapweed, tufted

hair-grass and isolated ragwort. Scrub is also common along this face with meadow sweet and *Juncus* species also present in patches.

4.2.34 At the bottom of the Primrose Valley beach access a small area of unimproved neutral grassland is present. To the north side of the access restharrow, knapweed, field scabious, red campion, cranesbill, wild carrot and woundwort were identified while to the south side of the access a taller sward with more grasses present and comprising colt's foot, knapweed, Yorkshire fog, marsh orchid, hawkbit, red clover and bird's foot trefoil was present.

4.2.35 Within The Bay holiday village a field of unimproved neutral grassland was identified on the east side of the beach access road with amphibian fencing (Target Note 12) noted along the far side of the access road at this location. Species recorded within this grassland include red clover, knapweed, creeping buttercup, sweet vernal grass, tufted hair-grass, spear thistle, birds foot trefoil, black medic, white clover, ragwort, common sorrel, soft rush, hogweed, yellow melilot, pignut, vetches, Timothy grass, teasel, perennial rye grass and Yorkshire fog.

4.2.36 Flat Cliff Gill is present to the south of The Bay holiday village. Unimproved neutral grassland comprising pignut, restharrow, colt's foot, red clover, yellow melilot , cocks foot grass, unidentified orchid and valerian were recorded along the cliff at the bottom of the Gill and on the adjacent cliffs. Bare ground areas are frequent on the cliff to the south of the Gill base.

4.2.37 A plateau of unimproved neutral grassland was recorded at the southern extent of the central Section 2 survey area (Target Note 14). Species recorded were present on a shingle-like substrate and included yarrow, sweet vernal grass, red clover, eyebright, hawkbit, selfheal, centaury, kidney vetch, knapweed, mouse ear, red fescue, pimpernel, birds foot trefoil, sharp rush, marsh orchid, carline thistle and colt's foot on disturbed areas.

4.2.38 <u>Marshy Grassland, Flushes and Seepages</u>

4.2.39 Wet flushes and seepages were noted at several places along the coast. Where flowing water was not visible these were often characterised by earth slippage or slumping on the cliff face and/or by areas of dense meadowsweet and *Juncus* species.

4.2.40 Meadowsweet flushes were noted at several locations, notably at Target Notes 2, 3, 9 and 10.

4.2.41 Travelling south again, adjacent to the Filey Golf Course meadowsweet and *Juncus* species are present in patches along the cliff face.

4.2.42 Ephemeral/Short Perennial and Bare Ground

4.2.43 Bare and re-colonising cliff faces below the coastal path were frequent along central Section 2 and comprised large areas of earth, where previous slippage had occurred. Where the turf layer had also fallen from the cliff top, allowing its vegetation to go with it, these areas have been detailed within the relevant habitat section, dependent on the nature of the habitat which was present on the turf, most commonly grassland.

4.2.44 Species recorded in these steep and ledge ephemeral/short perennial communities include mayweed, ground sorrel, colt's foot, yellow melilot, hoary plantain, horsetail, *Juncus* species, cocks foot grass, meadowsweet and spear thistle.

4.2.45 The cliff face at Newbiggin and North Cliffs, on the north side of Filey Brigg SSSI, was sheer, comprising bare rock and large seabird communities. It is possible that vegetated ledge communities are present along this stretch, however they are not visible from the top of the cliff and would only be visible from the bottom with aid of a boat.

4.2.46 Recent land slips (Target Note 7 and 13) comprising large areas of bare earth were noted along the beaches to the south of Filey Brigg SSSI. These areas were associated with wet flushes, which are likely to have undermined the cliff.

4.2.47 To the south of Hunmanby Gap the soft cliff face shows evidence of continued erosion with a recent landslip recorded at the south end (Target Note 13). Vegetation is as for other bare and ephemeral/ short perennial faces identified to the north.

4.2.48 Tall Ruderal Vegetation

4.2.49 Tall ruderal vegetation is interspersed throughout the grassland habitats along the central Section 2 coast. Within semi-improved and unimproved neutral grassland in the north of this Section, bordering the Flower of May Holiday Park, ruderal species including stinging nettle, hogweed, common thistle and hairy willowherb were identified.

4.2.50 The cliff face steepens adjacent to the Crows Nest Caravan Camp, in the north of Section 2, sloping steeply away then dropping vertically into the sea. These sloping upper reaches support dense common sorrel, stinging nettle, rosebay willowherb, hedge bindweed, common thistle, encroaching scrub and ornamental garden

escapees of ox-eye daisy and bamboo species near the to the slope top and caravans.

4.2.51 On the west, inland side of Filey Brigg an area of dense tall ruderal species border the footpaths onto the Brigg with hogweed, spear thistle, common thistle and isolated ragwort recorded with rank grassland beneath. Spear thistle and hogweed are also frequent along the top of the Brigg, amongst the semi-improved neutral grassland.

4.2.52 A small area, approximately 10m x 10m of common reed was noted on the cliff face on the south side of the Filey sea defence wall (Target Note 9).

4.2.53 In addition to those species present throughout and encroaching into areas of grassland along the central Section 2 coast, tall ruderal vegetation was prevalent on disturbed areas, particularly those associated with adjacent residential development.

4.2.54 Along the cliff face adjacent to the Primrose Valley Holiday Park dense scrub with large cultivated ox-eye daisy, teasels and dense stands of rosebay willowherb are frequent.

4.2.55 The cliff face adjacent to Lower Flat Cliff road begins to narrow and become steeper travelling south, with scrub dominant and rosebay willowherb, common thistle, meadowsweet, Russian vine, hedge bindweed, ragwort, isolated gorse and tipped garden waste behind residential property boundaries at the top of the cliff noted. At the base of the cliff, where the soil is exposed, isolated colt's foot and cultivated ox-eye daisy were recorded.

4.2.56 Bordering The Bay holiday village, south of Lower Flat Cliff road, the cliff is heavily vegetated with scrub and tall ruderal species hairy and rosebay willowherb, marsh thistle, stinging nettle, valerian, common thistle and common sorrel growth, including some dense stands of meadowsweet, in between. This vegetation continues south to Flat Cliff Gill, covering the inland cliff top for up to approximately 160m inland from the cliff base and beach.

4.2.57 As for further up the cliff, colt's foot is frequent along the cliff base adjacent to The Bay, where there are slumped and eroded bare earth areas. Adjacent to The Bay beach access valerian was also recorded.

4.2.58 Currently undeveloped fields were noted to the east side of The Bay holiday village. To the west side of the beach access road, adjacent to current development, is a field comprising almost exclusively common thistle and mayweed, with teasel and sow thistle also noted. It is likely that this field previously supported unimproved neutral grassland, as is still present on the east side of the beach access road (described

above), however, the current vegetation suggests that it has since been highly disturbed.

4.2.59 Flat Cliff Gill lies to the south of The Bay holiday village. A small stream runs down the base of the gill with dense scrub and tall ruderal species including hairy willowherb, meadowsweet and valerian recorded on either side.

4.2.60 A wide gully exists on either side of the Reighton Gill between the village and the cliff edge at Hunmanby Gap. The gully comprises dense scrub and tall ruderal species including common thistle, rosebay willowherb, knapweed, stinging nettle, hogweed and meadowsweet.

4.2.61 Dense scrub and tall ruderal vegetation comprising cultivated ox-eye daisy, rosebay willowherb, common thistle, marsh thistle, hogweed, hairy willowherb, honeysuckle, ragwort, meadow sweet and stinging nettle was recorded at the southern extent of the central Section 2, on the cliff face above the grassland plateau.

4.2.62 Dense and Scattered Scrub

4.2.63 Within the north of the central Section 2, scrub including gorse, blackthorn, bramble and hawthorn was recorded on the slopes above and below the coastal path, often interspersed with and encroaching into grassland and tall ruderal habitats.

4.2.64 At the western end of Newbiggin and North Cliff an area of dense blackthorn scrub is present on the cliff top. This leads into a dense, intact blackthorn and gorse hedge along the field boundary to the west.

4.2.65 To the south of the Brigg beach access from the Filey Country Park down a concrete lane is present. The lane is bordered by semi-natural broadleaved woodland with dense bramble scrub toward the bottom, making the transition to grassland at the bottom of the lane. Blackthorn and hawthorn scrub also extends along the northern cliff face at this location as well as being interspersed amongst the woodland.

4.2.66 Unimproved neutral grassland occurs to the south of Filey Country Park, beneath the Pampletine Cliffs. A small area of sycamore growth was recorded in the centre of the grassland on this cliff.

4.2.67 To the south of the Filey sea defence wall several small areas of sycamore, ash, blackthorn and bramble scrub with surrounding hairy willowherb are present along the cliff and amongst the grassland.

4.2.68 Travelling south again, adjacent to the Filey Golf Course, the cliff face is vegetated with unimproved neutral grassland. Bramble and dog rose scrub is also common along this face, including sycamore and blackthorn within the gullies.

4.2.69 To the south of Filey Golf Course, Primrose Valley comprises dense blackthorn scrub with meadowsweet, common reed and isolated gorse scrub at the cliff base also recorded.

4.2.70 South of Primrose Valley, at the Primrose Valley Holiday Park, the cliff face comprises ash, sycamore and bramble scrub. Where the scrub is very dense hedge bind weed is common growing over it bordered by dense tall ruderal growth.

4.2.71 The cliff face adjacent to Lower Flat Cliff road begins to narrow travelling south, with dominant blackthorn and bramble scrub present.

4.2.72 Bordering The Bay holiday village, south of Lower Flat Cliff road, the cliff is heavily vegetated with gorse, blackthorn, hawthorn and bramble scrub with tall ruderal growth between. Isolated *Prunus* species and sycamore were also recorded. This vegetation continues south to Flat Cliff Gill, covering the inland cliff top for up to approximately 160m inland from the cliff base and beach.

4.2.73 Flat Cliff Gill is present to the south of The Bay holiday village. A small stream runs down the base of the gill with dense blackthorn and bramble scrub and tall ruderal species to either side.

4.2.74 At Hunmanby Gap a wide gully, to either side of Reighton Gill and comprising dense scrub, was identified between the village and the cliff edge. The gully comprises dense gorse, hawthorn and blackthorn including tall ruderal species. Hawthorn, ash, sycamore, bramble, blackthorn and dog rose were also noted bordering the path along the top of the eroding soft cliff, on the east side of the Gill.

4.2.75 Dense scrub was recorded at the southern extent of the central Section 2, on the cliff face above a plateau of grassland which is present half way down the cliff. Scrub at this location comprised dense blackthorn, with hawthorn, ash, bramble, dog rose and tall ruderal vegetation identified.

4.2.76 Bracken

4.2.77 Bracken is present along cliffs to the south of Filey Brigg SSSI and Filey town.

4.2.78 A small area, approximately 10m x 10m of bracken was noted on the cliff face on the south side of the Filey sea defence wall (Target Note 9) with surrounding tall ruderal vegetation.

4.2.79 To the south of Filey Golf Course, Primrose Valley comprises dense scrub with bracken interspersed.

4.2.80 To the north side of The Bay beach access, dense bracken growth was identified along the top of the cliff face with isolated bracken also present amongst scrub and tall ruderal vegetation to the north.

4.2.81 A wide gully vegetated with dense scrub, tall ruderal vegetation (detailed above) and bracken is present on either side of the Reighton Gill, between the village and the cliff edge at Hunmanby Gap.

4.2.82 Broadleaved Semi-natural Woodland

4.2.83 To the south of the Brigg beach access is present from the Filey Country Park down a steep concrete lane. The lane is bordered by broadleaved semi-natural woodland comprising predominantly sycamore and hawthorn with blackthorn, ash and elder also noted.

4.2.84 Broadleaved semi-natural woodland, predominantly sycamore, was also recorded on the north side of Filey, behind the sea defence wall, extending up the Church Ravine, and to the south of Filey up Martins Gill and the Glen Gardens.

4.2.85 Ponds

4.2.86 Two ponds were identified on the western, inland end of Filey Brigg SSSI.

4.2.87 Pond P1 (Target Note 5) is approximately 25m x 20m. The marginal area was very overgrown with creeping bent and a small island covered with yellow iris and non-native New Zealand pygmyweed was recorded in the centre of the pond. A single frog was noted in the pond margins during this survey.

4.2.88 Pond P2 (Target Note 6) is located approximately 35m to the north west of pond P1 within poor semi-improved cattle-grazed grassland on the west end of the Brigg. The pond is approximately 40m x 35m with three sides heavily poached by stock. Large lily pads were recorded across the centre of the pond with dense pond weed also noted in the open water areas and amphibious bistort and flote-grass around the margins.

4.2.89 Pond P3 (Target Note 11) is present with The Bay holiday village complex, on the north side of Hunmanby Gap. The pond is approximately 130m x 30m with dense meadowsweet, hairy willowherb and valerian surrounding the edge and common bur reed margins. Potamogeton species covers the majority of the open water area.

5.0 NVC SURVEY – RATIONALE AND SITE DESCRIPTION

5.1 Physical Processes and Community Development

5.1.1 This section sets out to give an overview of how physical process, in particular on the soft cliff resource, create the conditions for the variety of vegetation communities observed on the site, and is designed to give context to the subsequent descriptions.

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

5.1.3 Erosion was observed to be happening in two guises, catastrophic slope failure and incremental erosion. These two processes were happening in conjunction with each other and formed a continuum which geomorphologists could no doubt describe with more clarity. These are dealt with below based on observations during the survey. Clearly more in depth study would allow a more coherent picture to evolve.

5.1.4 <u>Catastrophic slope failure</u>

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

5.1.6 Observations during the surveys indicated that vegetative reproduction was the most important factor on the sub-soil slopes favouring *Agrostis stolonifera* in particular, but also *Tussilago farfara* and *Pulicaria dysenterica* where these species are present, and deep rooted perennials such as *Equisetum arvense*. The latter was not as prevalent in these early successional communities, although the roots were often evident with a few poorly grown specimens; it is considered likely that the low nutrient status of the

soil was a factor in this. Larger plants would also survive as occasionals from the previous turf with clumps of *Festuca rubra* and *Plantago lanceolata* often distributed sparsely within this community. Where these survived they would continue to grow, though growth was often poor. Seeding into this matrix was common, although only *Anthyllis vulneraria* was consistently present. Other species could be prominent depending on seed sources locally. Where maritime influences were high (i.e. north-east facing and proximal to the sea), *Plantago maritima* was present. The steepness of slope and poor substrate makes establishment by seed challenging as seed is easily washed away, and the subsoil tends to be clayey and hostile to the establishment of young plants.

5.1.7 In contrast, the slumped material is nutrient rich, with abundant vegetative structures and seed germination opportunities. These areas showed rapid colonisation by deep rooted perennials extant in the former vegetation or growing through from the vegetation covered by the slump such as *Equisetum arvense* and *Cirsium arvense*. It was notable that species not tolerant of maritime conditions which were prevalent in the cliff top communities (for example *Arrhenatherum elatius*) were absent or poorly grown where slumping carried their root stocks seaward. This appeared to allow species which are present but not prominent on the cliff top (e.g. *Festuca arundinacea*) to gain prominence. Once established the latter appears highly effective in maintaining dominance in the soft cliff community, with tussocks surviving and re-establishing in subsequent slippage events. In addition, seeds germinated readily, and these areas were typically characterised by well grown tall ruderal vegetation.

5.1.8 These large scale slumps appeared to favour the creation of more defined groundwater springs, with bryophyte-rich spring head communities rapidly developing along with associated flush vegetation beneath, often identified at the time of the survey by a *Parnassia palustris*. As the slope levels out there is frequently a community with *Juncus articulatus* and *Triglochin palustre* (both species are good colonisers from fragments), which typically feeds wetland zones dammed behind slumped material. Dammed wetlands are variously colonised with the resultant dominant species probably determined largely by chance. Consequently perched wetland dominated by *Epilobium hirsutum, Filipendula ulmaria, Typha latifolia* and *Phragmites australis* were all recorded.

5.1.9 Catastrophic slippage events appeared to favour establishment by invasive non-native species, often deposited at the cliff top by local gardeners.

5.1.10 This mode of erosion and colonisation was observed preferentially on soft cliff at Gristhorpe Sands, parts of Gristhorpe Cliff, and soft cliff from Filey to Reighton Sands.

5.1.11 <u>Incremental erosion</u>

5.1.12 Incremental erosion appears to be driven by rotational slippage, probably powered by removal of sediments at the base of soft cliffs. Blocks of vegetation at the top of the cliff fall off at regular intervals and proceed down moderate slopes over time towards the sea.

5.1.13 Vegetation on the cliff top is typically unmanaged grassland forming a dense sward with no bare ground apparent. The soil is held together by an intimate mat of roots, consequently, as incremental erosion takes place, blocks of intact vegetation move down slope as a unit allowing the species in the sward to continue to grow. Thus the effect (usually on less steep slopes) is of a series of blocks moving down slope over sub-soil. The sub-soil is apparent between blocks and has its own vegetation forming an intimate mosaic of cliff top grassland moving down-slope in steps with gaps of varying size between these blocks. The blocks were typically no more than 0.6m wide and 1.2 to 2.0m wide, however, occasionally large blocks of intact vegetation had clearly migrated some distance downslope.

5.1.14 As blocks of generally mesotrophic grasslands approach the sea, maritime influences become more marked with a number of species (notably *Arrhenatherum elatius*) becoming scarcer, and other species colonising the space made available. This process is considered to have contributed to an increase in *Festuca rubra, Centaurea nigra, Lotus corniculatus* and, initially *Holcus lanatus*. However, whilst this was observed as a general process during this survey, it would certainly bear further investigation.

5.1.15 Gaps between travelling turfs consist of poorly drained sub-soil, and was generally colonised initially by *Tussilago farfara, Agrostis stolonifera, Equisetum arvense* and locally by *Pulicaria dysenterica.* Due to the poor drainage in gaps, these species are quickly joined by *Juncus effusus* and *J. inflexus* creating an intimate mosaic of often species-rich cliff top grassland and narrow veins of lowland mire. Depending on stability and drainage, gaps may also be also colonised over time by species in the turfs themselves.

5.1.16 Where well developed, gaps between turfs were often narrow (approximately 0.1 to 0.3m) and orientated at right angles to the sea. This created humid enclaves protected from maritime influence between turfs which, if persistent, often proved to have been colonised by a lush bryophyte flora taking advantage of the sheltered conditions and growing on the sides of turfs.

5.1.17 The vegetation communities are further complicated where turfs and blocks of vegetation are moving down-slope over a groundwater spring on the sub-soil slope (for example at NVC Notes 17, 21 and 29). This leads to an intimate mosaic consisting of the cliff-top turfs moving down-slope and changing due to maritime

influences. The vegetation community colonises the sub-soil at various stages of succession, and base-rich spring water percolating in the gaps between the turfs allows flush vegetation to thrive (such as *Carex panacea, Parnassia palustris* and associated bryophytes), giving way to *Juncus* sp and *Triglochin palustre* being replaced in slacks by wetland flora characterised by tall herb species. Quite a heady botanical mix!

5.1.18 Incremental erosion was recorded sporadically on soft cliff slopes. One aspect of this process is that turfs progressing downslope whilst species-rich at present are not likely to be species-rich in the future. For example at NVC Note 23 a large turf of MG5b has recently fallen from the top due to natural erosion processes and this is contributing to species-richness in the soft cliff environment. However, this has left MG1 grassland at the top of slope, and future turfs joining the process through erosion will be MG1 in this area rather than MG5. This means that over time species richness of the soft cliff environment is likely to be compromised.

5.1.19 As the cliffs are constantly eroding, vegetation recorded on the slumping cliffs often has its origin on the cliff top, with large turfs falling from the cliff top and then making their way downslope to the beach over time. During this period turfs often fragment and there is much bare ground allowing some species to regenerate by seed.

5.1.20 This process means that there are at least three elements to the cliff slope flora;

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

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

5.1.22 Soft cliff species occur on mobile slopes, species able to regenerate readily from seed are preferential including southern marsh orchid.

5.1.23 Where agricultural intensification has taken place habitats on the slope top are considerably modified and vegetation communities simplified. This means that the diversity of 'persisters' is compromised, which ultimately reduces species diversity on the soft cliff. This process of simplification was noted with species-rich turfs containing 'persisters' on lower slopes and being engulfed by the sea whilst species-poor turfs eroded at the top of the cliff.

5.1.24 The other main anthropogenic factor affecting the site is considered to be invasive non-native plants, derived from garden waste. These species tend to become opportunists, rapidly expanding to form dense stands to the detriment of native species.

5.1.25 In order to maintain biodiversity in such a dynamic system, it is important to ensure natural processes are allowed to occur and manage these processes through understanding the system as a whole. The diversity of vegetation communities does, to a certain extent, depend on the quality of vegetation communities immediately inland as this is the source of 'persisters' and 'opportunists'. Species-rich grassland will contribute much to the soft cliff ecosystem, species-poor grassland contributes little to diversity on the cliff, and invasive non-native species introduced via cliff top has the power to significantly alter communities on the soft cliff as these 'opportunists' fill the niche of native opportunists adapted to soft cliff habitats.

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

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

5.1.28 The squeeze is exacerbated by encroachment on to species-rich grassland by scrub, bracken and tall ruderal vegetation. Thus in steep sided valleys where agricultural improvement has not been possible, the squeeze continues as unmanaged grassland becomes rank and is then replaced.

5.1.29 Traditionally steep-sided valleys and much of the cliff top would have been grazed, and in order to address this form of coastal squeeze the following recommendations are made;

- Creation of a wide buffer inland using locally sourced seed from species-rich grasslands; possibly using green hay strewing to establish these;
- Consider methods to reduce the impact of persistent fertilisers in soil, in particular phosphate. Deep ploughing can help to bring less contaminated sub-soil to the surface;
- Targeted collection of seed from critically endangered communities (e.g. CG2c Geranium sanguineum variant to be propagated and young plants introduced to well managed cliff top permanent grasslands; and
- Manage new grasslands as low input system permanent grassland by grazing and hay making as appropriate.

6.0 NVC COMMUNITY DESCRIPTIONS

6.1 Rationale for Community Descriptions

6.1.1 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 eastern, and in particular soft cliffs, were not extensively sampled, and consequently this vegetation is not comprehensively characterised at present. Indeed sampling from the Yorkshire east coast appears not to have taken place at all. Consequently the communities encountered do not generally accord with those described in Rodwell.

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

6.1.3 An example would be MC8f *Festuca rubra – Armeria maritima* maritime grassland *Anthyllis vulneraria* sub-community. Whilst the grassland recorded clearly has most affinity with this NVC community, *Armeria maritima* was not recorded. Consequently the label on the map has the power to mislead future conservation officers unless it is considered in conjunction with the community descriptions in this report.

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

6.2 Summary of Communities Mapped

6.2.1 The NVC communities encountered, along with the area they cover are given in Table 1 below. NVC Maps are provided at Figure 5 and full plant species list is provided at Appendix 2.

6.2.2 Where communities were encountered in intimate mosaic, these areas have been recorded on Figure 5 as ‘Mosaic’ along with a label indicating which communities are present. Each mosaic is also labelled with a letter from A to Z and then AA to AC. The percentage of each community in each labelled mosaic area is recorded in Appendix 4.

6.2.3 Table 1: NVC Communities present in Section 2;

NVC Community	**Area (Ha)**
CG2c *Festuca ovina – Helictotrichon pratense* grassland; *Holcus lanatus – Trifolium repens* sub-community	2.39
M10b *Carex dioica – Pinguicula vulgaris* mire; *Briza media – Primula farinosa* sub-community	0.47
M27b *Filipendula ulmaria – Angelica sylvestris* mire; *Urtica dioica – Vicia cracca* sub-community	0.92
MC4a *Brassica oleracea* maritime cliff-ledge community *Beta vulgaris ssp. maritima* sub-community	<0.1
MC8d *Festuca rubra – Armeria maritima* grassland; *Holcus lanatus* sub-community	0.65
MC8f *Festuca rubra – Armeria maritima* grassland; *Anthyllis vulneraria* sub-community	9.70
MC9a *Festuca rubra – Holcus lanatus* maritime grassland; *Plantago maritima* sub-community	5.95
MC10b *Festuca rubra – Plantago* spp. maritime grassland *Carex panicea* sub-community	1.67
MG1b *Arrhenatherum elatius* grassland; *Urtica dioica* sub-community	27.12
MG5b *Cynosurus cristatus – Centaurea nigra* grassland *Galium verum* sub community	11.43
M22 *Juncus subnodulosus – Cirsium palustre* fen-meadow *Briza media – Trifolium spp* sub community	0.42
MG11b *Festuca rubra – Agrostis stolonifera – Potentilla anserina* grassland, *Atriplex prostrata* sub-community	14.30
MG12a – *Festuca arundinacea* grassland *Lolium perenne – Holcus lanatus* sub-community	1.89
OV25 *Urtica dioica – Cirsium arvense* community	0.78
OV26 *Epilobium hirsutum* community	1.21
S4diii *Phragmites australis* reedbed *Atriplex prostrata* sub-community *Agrostis stolonifera* variant	0.07
S26 *Phragmites australis – Urtica dioica* tall-herb fen	0.01
S12b *Typha latifolia* swamp *Mentha aquatica* sub-community	0.05
SD2 *Honkenya peploides – Cakile maritima* strandline community	0.23
SM28 *Elytrigia repens* salt-marsh community	0.01
U4b *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland; *Holcus lanatus – Trifolium repens* sub-community	1.74
Woodland, bracken and scrub	14.11

6.3 Community; CG2c *Festuca ovina – Helictotrichon pratense* grassland; *Holcus lanatus – Trifolium repens* sub-community

6.3.1 Whilst neither sheep's fescue nor meadow oat-grass were recorded during the survey, community constants are well represented including quaking grass, glaucous sedge, rough hawkbit, fairy flax, ribwort plantain, salad burnet and small scabious. Sheep's fescue is replaced throughout by red fescue.

6.3.2 The replacement of sheep's fescue by red fescue, and the abundance of Yorkshire fog accompanied by black medick, creeping bent and a range of bryophytes including rock pocket-moss indicates that this community is best described in terms of its affinity with CG2c *Holcus lanatus – Trifolium repens* sub-community. The local abundance of false brome and yellow oat-grass is also indicative of this sub-community.

6.3.3 CG2c occurs in abundance in the north on steep, free-draining slopes below hard cliffs (NVC Note 20) where the substrate is largely stable. These stands are considered to be of high nature conservation value as the sward is flower-rich with much small scabious and wild marjoram according with the sub-community description in Rodwell.

6.3.4 CG2c occurring on the slopes above the sailing club at Filey (TA12268142) has large ant-hills suggesting a considerable history with little disturbance.

6.3.5 Species of note in this community include saw-wort which is locally abundant throughout and bloody crane's-bill which is abundant in one variant of this vegetation occurring to the south of Filey town (NVC Notes 8, 10 and 18). I have termed this CG2c *Geranium sanguineum* variant.

6.3.6 In this variant the sward is characterised by a suite of species more familiar in wet grasslands such as great burnet, river feather-moss and bifid crestwort. There was also wild angelica, bitter-vetch, crosswort and a number of other species not normally encountered in CG2c. The occurrence of saw-wort, devil's-bit scabious, hoary plantain, betony and black knapweed indicates some affinity with CG2b *Succisa pratensis – Leucanthemum vulgare* sub-community. However, this sub-community also hosts a number of species with a Continental distribution which were not recorded during this survey, and affinity with this CG2b was considered to be superficial.

6.3.7 A further variant was recorded in Butcher Haven on north facing slopes of the valley. I have termed this CG2c *Primula vulgaris* variant, as primrose is a constant along with meadowsweet, black knapweed, betony, southern marsh orchid, devil's-bit scabious

and meadow vetchling. Salad burnet is also preferential here along with selfheal, hoary plantain and a range of bryophytes often forming a substantial weft. The community occurs on a flushed slope which is unstable and prone to erosion by the beck below. This has meant that tall ruderal vegetation and scrub has found it hard to gain a hold conserving this community.

6.3.8 Considerable areas of CG2c were recorded at Gristhorpe Cliff and Cunstone Nab, and to a lesser extent on stabilised slopes immediately north of Filey town. At these locations the community appears to be in a stable state with no imminent threats.

6.3.9 However, south of Filey CG2c occurs sporadically, usually in small fragments, and often in imminent threat of annihilation through erosion by the sea. These turfs are in the process of incremental erosion.

6.3.10 Along the soft cliffs south of Filey CG2c and was not encountered on the cliff top, and it's persistence in this area (including the two stands with bloody crane's-bill) is unlikely in the medium-term due to erosion.

6.3.11 Where CG2c occurs on the soft cliff south of Filey in stabilised situations, it is generally surrounded by tall ruderal, bracken and scrub which is likely to overwhelm the grassland in the short to medium term.

6.3.12 In terms of conservation of calcareous grassland on soft cliff resource south of Filey we appear to be at a critical point with imminent loss likely if no conservation action is taken.

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

		DAFOR	
Species	**Common name**	**North of Filey**	**South of Filey**
Achillea millefolium	Yarrow		F
Agrimonia eupatoria	Agrimony		O
Anacamptis pyramidalis	Pyramidal orchid	F	
Anthyllis vulneraria	Kidney vetch	R	R
Asplenium scolopendrium	Hart's tongue fern	R	
Brachypodium sylvaticum	False brome	A	A
Briza media	Quaking grass	LF	F
Calliergonella cuspidata	Pointed spear-moss	LF	
Campanula rotundifolia	Harebell	O	
Carex flacca	Glaucous sedge	A	LF
Carex panicea	Carnation sedge	LF	LF
Carlina vulgaris	Carline thistle	F	R
Centaurea nigra	Black knapweed	A	F
Cerastium fontanum	Common mouse-ear	O	O

		DAFOR	
Species	**Common name**	**North of Filey**	**South of Filey**
Cirriphyllum piliferum	Hair-pointed feather-moss	O	
Cirsium palustre	Mash thistle	D	R
Cirsium vulgare	Spear thistle	R	
Dactylis glomerata	Cock's foot	F	F
Dactylorhiza fuchsii	Common spotted orchid	O	
Dactylorhiza praetermissa	Southern marsh orchid	O	
Daucus carota	Wild carrot	O	LA
Equisetum arvense	Field horsetail		O
Euphrasia nemorosa	Eyebright	LF	LF
Festuca arundinacea	Tall fescue		O
Festuca rubra	Red fescue	D	D
Fissidens dubius	Rock pocket-moss	R	
Galium verum	Lady's bedstraw	LF	LF
Heracleum sphondylium	Common hogweed	R	O
Holcus lanatus	Yorkshire fog	LF	O
Homalothecium lutescens	Yellow feather-moss	O	
Hypericum pulchrum	Slender St. John's Wort		O
Hypnum lacunosum	Great plait moss	O	
Lathyrus linifolius	Bitter-vetch		R
Lathyrus pratensis	Meadow vetchling	O	
Leontodon hispidus	Rough hawkbit	F	F
Linum catharticum	Fairy flax	F	F
Lotus corniculatus	Bird's-foot trefoil	F	F
Medicago lupulina	Black medick	O	R
Ononis repens	Common restharrow	LF	
Ononis spinosa	Spiny restharrow	O	
Origanum vulgare	Wild marjoram	F	
Parnassia palustris	Grass-of-Parnassus		R
Plantago lanceolata	Ribwort plantain	F	A
Plantago maritima	Sea plantain	R	LF
Plantago media	Hoary plantain	F	O
Potentilla reptans	Creeping cinquefoil	R	
Primula veris	Cowslip	O	
Prunella vulgaris	Selfheal	O	O
Pseudoscleropodium purum	Neat feather-moss	LF	
Pteridium aquilinum	Bracken		O
Pulicaria dysenterica	Fleabane	R	
Rhinanthus minor	Hay rattle	O	
Rhytidiadelphus triquetrus	Big shaggy-moss	LF	
Rubus fruticosus agg.	Bramble	r	O
Rumex acetosa	Common sorrel	O	
Sanguisorba minor	Salad burnet	vLF	O
Scabiosa columbaria	Small scabious	F	F
Senecio erucifolius	Hoary ragwort	O	
Senecio jacobaea	Common ragwort		O
Serratula tinctoria	Saw-wort		F

		DAFOR	
Species	**Common name**	**North of Filey**	**South of Filey**
Stachys officinalis	Betony		F
Succisa pratensis	Devil's-bit scabious		O
Tortella tortuosa	Frizzled crisp-moss	R	
Trifolium pratense	Red clover	O	F
Trisetum flavescens	Yellow oat-grass	O	
Tussilago farfara	Colt's foot	O	R

6.3.14 The following quadrat data was recorded for CG2c;

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Freq**	**Abundance**
Quadrat location – OS Grid TA	**0956 8330**	**0952 8331**	**1002 8299**	**1002 8290**	**1236 8151**	**1226 8142**	**1207 7902**		
Sward height (cm)	**20**	**20**	**25**	**20**	**15**	**25**	**15**		
Festuca rubra	8	8	6	8	4	4	4	V	(4-8)
Leontodon hispidus	3	2	2	3	4	4	3	V	(2-4)
Centaurea nigra	2	2	2	3		3	3	V	(2-3)
Scabiosa columbaria		3	3	3	2	2	2	V	(2-3)
Lotus corniculatus			3	4	3	3	4	IV	(3-4)
Brachypodium sylvaticum	5	4	2	3		3		IV	(2-5)
Plantago lanceolata	3	3	2	4		2		IV	(2-4)
Pseudoscleropodium purum	4		4			4		III	(4_)
Carex flacca	3				4	3	4	III	(3-4)
Briza media					3	4	3	III	(3-4)
Holcus lanatus	2	2	4				2	III	(2-4)
Trifolium pratense			2		2	2	4	III	(2-4)
Medicago lupulina			2	2	3	2		III	(2-3)
Linum catharticum	3				2	2		III	(2-3)
Origanum vulgare	2	3	2	2				III	(2-3)
Euphrasia nemorosa	3		2				3	III	(2-3)
Daucus carota			2	2	2	2		III	(2_)
Dactylis glomerata			2	2	2			III	(2_)
Senecio erucifolius	2	1			1	1		III	(1-2)
Prunella vulgaris		1	2				1	III	(1-2)
Rhytidiadelphus triquetrus	4	4						II	(4_)
Calliergonella cuspidata	3	3						II	(3_)
Plantago maritima		2					3	II	(2-3)
Plantago media			2				3	II	(2-3)
Rhinanthus minor	2	2						II	(2_)
Sanguisorba minor				2			2	II	(2_)
Rubus fruticosus agg.	1			2				II	(1-2)
Heracleum sphondylium		1	2					II	(1-2)
Carlina vulgaris						2	1	II	(1-2)
Festuca arundinacea							4	I	(4_)
Achillea millefolium							4	I	(4_)
Succisa pratensis							4	I	(4_)
Carex panicea							4	I	(4_)
Tussilago farfara			3					I	(3_)

Hypnum lacunosum		3					I	(3_)
Homalothecium lutescens			3				I	(3_)
Cirriphyllum piliferum			3				I	(3_)
Stachys officinalis						2	I	(2_)
Fissidens dubius	2						I	(2_)
Tortella tortuosa	2						I	(2_)
Trisetum flavescens		2					I	(2_)
Lathyrus pratensis		2					I	(2_)
Galium verum					2		I	(2_)
Ononis repens				2			I	(2_)
Ononis spinosa					2		I	(2_)
Equisetum arvense						2	I	(2_)
Parnassia palustris						2	I	(2_)
Cirsium palustre			1				I	(1-2)
Rumex acetosa		1					I	(1_)
Dactylorhiza praetermissa			1				I	(1_)
Cerastium fontanum			1				I	(1_)
Potentilla reptans				1			I	(1_)
Cirsium vulgare				1			I	(1_)

6.3.15 The following quadrat data was recorded for CG2c *Geranium sanguineum* variant;

Species	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**	**Q13**	**Freq**	**Abundance**
Quadrat location - OS Grid TA	1301 7734	1207 7915	1202 7924	1205 7921	1202 7928	1203 7926		
Sward height (cm)	30	30	25	30	35	30		
Festuca rubra	5	5	7	4	5	5	V	(5-7)
Trifolium pratense		8	2	3	2	3	V	(2-8)
Brachypodium sylvaticum	5	3	3	6	5	2	V	(2-6)
Centaurea nigra	3	2	3	2	2	2	V	(2-3)
Agrostis stolonifera		1	2	3	3	4	V	(1-4)
Dactylis glomerata	2	2	1	3	1	1	V	(1-3)
Serratula tinctoria	3	4		2		2	IV	(2-4)
Daucus carota			3	2	3	2	IV	(2-3)
Equisetum arvense		2		3	2	1	IV	(1-3)
Achillea millefolium		2	1		1	1	IV	(1-2)
Lotus corniculatus			4	4	7		III	(4-7)
Plantago lanceolata	3		3		3		III	(3_)
Geranium sanguineum		4	2			4	III	(2-4)
Lathyrus pratensis			2	3		2	III	(2-3)
Filipendula ulmaria		3	2			2	III	(2-3)
Carex flacca	3		2	3			III	(2-3)
Tussilago farfara	3			2		2	III	(2-3)
Stachys officinalis	2	2			2		III	(2_)
Succisa pratensis			3	2		1	III	(1-3)
Linum catharticum			2	2	1		III	(1-2)
Heracleum sphondylium	1	2	1				III	(1-2)
Rubus fruticosus agg.	2	2	1				III	(1-2)
Arrhenatherum elatius	2	1				1	III	(1-2)

Species	Q8	Q9	Q10	Q11	Q12	Q13	Freq	Abundance
Brachythecium rutabulum	4			6			II	(4-6)
Galium verum			3	3			II	(3_)
Leontodon hispidus			3		2		II	(2-3)
Trisetum flavescens			3		2		II	(2-3)
Plantago media			2		2		II	(2_)
Vicia sepium		2				2	II	(2_)
Agrimonia eupatoria	2					2	II	(2_)
Hypericum pulchrum	3	1					II	(1-3)
Carlina vulgaris			1	2			II	(1-2)
Calliergonella cuspidata		4					I	(4_)
Sanguisorba officinalis						3	I	(3_)
Brachythecium rivulare		3					I	(3_)
Lophocolea bidentata		3					I	(3_)
Ononis repens						2	I	(2_)
Potentilla reptans			2				I	(2_)
Cruciata laevipes						2	I	(2_)
Veronica chamaedrys						2	I	(2_)
Pulicaria dysenterica		2					I	(2_)
Cirsium palustre	2						I	(2_)
Pteridium aquilinum	2						I	(2_)
Veronica montana	2						I	(2_)
Prunella vulgaris					1		I	(1_)
Senecio erucifolius					1		I	(1_)
Rosa canina (seedling)					1		I	(1_)
Centaurium erythraea			1				I	(1_)
Angelica sylvestris		1					I	(1_)
Dryopteris filix-mas	1						I	(1_)
Senecio jacobaea	1						I	(1_)
Dactylorhiza fuchsii	1						I	(1_)

6.3.16 The following quadrat data was recorded for CG2c *Primula vulgaris* variant;

Species	Q14	Q15	Frequency	Abundance
Quadrat location - OS Grid TA	1275 7766	1276 7766		
Sward height (cm)				
Festuca rubra	6	7	V	(6-7)
Filipendula ulmaria	3	3	V	(3_)
Carex flacca	3	3	V	(3_)
Brachypodium sylvaticum	5	2	V	(2-5)
Succisa pratensis	3	2	V	(2-3)
Centaurea nigra	3	2	V	(2-3)
Dactylis glomerata	3	2	V	(2-3)
Lotus corniculatus	2	3	V	(2-3)
Achillea millefolium	2	2	V	(2_)
Stachys officinalis	2	2	V	(2_)
Lathyrus pratensis	2	2	V	(2_)

Species	Q14	Q15	Frequency	Abundance
Holcus lanatus	2	2	V	(2_)
Primula vulgaris	2	2	V	(2_)
Rubus fruticosus agg.	2	2	V	(2_)
Trifolium pratense	4	1	V	(1-4)
Dactylorhiza praetermissa	2	1	V	(1-2)
Angelica sylvestris	2	1	V	(1-2)
Equisetum arvense	1	1	V	(1_)
Calliergonella cuspidata		8	III	(8_)
Pseudoscleropodium purum	7		III	(7_)
Thuidium tamariscinum	4		III	(4_)
Kindbergia praelonga		4	III	(4_)
Pulicaria dysenterica		3	III	(3_)
Arrhenatherum elatius		3	III	(3_)
Cirsium palustre		3	III	(3_)
Sanguisorba minor		3	III	(3_)
Helictotrichon pratense	3		III	(3_)
Deschampsia cespitosa		2	III	(2_)
Ajuga reptans	2		III	(2_)
Tussilago farfara		2	III	(2_)
Briza media		2	III	(2_)
Viola sp.		2	III	(2_)
Festuca arundinacea	1		III	(1_)
Prunella vulgaris	1		III	(1_)
Heracleum sphondylium		1	III	(1_)
Plantago media		1	III	(1_)

6.4 Community: M10b *Carex dioica – Pinguicula vulgaris* mire; *Briza media – Primula farinosa* sub-community

6.4.1 There are a number of base-rich springs and seepages throughout the soft cliff resource which give rise to M10 flushes characterised by small sedges predominantly carnation sedge with a smaller contribution from glaucous sedge.

6.4.2 Grass of Parnassus is a community constant in this community, and the presence of this species along with other sub-community preferentials such as marsh arrowgrass, glaucous sedge and Yorkshire fog, suggest most affinity with M10b. Tawny sedge was also recorded. A good example exists at NVC Note 13.

6.4.3 These springs and flushes are of high conservation value and would benefit from frequent monitoring. Bryophytes form a hepatic mat in a number of locations with endive pellia and Kneiff's hook-moss; these would bear further study. Where chalk is present mountain liverwort was recorded along with good growth of olive beard-moss.

6.4.4 Where base-rich seepage occurs on the soft cliffs south of Filey M10b tends to occur in intimate mosaic with grassland turfs moving down slope due to erosion. Consequently these stands tend to be grassier (e.g. Quadrat 3).

6.4.5 The community appears to be in favourable conservation status at present.

6.4.6 The following species were recorded in M10b;

Species	Common name	DAFOR
Agrostis stolonifera	Creeping bent	A
Carex panicea	Carnation sedge	A
Parnassia palustris	Grass-of-Parnassus	A
Juncus conglomeratus	Compact rush	LA
Juncus inflexus	Hard rush	LA
Calliergonella cuspidata	Pointed spear-moss	LA
Carex flacca	Glaucous sedge	LA
Triglochin palustris	Marsh arrow-grass	LA
Bryophyta	Hepatic mat	vLA
Dactylorhiza praetermissa	Southern marsh orchid	F
Festuca rubra	Red fescue	F
Juncus articulatus	Jointed rush	F
Pellia endiviifolia	Endive pellia	F
Pulicaria dysenterica	Common fleabane	F
Tussilago farfara	Colt's foot	F
Drepanocladus aduncus	Kneiff's hook-moss	LF
Equisetum arvense	Field horsetail	LF
Marchantia polymorpha ssp montivagans	Mountain liverwort	vLF
Didymodon tophaceus	Olive beard-moss	vLF

Species	Common name	DAFOR
Angelica sylvestris	Wild angelica	O
Brachythecium rivulare	River feather-moss	O
Cirsium palustre	Marsh thistle	O
Holcus lanatus	Yorkshire fog	O
Homalothecium lutescens	Yellow feather-moss	O
Leontodon hispidus	Rough hawkbit	O
Lotus corniculatus	Bird's-foot trefoil	O
Trifolium pratense	Red clover	O
Achillea millefolium	Yarrow	R
Carex hostiana	Tawny sedge	R
Carex otrubae	False fox-sedge	R
Centaurea nigra	Black knapweed	R
Centaurium erythraea	Common centaury	R
Epilobium hirsutum	Great willowherb	R
Isolepis setacea	Bristle club-rush	R
Prunella vulgaris	Selfheal	R
Vicia cracca	Tufted vetch	R

6.4.7 The following quadrat data was recorded for M10b;

Species	Q1	Q2	Q3	Q4	Q5	Q6	Frequency	Abundance
Quadrat location – OS Grid TA	0851 8377	1210 8109	1193 7965	1412 7636	1386 7656	0908 8355		
Sward height (cm)	10	10	15	15	15	30		
Carex panicea	5	6	3	5	4		V	(3-6)
Agrostis stolonifera	4	4	6	3		3	V	(3-6)
Parnassia palustris	3	3	3	5	3		V	(3-5)
Pellia endiviifolia	4	4	3	3	3		V	(3-4)
Juncus articulatus	3	2	3	2	2		V	(2-3)
Carex flacca		3		3	3	8	IV	(3-8)
Festuca rubra	1			2	2	3	IV	(2-3)
Equisetum arvense			3	2	2	2	IV	(2-3)
Tussilago farfara	2		2		1	3	IV	(1-3)
Pulicaria dysenterica		2	3	1		2	IV	(1-3)
Calliergonella cuspidata	3		5	3			III	(3-5)
Didymodon tophaceus	3			4	3		II	(3-4)
Triglochin palustris			3			4	II	(3-4)
Drepanocladus aduncus		3	3				II	(3_)
Juncus inflexus	3	2					II	(2-3)
Trifolium pratense				2			II	(2_)
Holcus lanatus	1				1	3	II	(1-3)
Juncus conglomeratus			2		1		II	(1-2)
Cirsium palustre			2		1		II	(1-2)
Leontodon hispidus				2	1		II	(1-2)
Angelica sylvestris			1	1			II	(1_)
Brachythecium rivulare			3				I	(3_)

Homalothecium lutescens	2						I	(2_)
Isolepis setacea	2						I	(2_)
Epilobium hirsutum	2						I	(2_)
Achillea millefolium			1				I	(1_)
Carex otrubae				1			I	(1_)
Prunella vulgaris				1			I	(1_)
Centaurea nigra					1		I	(1_)
Dactylorhiza praetermissa						1	I	(1_)
Vicia cracca						1	I	(1_)
Lotus corniculatus						1	I	(1_)

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

6.5.1 Dominated by meadowsweet, this community is characterised by a number of associates including great willowherb, false oat-grass, marsh thistle and in some stands wild angelica and hemp agrimony. 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.

6.5.2 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.

6.5.3 M27 occurs on this coast where flushes are found on the more stable soft cliff in the north at Lebberston Cliff and Gristhorpe Cliff where extensive flushed areas occur. The community is also found at this location on the cliff top associated with drainage ditches and small seepage zones.

6.5.4 Otherwise M27b is confined to Butcher Haven where large stands occur both on the south facing slope and associated with the beck, and along the watercourse at Hunmanby Gap. At both of these locations the community is under threat of encroachment by bramble and potentially scrub, although at Butcher Haven the large flush appears wet enough to discourage establishment of hawthorn and blackthorn. The Butcher Haven stand is characterised by an abundance of great horsetail.

6.5.5 The following species were recorded in M27b;

Species	Common name	To Filey Brigg	Butcher Haven & Hunmanby Gap
Angelica sylvestris	Wild angelica		F
Arrhenatherum elatius	False oat grass	F	O
Brachythecium rivulare	River feather-moss	LF	A
Brachythecium rutabulum	Rough-stalked feather-moss	O	
Calliergonella cuspidata	Pointed spear-moss	A	LF
Chamerion angustifolium	Rosebay willowherb		O
Cirsium arvense	Creeping thistle	O/LF	O/LF
Cirsium palustre	Marsh thistle	F	F
Deschampsia cespitosa	Tufted hair grass	F	
Dryopteris filix-mas	Male fern	R	
Elytrigia repens	Common couch		O
Epilobium hirsutum	Great willowherb	F	A
Equisetum arvense	Field horsetail		R
Equisetum telmateia	Great horsetail		F/LD

Species	Common name	To Filey Brigg	Butcher Haven & Hunmanby Gap
Eupatorium cannabinum	Hemp agrimony		LF
Festuca rubra	Red fescue	F	O
Filipendula ulmaria	Meadowsweet	D	D
Galium aparine	Goosegrass	O	O
Geranium robertianum	Herb robert		R
Heracleum sphondylium	Hogweed	O	
Iris pseudacorus	Yellow iris		LF
Juncus inflexus	Hard rush	O	R
Kindbergia praelonga	Common feather-moss	LF	
Lathyrus pratensis	Meadow vetchling		R
Primula vulgaris	Primrose		O
Pulicaria dysenterica	Fleabane	LF	F
Rubus fruticosus	Bramble	LF	F
Rumex crispus	Curled dock		F
Silene dioica	Red campion		F
Tussilago farfara	Colt's-foot	F	F
Urtica dioica	Common nettle	LF	O/LF

6.5.6 The following quadrat data was recorded for M27b;

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid TA	1312 7719	1275 7766	1274 7766	0870 8364	0882 8357		
Sward height (cm)	90	110	120	90	110		
Filipendula ulmaria	7	10	6	10	9	V	(6-10)
Brachythecium rivulare	4	8	3		6	IV	(3-8)
Tussilago farfara	1	1	1	3		IV	(1-3)
Arrhenatherum elatius		1	2	2	2	IV	(1-2)
Cirsium palustre	1	2	1	1		IV	(1-2)
Cirsium arvense		1	1	1	1	IV	(1_)
Epilobium hirsutum	4		5		4	III	(4-5)
Angelica sylvestris	2	1	2			III	(1-2)
Equisetum telmateia		2	3			II	(2-3)
Urtica dioica	3		2			II	(2-3)
Eupatoria cannabinum		2	2			II	(2_)
Silene dioica	1		3			II	(1-3)
Chamerion angustifolium	2	1				II	(1-2)
Galium aparine		1	2			II	(1-2)
Pulicaria dysenterica	1	1				II	(1_)
Rubus fruticosus agg.		1			1	II	(1_)
Rumex crispus	1		1			II	(1_)
Kindbergia praelonga				8		I	(8_)
Calliergonella cuspidata	4					I	(4_)
Brachythecium rutabulum				2		I	(2_)
Elytrigia repens			2			I	(2_)
Primula vulgaris		2				I	(2_)

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Dryopteris filix-mas				1		I	(1_)
Equisetum arvense		1				I	(1_)
Geranium robertianum			1			I	(1_)
Heracleum sphondylium				1		I	(1_)
Lathyrus pratensis			1			I	(1_)

6.6 Community: MC4a *Brassica oleracea* maritime cliff-ledge community *Beta vulgaris ssp. maritima* sub-community

6.6.1 Characterised by an abundance of wild cabbage with red fescue (often pruinose) and ribwort plantain, with locally frequent occurrence of sea beet, the cliff ledge community encountered during the survey clearly has most affinity with MC4a. The community occupies a niche on the eroding edges and ledges of friable calcareous cliffs and is associated with cliff-ledge nesting birds. Due to erosion, the community was also encountered down to sea level on recently deposited material from cliff ledges, and also on low level rock outcrops.

6.6.2 As seems to be the case throughout the maritime NVC little sampling was undertaken on the east coast of Yorkshire, and consequently the community encountered has a number of species not recorded in the published text. Sea mayweed, sea plantain and common scurvy grass occur commonly, the latter species having a distribution largely outwith the area sampled for NVC lending a unique character to the assemblage of species encountered.

6.6.3 MC4a is of limited distribution in the survey area, occurring on the hard cliff at Gristhorpe Cliff and then along to the start of Newbiggin Cliff. The community was usually observed on ledges and immediately below hard cliff outcrops, however, it was occasionally recorded where rock outcrops at sea level (e.g. NVC Note 3).

6.6.4 For the majority of Newbiggin Cliff and the rest of the survey area south of that point the community is rare.

6.6.5 The following species were recorded in MC4a;

Species	Common name	DAFOR
Brassica oleracea	Wild cabbage	A
Tripleurospermum maritimum	Sea mayweed	A
Plantago maritima	Sea plantain	A
Festuca rubra	Red fescue	A
Cochlearia officinalis	Common scurvy grass	F
Plantago lanceolata	Ribwort plantain	F
Beta vulgaris ssp. maritima	Sea beet	LF
Festuca rubra ssp. juncea	Red fescue (pruinose)	O
Atriplex prostrata	Common orache	O

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

6.7.1 The succession encountered commonly on unstable soft cliff involves rotational slippage of clayey soils exposing bare ground, this is readily colonised by MG11 which, over time, develops into MC8f. Where erosion and slippage continues, MC8f can persist until the soils reach the sea, however, if the slope re-stabilises at this stage a closed sward develops with much Yorkshire fog develops. When this happens kidney vetch may be out-competed creating a sward with most affinity with MC8d.

6.7.2 Community constants are represented by red fescue (thrift was not encountered during the survey), and Yorkshire fog, creeping bent, ribwort plantain and cock's-foot are preferential.

6.7.3 Vegetation with these characteristics was not commonly encountered, however, a sizeable stand occurs north of Reighton Gap where soft cliff slippage has occurred, and then the slope appears to have stabilised for some time.

6.7.4 There is a certain amount of base-rich flushing in the vegetation community recorded, and this is reflected in the occurrence of grass-of-Parnassus, wild angelica and glaucous sedge.

6.7.5 The following species were recorded in MC8d;

Species	Common name	DAFOR
Carex flacca	Glaucous sedge	D
Festuca rubra	Red fescue	D
Agrostis stolonifera	Creeping bent	A
Holcus lanatus	Yorkshire fog	A
Trifolium pratense	Red clover	A
Calliergon cuspidata	Pointed spear-moss	LA
Centaurea nigra	Black knapweed	F
Dactylis glomerata	Cock's-foot	F
Equisetum arvense	Field horsetail	F
Leontodon hispidus	Rough hawkbit	F
Pulicaria dysenterica	Common fleabane	F
Tussilago farfara	Colt's-foot	F
Lotus corniculatus	Bird's foot trefoil	LF
Angelica sylvestris	Wild angelica	O
Anthoxanthum odoratum	Sweet vernal-grass	O
Centaurium erythraea	Common centaury	O
Dactylorhiza praetermissa	Southern marsh orchid	O
Hypericum pulchrum	Slender St John's-wort	O
Lathyrus pratensis	Meadow vetchling	O

Species	Common name	DAFOR
Linum catharticum	Fairy flax	O
Lophocolea bidentata	Bifid crestwort	O
Parnassia palustris	Grass-of-Parnassus	O
Plantago lanceolata	Ribwort plantain	O
Plantago maritima	Sea plantain	O
Brachypodium sylvaticum	False brome	R
Cirsium palustre	Marsh thistle	R
Prunella vulgaris	Selfheal	R
Senecio jacobaea	Common ragwort	R
Taraxacum officinale agg.	Dandelion	R

6.7.6 The following quadrat data was collected for MC8d;

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid TA	1377 7660	1378 7660	1374 7663	1374 7663	1375 7661		
Sward height (cm)	15	20	20	15	25		
Festuca rubra	5	4	4	8	5	V	(4-8)
Carex flacca	5	4	3	3	4	V	(3-5)
Trifolium pratense	3	3	5	2	3	V	(2-5)
Agrostis stolonifera	5	2	4	3	3	V	(2-5)
Leontodon hispidus	3	2	2	3	3	V	(2-3)
Pulicaria dysenterica	1	1	1	1	1	V	(1_)
Holcus lanatus	4	3	2		3	IV	(2-4)
Centaurea nigra	1		3	1	3	IV	(1-3)
Equisetum arvense	1	2	3	2		IV	(1-3)
Tussilago farfara	1	2	2	2		IV	(1-2)
Dactylis glomerata	1		2	1	2	IV	(1-2)
Calliergonella cuspidata	4	4			4	III	(4_)
Lotus corniculatus	3	7			3	III	(3-7)
Dactylorhiza praetermissa	2				2	II	(2_)
Parnassia palustris	2		1			II	(1-2)
Angelica sylvestris	1				2	II	(1-2)
Plantago lanceolata				1	2	II	(1-2)
Centaurium erythraea	1			1		II	(1_)
Lathyrus pratensis					3	I	(3_)
Lophocolea bidentata					3	I	(3_)
Plantago maritima	2					I	(2_)
Linum catharticum		2				I	(2_)
Hypericum pulchrum		2				I	(2_)
Anthoxanthum odoratum					2	I	(2_)
Brachypodium sylvaticum		1				I	(1_)
Senecio jacobaea			1			I	(1_)
Taraxacum officinale agg.				1		I	(1_)
Cirsium palustre				1		I	(1_)
Prunella vulgaris				1		I	(1_)

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

6.8.1 A maritime cliff community, MC8f is found on soft cliffs where slopes are partially stabilised and is the natural succession from MG11 colonisation grassland, consequently creeping bent can form a significant part of the graminoid element. Dominated by red fescue, the sub-community preferential kidney vetch was recorded, often in abundance, at this site. Colt's-foot and creeping bent are not dominant in this community, however, the latter can appear to have significant coverage in late summer. Southern marsh orchid was preferential in this community as were other soft cliff colonising species.

6.8.2 In common with the MC8 recorded by Milliken and Pendry (2002), no thrift was recorded during these surveys, suggesting that on further analysis this community may well be recognised as a distinct community of Yorkshire's east coast.

6.8.3 Bird's foot trefoil, black knapweed and ribwort plantain are less frequent, giving the community the air of MG5 in some cases, however, the abundance of kidney vetch gives the community an altogether different character. It is likely that some stands of MC8f have been derived from MG5 grassland as turfs move down-slope into situations more exposed to salt spray, the incremental movement allowing gaps for kidney vetch and sea plantain to colonise.

6.8.4 This community can form quite a dense sward of red fescue with little bare ground over time, and appears to stabilise even very steep soft slopes. Where flushing is apparent, there is a transition community featuring MC8f constants mingling with grass-of-Parnassus and common sedge.

6.8.5 Bryophytes do not usually form a large component of this community, however, it was noted that on east-facing slopes there was a tendency for a species-poor variant of MC8f to form accompanied by a bed of neat feather-moss and common feather-moss. Where there is evidence of base-rich substrate comb moss and yellow feather-moss were also recorded.

6.8.6 Wild carrot is locally frequent in this community, and affinities with MC11 were considered. However, the description of MC11 in Rodwell (2000) appears limited to communities in the south-west of England and Wales featuring *Daucus carota ssp gummifer* which was not recorded during this survey.

6.8.7 The community usually forms as a sere in succession following erosion of soft cliff, however, it was also encountered below hard cliffs forming large stands at the base of the cliff. In these situations the community was not influenced by species arriving on

turfs from higher up the slope, and it appears the steep slope supports a stable, self-sustaining community between cliff base and beach. Substantial stands on stabilised talus occur at NVC Note 1.

6.8.8 Due to its open character this community forms a niche for 'soft cliff species', ie those species capable of sustainably colonising bare ground as it forms on the soft cliff slope. Soft cliff species are not dependent on input from vegetation communities at the top of the cliff, and consequently are less under threat from simplification of vegetation communities adjacent to the cliff due to agricultural intensification.

6.8.9 On soft cliff between Filey Brigg and the town, species richness of the community is enhanced as calcareous grassland forms the precursor community and species common in calcareous grassland such as quaking grass, common centaury and carline thistle are present throughout.

6.8.10 The following species were recorded in MC8f;

Species	**Common name**	**DAFOR**
Agrostis stolonifera	Creeping bent	A
Anthyllis vulneraria	Kidney vetch	A
Festuca rubra	Red fescue	A
Leontodon hispidus	Rough hawkbit	F
Lotus corniculatus	Bird's foot trefoil	F
Plantago lanceolata	Ribwort plantain	F
Carlina vulgaris	Carline thistle	LF
Brachypodium sylvaticum	False brome	LF
Carex flacca	Glaucous sedge	LF
Centaurium erythraea	Common centaury	LF
Daucus carota	Wild carrot	LF
Equisetum arvense	Field horsetail	LF
Holcus lanatus	Yorkshire fog	LF
Ononis spinosa	Spiny restharrow	LF
Pulicaria dysenterica	Common fleabane	LF
Tussilago farfara	Colt's foot	LF
Veronica chamaedrys	Germander speedwell	LF
Sonchus asper	Prickly sow-thistle	LF/O
Parnassia palustris	Grass-of-Parnassus	vLF
Pilosella officinarum	Mouse-ear hawkweed	vLF
Calliergon cuspidata	Pointed spear-moss	O
Centaurea nigra	Black knapweed	O
Cirsium vulgare	Spear thistle	O
Dactylorhiza praetermissa	Southern marsh orchid	O
Festuca rubra ssp. juncea	Red fescue (pruinose)	O
Heracleum sphondylium	Hogweed	O
Lathyrus pratensis	Meadow vetchling	O
Linum catharticum	Fairy flax	O
Rhinanthus minor	Hay rattle	O

Species	Common name	DAFOR
Rhytidiadelphus triquetrus	Big shaggy-moss	O
Taraxacum agg.	Dandelion	O
Trifolium pratense	Red clover	O
Plantago maritima	Sea plantain	O
Plantago media	Hoary plantain	O
Arrhenatherum elatius	False oat-grass	R
Bellis perennis	Daisy	R
Brachythecium rutabulum	Rough-stalked feather-moss	R
Briza media	Quaking grass	R
Cerastium fontanum	Common mouse-ear	R
Cirriphyllum piliferum	Hair pointed feather-moss	R
Cirsium palustre	Marsh thistle	R
Ctenidium molluscum	Comb moss	R
Dactylis glomerata	Cock's-foot	R
Dactylorhiza fuchsii	Common spotted orchid	R
Galium verum	Lady's bedstraw	R
Homalothecium lutescens	Yellow feather-moss	R
Hypericum pulchrum	Slender St John's-wort	R
Leontodon autumnalis	Autumn hawkbit	R
Lophocolea bidentata	Bifid crestwort	R
Medicago lupulina	Black medick	R
Pellia endiviifolia	Endive pellia	R
Pseudoscleropodium purum	Neath feather-moss	R
Rubus fruticosus agg.	Bramble	R
Senecio erucifolius	Hoary ragwort	R
Senecio jacobaea	Common ragwort	R
Tragopogon pratensis agg.	Goat's beard	R
Tripleurospermum maritimum	Sea mayweed	R
Urtica dioica	Common nettle	R
Vicia cracca	Tufted vetch	R

6.8.11 The following quadrat data was recorded for MC8f;

Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Freq-uency	Abun-dance
Quadrat location - OS Grid TA	0860 8374	0869 8370	0918 8351	0980 8320	1131 8233	1240 8157	1194 7970	1211 7898	1292 7747	1347 7688		
Sward height (cm)	20	20	15	20	25	20	25	15	20	20		
Festuca rubra	5	5	4	7	6	6	6	5	5	8	V	(4-8)
Agrostis stolonifera	4	7	6	4		6	3	3	3	3	V	(3-7)
Leontodon hispidus	3	3	3		3	3	3	3	3	3	V	(3_)
Anthyllis vulneraria	5	2	4	5	4	2	4	2	4	2	V	(2-5)
Trifolium pratense	2	2			3	2	2		4	2	IV	(2-4)
Centaurea nigra	1		2		3	2	2	2	1		IV	(1-3)
Lotus corniculatus	3	3			2		2	4			III	(2-4)
Holcus lanatus	3	2			4				1	1	III	(1-4)
Tussilago farfara	3	3		3	1				3	2	III	(1-3)
Dactylis glomerata	3		2	2				2	1		III	(1-3)
Plantago lanceolata		2		2	3	1			3	3	III	(1-3)
Pilosella officinarum			3				2	2			II	(2-3)
Equisetum arvense		2	2				2			2	II	(2_)
Linum catharticum			2			3		1			II	(1-3)
Heracleum sphondylium			1	1	2						II	(1-2)
Dactylorhiza praetermissa			1						1	2	II	(1-2)
Pseudoscleropodium purum					4						I	(4_)
Carex flacca						4	3				I	(3-4)
Brachypodium sylvaticum							3	4			I	(3-4)
Ctenidium molluscum			3								I	(3_)
Lophocolea bidentata					3				3		I	(3_)
Cirriphyllum piliferum					3						I	(3_)
Briza media						3					I	(3_)
Bellis perennis									3		I	(3_)
Pellia endiviifolia									3		I	(3_)
Parnassia palustris										3	I	(3_)
Calliergonella cuspidata		2			4						I	(2-4)
Brachythecium rutabulum					2				3		I	(2-3)
Lathyrus pratensis		2								2	I	(2_)
Carlina vulgaris			2				2				I	(2_)
Homalothecium lutescens			2								I	(2_)
Tripleurospermum maritimum				2							I	(2_)
Arrhenatherum elatius									2		I	(2_)
Cerastium fontanum					2						I	(2_)
Senecio jacobaea									2		I	(2_)
Festuca rubra ssp. juncea										2	I	(2_)
Rhinanthus minor					2			1			I	(1-2)
Plantago media					1			2			I	(1-2)
Daucus carota						1	2				I	(1-2)
Centaurium erythraea								2		1	I	(1-2)
Plantago maritima	1										I	(1_)
Rubus fruticosus agg.			1								I	(1_)
Urtica dioica				1							I	(1_)

Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Freq-uency	Abun-dance
Cirsium palustre					1					1	I	(1_)
Senecio erucifolius						1	1				I	(1_)
Hypericum pulchrum								1			I	(1_)
Dactylorhiza fuchsii								1			I	(1_)
Pulicaria dysenterica									1	1	I	(1_)
Leontodon autumnalis										1	I	(1_)

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

6.9.1 A maritime cliff community of more sheltered location, MC9 is found on soft cliffs generally on deeper soils and shallower slopes than MC8. Red fescue and Yorkshire fog are sometimes co-dominant with forbs reflecting the deeper, more water retentive soils such as black knapweed, hogweed and ribwort plantain.

6.9.2 Sea plantain is frequent in this community, particularly in more maritime stands which have thus been classified as MC9a. A number of stands are species poor or have a preponderance of ruderal species due to ongoing erosion activity. In these cases it has not been possible to assign a sub-community with any certainty, however, for the purposes of this study these stands are grouped with MC9a sub-community.

6.9.3 Occasionally elements indicating base enrichment were recorded, with hoary plantain and rough hawkbit preferential in some stands of MC9a.

6.9.4 Where incremental erosion is active, ruderal species (common fleabane and field horsetail) take hold in the gaps between turfs, and can mask this community at a distance.

6.9.5 This community is distributed on the soft cliffs throughout the study area, often forming small stands on spurs exposed to maritime influence.

6.9.6 At Gristhorpe Cliff the soft cliffs have stabilised in the north allowing MC9 to mature, and a number of species are present here which do not occur in MC9 elsewhere (see DAFOR table below). This sward has a marked affinity with MC9c, however, on balance the similarities with MC9 encountered elsewhere suggest inclusion in this description.

6.9.7 Where hard cliffs occur, north of Filey Brigg, MC9a forms a narrow band along the seashore and at the base of the cliff. Larger stands form sporadically where slopes are stabilised and there is a lack of eutrophication from above. Unfortunately these more extensive areas are rare, and the more usual case is a wide band of MG1 and OV25 between the cliff base and MC9a forming a narrow band along the shore. In this case MC9a tends to be species poor, with ribwort plantain preferential. In this situation there is some influence from cliff ledge communities above with sea mayweed, sea beet and common scurvy grass appearing.

6.9.8 MC9a reaches its greatest extent on Filey Brigg (NVC Note 4), where unimproved MC9a grassland persists, though eutrophication is evident. The sward is rank and being invaded by creeping thistle and prickly sowthistle. Despite this, sea plantain

remains frequent throughout although the sward tends to be species-poor. Limited areas of pruinose red fescue occur.

6.9.9 On more exposed areas of Filey Brigg, MC9a in good condition occurs and common centaury appears.

6.9.10 South of Filey Brigg occurrence of MC9a is extremely limited, confined to small promontories and exposed lenses where maritime influence is enhanced. The mobile nature of soft cliff coupled with lack of maritime influence in these areas does not promote development of MC9a.

6.9.11 The following species were recorded in MC9a;

Species	**Common name**	**DAFOR**	Notes
Festuca rubra	Red fescue	D	
Agrostis stolonifera	Creeping bent	F	
Carex flacca	Glaucous sedge	F	
Dactylorhiza praetermissa	Southern march orchid	F	
Heracleum sphondylium	Hogweed	F	
Holcus lanatus	Yorkshire fog	F	
Lotus corniculatus	Bird's foot trefoil	F	
Plantago maritima	Sea plantain	F	
Calliergonella cuspidata	Pointed spear-moss	LF	
Leontodon hispidus	Rough hawkbit	LF	
Plantago lanceolata	Ribwort plantain	LF	
Pseudoscleropodium purum	Neat feather-moss	LF	
Trifolium pratense	Red clover	LF	
Tussilago farfara	Colt's foot	LF	
Arrhenatherum elatius	False oat-grass	O	
Centaurea nigra	Black knapweed	O	
Cerastium fontanum	Common mouse-ear	O	
Dactylis glomerata	Cock's foot	O	
Field horsetail	Field horsetail	O	
Galium verum	Lady's bedstraw	O	
Kindbergia praelonga	Common feather-moss	O	
Lathyrus pratensis	Meadow vetchling	O	
Parnassus palustris	Grass-of-Parnassus	O	
Plantago media	Hoary plantain	O	
Potentilla reptans	Creeping cinquefoil	O	
Vicia cracca	Tufted vetch	O	
Achillea millefolium	Yarrow	R	
Anthyllis vulneraria	Kidney vetch	R	
Beta vulgaris subsp. maritima	Sea beet	R	Input from hard cliff above
Brachypodium sylvaticum	False brome	R	Gristhorpe Cliff only
Brachythecium rivulare	River feather-moss	R	
Briza media	Quaking grass	R	Gristhorpe Cliff only
Carex panicea	Carnation sedge	R	Gristhorpe Cliff only

Species	**Common name**	**DAFOR**	Notes
Centaurium erythraea	Common centaury	R	Filey Brigg only
Cirsium palustre	Marsh thistle	R	Gristhorpe Cliff only
Cirsium vulgare	Spear thistle	R	Gristhorpe Cliff only
Cochlearia officinalis	Common scurvy grass	R	Input from hard cliff above
Ctenidium molluscum	Comb moss	R	Gristhorpe Cliff only
Dactylorhiza fuchsii	Common spotted orchid	R	
Equisetum arvense	Field horsetail	R	
Festuca arundinacea	Tall fescue	R	
Festuca rubra ssp. juncea	Red fescue (pruinose)	R	
Filipendula ulmaria	Meadowsweet	R	
Glaux maritima	Sea milk-wort	R	
Linum catharticum	Fairy flax	R	
Lolium perenne	Perennial rye-grass	R	
Medicago lupulina	Black medick	R	Gristhorpe Cliff only
Ononis spinosa	Spiny restharrow	R	
Pilosella officinarum	Mouse-ear hawkweed	R	
Plantago coronopus	Buck's-horn plantain	R	
Potentilla erecta	Tormentil	R	Gristhorpe Cliff only
Prunella vulgaris	Selfheal	R	
Pulicaria dysenterica	Common fleabane	R	
Rhinanthus minor	Hay rattle	R	
Rhytidiadelphus triquetrus	Big shaggy-moss	R	Gristhorpe Cliff only
Rubus fruticosus agg.	Bramble	R	Gristhorpe Cliff only
Senecio erucifolius	Hoary ragwort	R	
Sonchus asper	Prickly sow-thistle	R	
Succisa pratensis	Devil's-bit scabious	R	Gristhorpe Cliff only
Taraxacum agg.	Dandelion	R	
Tripleurospermum maritimum	Sea mayweed	R	Input from hard cliff above
Trisetum flavescens	Yellow oat grass	R	Gristhorpe Cliff only
Viola sp.	Violet	R	

6.9.12 The following quadrat data was recorded for MC9a;

Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Frequency	Abundance
Quadrat location - OS Grid TA	0860 8373	0884 8364	1047 8265	1092 8253	1182 8216	1230 8184	1262 8172	1276 7769		
Sward height (cm)	25	20	20	20	25	15	20	15		
Festuca rubra	6	9	8	9	9	8	8	3	V	(3-9)
Plantago maritima	2	3		2	2	5	4	9	V	(2-9)
Agrostis stolonifera			1	2	2		2	2	IV	(1-2)
Plantago lanceolata	3		3			3			III	(3_)
Tussilago farfara	1	2			2			2	III	(1-2)
Heracleum sphondylium	1		1	1	1				III	(1_)
Pseudoscleropodium purum	4	4							II	(4_)
Centaurea nigra	5	2						2	II	(2-5)
Plantago media	4	2	3						II	(2-4)
Leontodon hispidus	2	2				4			II	(2-4)
Arrhenatherum elatius	3		2	2					II	(2-3)
Holcus lanatus	2	3							II	(2-3)
Lotus corniculatus	3	2							II	(2-3)
Tripleurospermum maritimum				2	2				II	(2_)
Cochlearia officinalis					2		2		II	(2_)
Cerastium fontanum	1		2						II	(1-2)
Dactylis glomerata			2			1		1	II	(1-2)
Galium verum	3								I	(3_)
Calliergonella cuspidata		5							I	(5_)
Lathyrus pratensis	3								I	(3_)
Plantago coronopus						3			I	(3_)
Festuca rubra ssp. juncea							3		I	(3_)
Glaux maritima							3		I	(3_)
Ononis spinosa								3	I	(3_)
Prunella vulgaris		2							I	(2_)
Pulicaria dysenterica		2							I	(2_)
Dactylorhiza fuchsii			2						I	(2_)
Beta vulgaris subsp. maritima			2						I	(2_)
Achillea millefolium						2			I	(2_)
Lolium perenne						2			I	(2_)
Festuca arundinacea								2	I	(2_)
Viola sp.	1								I	(1_)
Filipendula ulmaria		1							I	(1_)
Equisetum arvense		1							I	(1_)
Dactylorhiza praetermissa		1							I	(1_)
Senecio erucifolius			1						I	(1_)
Sonchus asper				1					I	(1_)

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

6.10.1 More usually a community associated with exposed west coast of Britain, a phytosociological grouping having most affinity with MC10b has found a locus on the exposed cliff tops of Filey Brigg. The community is characterised by a closed, tight sward dominated by red fescue (with significant amounts of pruinose sub-species). Interleaved with red fescue is an abundance of sea plantain and stag's horn plantain with stolons of creeping bent sporadically through the sward.

6.10.2 Locally small sedge species including carnation sedge and glaucous sedge are frequent, suggesting most affinity with the *Carex panicea* sub-community. Species indicating occurrence on base-rich substrates such as common centaury, rough hawkbit, and frizzled crisp-moss occur sporadically throughout.

6.10.3 In the absence of grazing, short turf is maintained on Filey Brigg through trampling and extreme maritime exposure of situations supporting this vegetation.

6.10.4 MC10b also occurs in an even more restricted niche on previously developed land at Reighton Gap. A tight turf dominated by red fescue with stag's-horn plantain, ribwort plantain, bird's-foot trefoil and creeping bent suggest affinity with MC10, however, the associated plant species indicate a strongly calcareous substrate with mouse-ear hawkweed, rough hawkbit, common centaury, carline thistle and fairy flax. This combination of species suggests CG1, however, a north-eastern locus for this vegetation community is not countenanced in the published NVC text, and the community present is probably best described with reference to MC10b.

6.10.5 Due to the differing nature of the two areas of MC10b encountered, these have been sampled separately as MC10b – Filey and MC10b – Reighton.

6.10.6 The following species were encountered in MC10b;

		DAFOR	
Species	**Common name**	**Filey Brigg**	**Reighton Gap**
Achillea millefolium	Yarrow		O
Agrostis stolonifera	Creeping bent	O	F
Anagallis arvensis	Scarlet pimpernel		R
Anthyllis vulneraria	Kidney vetch		O
Bellis perennis	Daisy		O
Brachypodium sylvaticum	False brome		R
Calliergonella cuspidata	Pointed spear-moss	R	
Carex flacca	Glaucous sedge	F	O
Carex panicea	Carnation sedge	F	
Carlina vulgaris	Carline thistle	R	O

		DAFOR	
Species	**Common name**	**Filey Brigg**	**Reighton Gap**
Centaurea nigra	Black knapweed	R	O
Centaurium erythraea	Common centaury	LF	O
Cerastium fontanum	Common mouse-ear		O
Dactylis glomerata	Cock's-foot	R	
Daucus carota	Wild carrot	O	LF
Euphrasia nemorosa	Common eyebright		LF
Festuca rubra	Red fescue	F	A
Festuca rubra ssp juncea	Red fescue (pruinose)	vLF	O
Glaux maritima	Sea milkwort		O
Holcus lanatus	Yorkshire fog	F	
Leontodon hispidus	Rough hawkbit	O	LF
Linum catharticum	Fairy flax		LF
Lotus corniculatus	Bird's foot trefoil	F	F
Medicago lupulina	Black medick	R	
Ononis spinosa	Spiny restharrow	R	
Pilosella officinarum	Mouse-ear hawkweed		A
Plantago coronopus	Buck's horn plantain	F	F
Plantago lanceolata	Ribwort plantain	LF	A
Plantago maritima	Sea plantain	A	F
Prunella vulgaris	Selfheal		R
Pulicaria dysenterica	Common fleabane		O
Senecio erucifolius	Hoary ragwort	R	
Senecio jacobaea	Common ragwort		O
Taraxacum officinale agg.	Dandelion		O
Tortella tortuosa	Frizzled crisp-moss	F	F
Trifolium dubium	Lesser trefoil		O
Trifolium pratense	Red clover	O	
Vicia cracca	Tufted vetch		LF

6.10.7 The following species were recorded in quadrat survey of MC10b at Filey Brigg;

Species	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Frequency**	**Abundance**
Quadrat location - OS Grid TA	1240 8183	1253 8174	1253 8172	1282 8162	1302 8151		
Sward height (cm)	10	7	10	10	15		
Festuca rubra	5	5	5	8	7	V	(5-8)
Plantago maritima	4	5	6	4	2	V	(2-6)
Agrostis stolonifera	2	4		3	4	IV	(2-4)
Lotus corniculatus	2	2	2		2	IV	(2_)
Tortella tortuosa	3	3	3			III	(3_)
Plantago coronopus		3	3	3		III	(3_)
Centaurium erythraea			1	1	3	III	(1-3)
Daucus carota				1	3	II	(1-3)
Plantago lanceolata		1			2	II	(1-2)
Trifolium pratense		1	1			II	(1_)
Leontodon hispidus		4				I	(4_)
Festuca rubra ssp juncea			4			I	(4_)
Carex panicea	3					I	(3_)
Carlina vulgaris					3	I	(3_)
Carex flacca	2					I	(2_)
Calliergonella cuspidata		2				I	(2_)
Medicago lupulina	1					I	(1_)

6.10.8 The following species were recorded in quadrat survey of MC10b at Reighton Gap;

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid TA	1402 7640	1402 7639	1403 7638	1406 7637	1408 7637		
Sward height (cm)	7	5	8	5	5		
Festuca rubra	6	3	5	3	3	V	(3-6)
Agrostis stolonifera	3	4	3	3	4	V	(3-4)
Lotus corniculatus	3	3	3	3	3	V	(3_)
Plantago coronopus	1	1	3	3	3	V	(1-3)
Plantago lanceolata	3	3	3	4		IV	(3-4)
Pilosella officinarum	4	2	2	2		IV	(2-4)
Leontodon hispidus		3	2	2	3	IV	(2-3)
Bellis perennis		1	1	2	2	IV	(1-2)
Vicia cracca	4	5	3			III	(3-5)
Carlina vulgaris	2	2		1		III	(2-1)
Centaurea nigra	2	2	2			III	(2_)
Centaurium erythraea	2	1	2			III	(1-2)
Taraxacum agg.		2		1	1	III	(1-2)
Senecio jacobaea			1	1	1	III	(1_)
Linum catharticum	3	3	3			II	(3_)
Achillea millefolium	2	1				II	(2-1)
Euphrasia nemorosa		1	3			II	(1-3)
Pulicaria dysenterica		1			2	II	(1-2)
Trifolium dubium		1		2		II	(1-2)
Anthyllis vulneraria			1	2		II	(1-2)
Cerastium fontanum	1		1			II	(1_)
Brachypodium sylvaticum	3					I	(3_)
Carex flacca					2	I	(2_)
Prunella vulgaris		1				I	(1_)
Anagallis arvensis		1				I	(1_)

6.11 Community: MG1b *Arrhenatherum elatius* grassland; *Urtica dioica* sub-community

6.11.1 This community is dominated by coarse grasses including false oat-grass and cock's foot, however, tall fescue and red fescue are both locally prominent. There is much evidence of eutrophication throughout, probably as a result of fertiliser drift from adjacent farmland (or via nutrient rich run-off), and the community is characterised by an abundance of common nettle and locally abundant rosebay willowherb, great willowherb and creeping thistle. This combination of species is consistent with the description for MG1b in Rodwell 1992.

6.11.2 Stands of MG1 at this site are unmanaged, with neither grazing nor cutting, and a tussocky sward usually develops.

6.11.3 The community develops throughout the site on the fertile, moisture retentive clay soils, predominantly on the cliff top where maritime influence is minimal. MG1b is also prevalent in sheltered locations throughout the site where spray deposition is limited on the soft cliff slope.

6.11.4 Dominating vegetation on the top of hard cliffs from Gristhorpe to Filey Brigg, the community also finds a locus at the bottom of these cliffs where there is sufficient distance between the foot of the cliff and seashore.

6.11.5 Where habitation is nearby, MG1b often receives garden waste, and in some areas these can become locally prominent, in particular garden ox-eye daisy, and Montbretia, for example at NVC Note 14 and the whole vegetated shoreline along Flat Cliff at Hunmanby Sands.

6.11.6 There are large areas where scrub dominates, however, open areas support MG1, tall ruderal vegetation and bramble. Sheltered inlets such as Butcher Haven, Hunmanby Gap, and Reighton Gap support this vegetation. It is likely that these areas were previously grazed pasture, but with the cessation of grazing species rich grassland has been replaced with the scrub mosaic described above.

6.11.7 Bryophytes are represented by common feather-moss, rough-stalked feather-moss and bifid crestwort. These species are common and widespread in MG1b, and indicate humid conditions at ground level.

6.11.8 This community appears to be the precursor to communities recorded on soft cliff slopes throughout much of the site. When stands are exposed to increased maritime influence through erosion, false oat-grass competes poorly, and appears to be replaced by red fescue and black knapweed where stands are exposed and dry,

whereas in wetter areas where water from groundwater springs accumulate, tall fescue replaces false-oat grass as dominant forming large tussocks. Good colonisers which are adapted to regenerating readily on bare ground in soft cliff communities ('soft cliff species') exploit gaps created by the reduced vigour and ultimate loss of false oat-grass

6.11.9 Nutrient enrichment appears to mask underlying soil chemistry and species characteristic of calcareous grassland are readily outcompeted. On soft cliffs vegetation present is to a certain extent dependent on turfs slipping down as erosion takes place. Where the precursor vegetation is MG1b, species diversity tends to be compromised.

6.11.10 In several areas a broad strip of unmanaged grassland has been created at the cliff top which are now dominated by MG1, for example at North Cliff north of Filey.

6.11.11 The following species were recorded in MG1b grassland;

Species	**Common name**	**DAFOR**
Arrhenatherum elatius	False oat grass	D
Heracleum sphondylium	Common hogweed	A
Urtica dioica	Common nettle	LA
Cirsium arvense	Creeping thistle	LA
Chamerion angustifolium	Rosebay willowherb	LA
Pulicaria dysenterica	Fleabane	vLA
Dactylis glomerata	Cock's foot	F
Holcus lanatus	Yorkshire fog	F
Sonchus asper	Prickly sow-thistle	LF
Senecio jacobaea	Common ragwort	LF
Deschampsia cespitosa	Tufted hair-grass	LF
Equisetum arvense	Field horsetail	LF
Tussilago farfara	Colt's foot	LF
Festuca arundinacea	Tall fescue	LF
Lolium perenne	Perennial ryegrass	LF
Trifolium repens	White clover	LF
Agrostis stolonifera	Creeping bent	LF
Cirsium palustre	Marsh thistle	vLF
Elytrigia repens	Couch grass	vLF
Rubus fruticosus agg.	Bramble	O
Lathyrus pratensis	Meadow vetchling	O
Vicia cracca	Tufted vetch	O
Galium aparine	Goose grass	O
Anthriscus sylvestris	Cow parsley	O
Centaurea nigra	Black knapweed	O
Plantago lanceolata	Ribwort plantain	O
Agrostis capillaris	Common bent	O
Trifolium pratense	Red clover	O
Rumex obtusifolius	Broad-leaved dock	O

Species	Common name	DAFOR
Potentilla reptans	Creeping cinquefoil	R
Achillea millefolium	Yarrow	R
Dryopteris filix-mas	Male fern	R
Brachypodium sylvaticum	False brome	R
Athyrium filix-femina	Lady fern	R
Phleum pratense	Timothy	R
Tragopogon pratensis	Goat's beard	R
Galium verum	Lady's bedstraw	R
Torilis japonica	Upright hedge parsley	R
Geranium robertianum	Herb robert	R
Angelica sylvestris	Wild anglica	R
Solanum dulcamara	Bittersweet	R
Galeopsis tetrahit	Common hemp nettle	R
Stellaria graminea	Lesser stitchwort	R
Silene dioica	Red campion	R
Dryopteris dilatata	Broad buckler fern	R
Cynosurus cristatus	Crested dogs tail	R

6.12 Community: MG5b *Cynosurus cristatus – Centaurea nigra* grassland *Galium verum* sub community

6.12.1 This community is distributed throughout the site on both the cliff top (in limited areas) and developing on the soft cliff, in particular where soils have stabilised for some time and are well-drained. A degree of exposure to salt spray appears to be tolerated, and the community has a widespread distribution on clayey soils.

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

6.12.3 Whilst dominated by red fescue and Yorkshire fog, false oat-grass is also present, although usually represented by poorly grown individuals. Characteristically in these mesotrophic grasslands of soft cliffs in Yorkshire, false brome is often a prominent component of the sward. Creeping bent is preferential in small quantities throughout, which reflects the mobile nature of much of the substrate on which this community occurs, creeping bent colonising cracks and crevices. Common ragwort also takes advantage of the opportunities for colonisation caused by creeping erosion, along with colt's foot and common fleabane.

6.12.4 Forbs are represented by consistent appearance of ribwort plantain, black knapweed, tufted vetch and meadow vetchling. The influence of base-rich sub-soils is often apparent, with the appearance of hoary plantain, lady's bedstraw and big shaggy moss. Yellow oat-grass, creeping bent, yarrow, glaucous sedge are also preferential suggesting strong affinity with MG5b *Galium verum* sub-community.

6.12.5 Where the substrate is wetter, at the base of slumps, where groundwater issues and in association with small flushes, the community is occasionally enriched by meadowsweet, southern marsh orchid and grass-of-Parnassus.

6.12.6 Ruderal species common on soft cliffs at this site include common fleabane, field horse-tail and colt's foot. These are prominent where disturbance due to erosion is marked. These opportunities for colonisation may well form a focus for invasive non-native species in the future.

6.12.7 Where habitation is nearby MG5b is threatened by invasive, non-native species. Similarly at Reighton Gap where MG5 has been recorded on an area which was formerly garden (NVC Note 16) robust species are thriving such as yellow loosestrife, Michaelmas daisy, cultivated ox-eye daisy and Montbretia.

6.12.8 Bryophytes are not prominent in this community, however, springy turf-moss and neat turf-moss both occur where conditions allow. Where soils are damp, pointed spear-moss can form a loose carpet.

6.12.9 Due to extensive eutrophication and the narrow ecotone created by hard cliff habitat, MG5b is sparsely distributed along Gristhorpe Cliff to The Wyke, however, where it occurs it is often species-rich. Stabilised soft clay slopes in north west part of Gristhorpe Cliff do support reasonably large patches of MG5b, with pruinose red fescue in evidence and drifts of big shaggy moss.

6.12.10 From The Wyke to Filey Brigg the community occurs in small pockets on the relatively stable slopes above the hard cliff.

6.12.11 Filey Brigg supports a large area of MG5b grassland on the sheltered, south half of the peninsula; spiny restharrow and wild carrot are prominent in this community which appears to have the character of genuine unimproved grassland.

6.12.12 Species-rich MG5b swards occur in mosaic with MC8f and MG11 on the stabilised slopes above Filey Sands, although there appears to be a decreased importance of plantains with very little (if any) buck's-horn and sea plantain, and less ribwort plantain. It is likely that maritime influence is low on these slopes.

6.12.13 South of Filey soft cliffs support large areas of MG5b, although some swards are relatively species-poor with wild carrot showing reduced frequency. Between Butcher Haven and Reighton Gap a marked increase in the frequency of pruinose red fescue was noted.

6.12.14 Extensive examples of species poor MG5 were recorded on former arable land also occur (for example at NVC Note 2 and at Cunstone Nab).

6.12.15 Good, species-rich MG5b sward is present in a number of places including a small stand at Hunmanby Gap and Butcher Haven. Spiny restharrow occurs at the latter. These fragmentary stands on stable soils are extremely vulnerable to natural succession with encroachment by tall ruderal vegetation and scrub imminent.

6.12.16 To a large extent, the persistence of species-rich MG5b on the soft cliff resource south of Filey is dependent on maintenance of species-rich MG5 grassland at the top of the eroding slope. Unfortunately this is being whittled away, for instance at NVC note 23 where MG5b turfs were observed having recently fallen from the top to join the eroding turfs progress to the sea. Unfortunately, as MG5 turfs are lost, it is clear that the next turfs to fall will be MG1.

6.12.17 Management of cliff top grasslands to reduce dominance of coarse grasses and promote a species-rich sward are recommended. This includes creation of wide buffer strips (to reduce eutrophication) and grazing. Re-seeding with locally sourced wildflower seed or strewing of green hay from local species rich grasslands should also be considered; however, reduction in soil fertility would be key to success.

6.12.18 The following species were recorded in MG5b grassland;

		DAFOR		
Species	**Common name**	**To Filey Brigg**	**Filey Brigg**	**Post Filey Brigg**
Achillea millefolium	Yarrow	O / LF	O	LF
Agrimonia eupatoria	Agrimony			R
Agrostis capillaris	Common bent	O / LF	R	O / LF
Agrostis stolonifera	Creeping bent	LF		LF
Angelica sylvestris	Wild anglica			R
Anthoxanthum odoratum	Sweet vernal grass	O		O
Arrhenatherum elatius	False oat grass	LF		O
Brachypodium sylvaticum	False brome			LF
Brachythecium rutabulum	Rough-stalked feather-moss			LF
Calliergonella cuspidata	Pointed spear-moss	F		LF
Carex flacca	Glaucous sedge	R	R	F
Carlina vulgaris	Carline thistle			LF
Centaurea nigra	Black knapweed	F	F	A
Cerastium fontanum	Common mouse-ear	O		O
Cirsium arvense	Creeping thistle	O	R	R
Cirsium palustre	Marsh thistle	LF		LF
Cirsium vulgare	Spear thistle	O		R
Dactylis glomerata	Cock's foot	F	O	F
Dactylorhiza fuchsii	Common spotted orchid		R	O
Dactylorhiza praetermissa	Southern marsh orchid	O		R
Daucus carota	Wild carrot	LF	F	O
Equisetum arvense	Field horsetail	LF	R	LF
Euphrasia nemorosa	Eyebright	O		R
Festuca arundinacea	Tall fescue	O	R	LF
Festuca rubra	Red fescue	D	D	D
Festuca rubra ssp juncea	Red fescue (pruinose)	vLF		O
Filipendula ulmaria	Meadowsweet	LF		vLF
Galium verum	Lady's bedstraw	LF	O	LF
Heracleum sphondylium	Common hogweed	F	R	O
Holcus lanatus	Yorkshire fog	F	F	F
Hypericum pulchrum	Slender St. John's wort			R
Hypnum lacunosum	Great plait-moss	O		
Hypochaeris radicata	Cat's-ear		O	R
Kindbergia praelonga	Common feather-moss			O
Knautia arvensis	Field scabious	R		R
Lathyrus pratensis	Meadow vetchling	F	R	LF
Leontodon autumnalis	Autumn hawkbit	O		

		DAFOR		
Species	**Common name**	**To Filey Brigg**	**Filey Brigg**	**Post Filey Brigg**
Leontodon hispidus	Rough hawkbit	R	R	F
Leucanthemum vulgare	Garden ox-eye daisy	LA		O
Lotus corniculatus	Bird's foot trefoil	LF	R	F
Medicago lupulina	Black medick			O
Melilotus altissimus	Tall melilot			R
Odontites vernus	Red bartsia			R
Ononis spinosa	Spiny restharrow		O	
Parnassia palustris	Grass-of-Parnassus			R
Plantago lanceolata	Ribwort plantain	F/LA	A	A
Plantago major	Greater plantain			R
Plantago media	Hoary plantain	LF		
Potentilla reptans	Creeping cinquefoil	O		O
Prunella vulgaris	Selfheal	R		R
Pseudoscleropodium purum	Neat feather-moss	vLA		LF
Pulicaria dysenterica	Common fleabane	LF		LF
Rhinanthus minor	Hay rattle	O		O
Rhytidiadelphus squarrosus	Springy turf-moss			LA
Rhytidiadelphus triquetrus	Big shaggy-moss	LF		
Rubus fruticosus agg.	Bramble	R	R	F
Rumex acetosa	Common sorrel	O	R	
Senecio erucifolius	Hoary ragwort	O		R
Senecio jacobaea	Common ragwort	R	R	O / LF
Serratula tinctoria	Saw-wort	R	R	
Stachys officinalis	Betony			vLF
Succisa pratensis	Devil's bit scabious			vLF
Taraxacum officinale agg.	Dandelion			R
Trifolium campestre	Hop trefoil			R
Trifolium dubium	Lesser trefoil	R		
Trifolium pratense	Red clover	A	O	F
Trifolium repens	White clover	R		R
Trisetum flavescens	Yellow oat-grass	F		
Tussilago farfara	Colt's foot	LF		LF
Veronica chamaedrys	Germander speedwell	R	R	O
Vicia cracca	Tufted vetch	F		F
Vicia hirsuta	Hairy tare			R

6.12.19 The following quadrat data was recorded for MG5b grassland;

Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Freq	Abun-dance
Quadrat location - OS Grid TA	0882 8360	0988 8301	0997 8285	0975 8314	1172 8215	1297 8158	1281 8157	1191 7971	1365 7673	1311 7725		
Sward height (cm)	30	25	35	20	30	20	20	30	30	25		
Festuca rubra	9	9	8	9	5	6	5	8	4	7	V	(4-9)
Centaurea nigra	3	2	2	3		3	5	4	7	3	V	(2-7)
Plantago lanceolata		3	1	2	3	5	2	3	3	1	V	(1-5)
Holcus lanatus	3	2	2		6	3	2		4	3	IV	(2-6)
Trifolium pratense	4		5	2		3		2	2		III	(2-5)
Tussilago farfara	3		2	1	1				2		III	(1-3)
Heracleum sphondylium	2			1	2	1		1	1		III	(1-2)
Dactylis glomerata	2	2		2		2		1			III	(1-2)
Calliergonella cuspidata	4								3	4	II	(3-4)
Lotus corniculatus			3	3				4			II	(3-4)
Daucus carota			3			3	3				II	(3_)
Lathyrus pratensis	2				3			2		4	II	(2-4)
Agrostis stolonifera		4		2					3	3	II	(2-4)
Trisetum flavescens	3		2	2							II	(2-3)
Carex flacca					2		3		2		II	(2-3)
Leontodon hispidus				2				2	2		II	(2_)
Arrhenatherum elatius	4			1				4	5		II	(1-5)
Achillea millefolium			1			3			2		II	(1-3)
Cirsium arvense	2				1					2	II	(1-2)
Rhinanthus minor			2					2		1	II	(1-2)
Rubus fruticosus agg.								2	1	1	II	(1-2)
Pseudoscleropodium purum					7						I	(7_)
Filipendula ulmaria	3										I	(3_)
Hypnum lacunosum				3							I	(3_)
Rhytidiadelphus triquetrus					3						I	(3_)
Brachythecium rutabulum								3	3		I	(3_)
Kindbergia praelonga									3		I	(3_)
Carlina vulgaris										3	I	(3_)
Leucanthemum vulgare										3	I	(3_)
Festuca arundinacea			2				3				I	(2-3)
Vicia cracca	2										I	(2_)
Veronica chamaedrys	2										I	(2_)
Rumex acetosa			2			2					I	(2_)
Plantago media					2						I	(2_)
Galium verum					2		2				I	(2_)
Agrostis capillaris						2					I	(2_)
Ononis spinosa							2				I	(2_)
Cirsium palustre									2		I	(2_)
Pulicaria dysenterica										2	I	(2_)
Brachypodium sylvaticum										2	I	(2_)
Hypochaeris radicata						3		1			I	(1-3)
Equisetum arvense								1		3	I	(1-3)

Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Freq	Abun-dance
Leontodon autumnalis		2	1								I	(1-2)
Prunella vulgaris					2				1		I	(1-2)
Senecio jacobaea				1						1	I	(1_)
Dactylorhiza fuchsii						1					I	(1_)
Taraxacum agg.									1		I	(1_)
Potentilla reptans										1	I	(1_)
Cerastium fontanum										1	I	(1_)

6.13 Community: M22 *Juncus subnodulosus – Cirsium palustre* fen-meadow *Briza media – Trifolium sp* sub community

6.13.1 Whilst clearly not fen meadow, the suite of species encountered in this community appear to have most affinity with M22, although is generally dominated by compact rush or hard rush rather than blunt-flowered rush. Community constants marsh thistle, Yorkshire fog, meadowsweet and pointed spear-moss are present, and the open sward allows a range of less robust species to flourish including jointed rush, common sorrel, hoary willowherb, common mouse-ear, red clover, black knapweed, marsh arrow-grass and glaucous sedge. With hard rush preferential and the combination of associates listed, it is considered that the community has most affinity with M22b.

6.13.2 Occurring patchily on the eroding soft cliff, this community often forms a transition from M10 flushes to surrounding grassland, or from S12 and S4 swamp to MG12 grassland.

6.13.3 M22b forms typically on poorly drained, clay soils. On soft cliff slopes hard and compact rush all occur as dominants, in various places accompanied by Yorkshire fog and enlivened by ruderal species typical of the soft slopes, including common fleabane, creeping bent and field horsetail.

6.13.4 This rather variable community is characteristic of soft cliffs on Yorkshire's east coast, and is worthy of conservation effort and further study.

6.13.5 The community is threatened by eutrophication of incoming water from arable land which promotes exuberant growth of great willowherb and / or common nettle and replacement of M22 by OV25 and OV26. This effect appears limited at present.

6.13.6 Bryophytes are represented in more mature stands by a lush carpet of pointed spear-moss, endive pellia and river feather-moss.

6.13.7 The following species were recorded in M22b;

Species	Common name	DAFOR
Juncus conglomeratus	Compact rush	D
Calliergonella cuspidata	Pointed spear-moss	A
Cirsium palustre	Marsh thistle	A
Holcus lanatus	Yorkshire fog	A
Pellia endiviifolia	Endive pellia	A
Brachythecium rivulare	River feather-moss	LA
Pulicaria dysenterica	Common fleabane	LA
Agrostis stolonifera	Creeping bent	F
Arrhenatherum elatius	False oat grass	F
Juncus inflexus	Hard rush	F

Species	Common name	DAFOR
Senecio erucifolius	Hoary ragwort	F
Festuca rubra	Red fescue	F
Carex flacca	Glaucous sedge	LF
Juncus articulatus	Jointed rush	LF
Parnassia palustris	Grass-of-Parnassus	LF
Tussilago farfara	Colt's foot	LF
Triglochin palustre	Marsh arrowgrass	LF
Carex panicea	Carnation sedge	LF
Centaurea nigra	Black knapweed	O
Deschampsia cespitosa	Tufted hair grass	O
Epilobium hirsutum	Great willowherb	O
Epilobium parviflorum	Hoary willowherb	O
Equisetum arvense	Field horsetail	O
Eupatorium cannabinum	Hemp agrimony	O
Festuca arundinacea	Giant fescue	O
Filipendula ulmaria	Meadowsweet	O
Juncus bufonius	Toad rush	O
Lathyrus pratensis	Meadow vetchling	O
Rumex acetosa	Common sorrel	O
Hypericum tetrapterum	Square-stalked St. John's-wort	R
Sanguisorba officinalis	Great burnet	R
Typha latifolia	Common bulrush	R

6.13.8 The following quadrat data was recorded for M22b;

Species	Q1	Q2	Q3	Q4	Frequency	Abundance
Quadrat location - OS Grid TA	1384 7658	1300 7740	0854 8381	0889 8360		
Sward height (cm)	40	45	55	80		
Juncus conglomeratus	4	5	4	7	V	(4-7)
Pulicaria dysenterica	2	3	3	3	V	(2-3)
Agrostis stolonifera	2	3	3	3	V	(2-3)
Pellia endiviifolia	2	2	3	3	V	(2-3)
Carex flacca	5	6	3		IV	(3-6)
Festuca rubra	3	3	3		IV	(3_)
Equisetum arvense	3	2		2	IV	(2-3)
Juncus articulatus	2	1		3	IV	(1-3)
Tussilago farfara	3			3	III	(3_)
Juncus inflexus			5	2	III	(2-5)
Brachythecium rivulare		2	3		III	(2-3)
Holcus lanatus		1		2	III	(1-2)
Lathyrus pratensis			1	2	III	(1-2)
Dactylorhiza praetermissa	1		1		III	(1_)
Centaurea nigra		1	1		III	(1_)
Leucanthemum vulgare	3				II	(3_)
Cephaloziella sp.		3			II	(3_)
Senecio jacobaea			2		II	(2_)
Filipendula ulmaria			2		II	(2_)
Parnassia palustris			2		II	(2_)
Vicia cracca			2		II	(2_)
Festuca arundinacea			2		II	(2_)
Epilobium hirsutum				2	II	(2_)
Arrhenatherum elatius	1				II	(1_)
Deschampsia cespitosa				1	II	(1_)
Cirsium palustre	1				II	(1_)
Centaurium erythraea	1				II	(1_)
Cerastium fontanum		1			II	(1_)
Trifolium pratense		1			II	(1_)
Heracleum sphondylium			1		II	(1_)
Epilobium palustre				1	II	(1_)
Brachypodium sylvaticum	1				II	(1_)

6.14 Community: MG10a *Holcus lanatus – Juncus effusus* rush-pasture Typical sub-community

6.14.1 What appears to be abandoned arable land above Gristhorpe Cliff is now vegetated with a rush dominated community which appears to have most affinity with the description for MG10 rush-pasture.

6.14.2 The sward is relatively species poor, dominated by compact rush with a ground layer of Yorkshire fog and creeping bent; these being community constants for MG10.

6.14.3 There is an abundance of common fleabane which is likely to have spread by seed and vegetatively from the soft cliff. The presence of this species and a range of mesic forbes suggests most affinity with MG10a Typical sub-community.

6.14.4 MG10 was not recorded elsewhere in the study area.

6.14.5 The following species were recorded in this community;

Species	Common name	DAFOR
Juncus conglomeratus	Compact rush	D
Pulicaria dysenterica	Common fleabane	A
Holcus lanatus	Yorkshire fog	F
Cirsium arvense	Creeping thistle	F
Brachythecium rutabulum	Rough-stalked feather-moss	F
Agrostis stolonifera	Creeping bent	O
Arrhenatherum elatius	False oat-grass	O
Deschampsia cespitosa	Tufted hair-grass	O
Cirsium palustre	Marsh thistle	R
Sonchus asper	Prickly sowthistle	R

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

6.15.1 The community present on the eroding soft 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, but the maritime influence comes from salt spray rather than direct inundation.

6.15.2 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 rarely prominent.

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

6.15.4 These species are joined in damp soils by grass-of-Parnassus, toad rush, jointed rush and field horsetail. Velvet bent-grass is a feature of this community on Filey Brigg.

6.15.5 The following species were recorded in MG11b;

Species	Common name	DAFOR
Agrostis stolonifera	Creeping bent grass	A
Calliergonella cuspidata	Pointed spear-moss	F
Tussilago farfara	Colt's foot	LF
Parnassia palustris	Grass-of-Parnassus	LF
Juncus bufonius	Toad rush	LF
Juncus articulatus	Jointed rush	LF
Equisetum arvense	Field horsetail	LF
Holcus lanatus	Yorkshire fog	O
Festuca rubra	Red fescue	O
Epilobium hirsutum	Great willowherb	O
Suaeda maritima	Annual sea-blite	O
Senecio erucifolius	Hoary ragwort	O
Sonchus asper	Prickly sow-thistle	O
Agrostis canina	Brown bent	O
Senecio jacobaea	Common ragwort	O
Plantago maritima	Sea plantain	R

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

6.16.1 This community develops on moist but free-draining soils on coastal soft cliffs, and is characteristic of the Yorkshire coast. Encountered frequently on soft cliffs in the study area, the community is dominated by tussocks of tall fescue usually with abundant red fescue and creeping bent which are the community constants for MG12. Yorkshire fog is locally prominent, and in places false oat-grass can rival tall fescue in abundance. Forbs are represented by black knapweed and meadow vetchling, with ribwort plantain and hogweed often present. This combination of associates is consistent with MG12a *Lolium perenne – Holcus lanatus* sub-community.

6.16.2 Where incremental erosion is taking place, the community is often characterised by an over-whelming abundance of common fleabane growing in the gaps between turfs, which gives the community a yellow hue when this species is in flower. Other ruderal species are present, and field horsetail can also be prominent. These wetter stands have a good cover of bryophytes with pointed spear-moss forming a weft under hard rush and great willowherb.

6.16.3 Ruderal species are usually present in this community as there is opportunity for colonisation as the community forms. A number of formerly common arable weeds such as hop trefoil and tall melilot occur in this early phase of colonisation. As the community matures, ruderal species such as common fleabane, colt's foot and field horsetail become less important, and a sward dominated by grasses emerges. The early phase can also allow invasive non-native species to dominate where these have been introduced. Consequently, where houses are present by the soft cliff (for example at Primrose Valley) there are considerable areas of slope dominated by a garden variety of ox-eye daisy, presumably introduced from local gardens.

6.16.4 Transition to M10 flushes occur, with grass-of-Parnassus, marsh arrowgrass and carnation sedge appearing interleaved with MG12 elements.

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

6.16.6 Where well established in less maritime situations lady's bedstraw, false brome and ribwort plantain are often preferential. Conversely, where the community exists close to shore, spear-leaved orache is present giving the community some affinity with MG12b.

6.16.7 MG12a appears to form in three ways. Swards dominated by tall fescue can originate from large turfs which have fallen from the cliff top, species less tolerant of maritime influence such as false oat-grass grow poorly under these conditions, and this allows tall fescue present to flourish encouraging change from a sward dominated by false oat-grass to one dominated by tall fescue. Break up of turfs as incremental erosion takes place allows tall fescue and opportunistic soft cliff species to colonise, and the sward becomes more species rich.

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

6.16.9 In rare cases, tall fescue colonises bare ground created through catastrophic slippage; MG11 colonises initially, however, if the slope remains stable for some time, tall fescue can successfully colonise.

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

6.16.11 This rather variable community is not adequately described in Rodwell 1992, and further work to elucidate sub-communities based on the Yorkshire coast examples is necessary.

6.16.12 The following species were recorded in MG12a;

Species	Common name	DAFOR	Comments
Festuca arundinacea	Tall fescue	D	
Sonchus asper	Prickly sow-thistle	D	
Agrostis stolonifera	Creeping bent	F	
Festuca rubra	red fescue	F	
Holcus lanatus	Yorkshire fog	F	
Arrhenatherum elatius	False oat-grass	LF	
Brachypodium sylvaticum	False brome	LF	
Brachythecium rutabulum	Common feather-moss	LF	
Calliergonella cuspidata	Pointed spear-moss	LF	
Carex flacca	Glaucous sedge	LF	
Cirsium arvense	Creeping thistle	LF	
Dactylorhiza praetermissa	Southern marsh orchid	LF	
Epilobium hirsutum	Great willowherb	LF	
Equisetum arvense	Field horsetail	LF	
Parnassia palustris	Grass-of-Parnassus	LF	

Species	Common name	DAFOR	Comments
Pulicaria dysenterica	Common fleabane	LF	
Rubus fruticosus	Bramble	LF	
Tussilago farfara	Colt's foot	LF	
Atriplex prostrata	Spear-leaved orache	vLF	MG12b affinity
Plantago maritima	Sea plantain	vLF	
Triglochin palustris	Marsh arrow-grass	vLF	MG12b affinity
Lathyrus pratensis	Meadow vetchling	O / LF	
Angelica sylvestris	Wild angelica	O	
Centaurea nigra	Black knapweed	O	
Cirsium palustre	Marsh thistle	O	
Dactylis glomerata	Cock's foot	O	
Epilobium montanum	Broad-leaved willowherb	O	
Heracleum sphondylium	Hogweed	O	
Juncus conglomeratus	Compact rush	O	
Juncus inflexus	Hard rush	O	
Lotus pedunculatus	Greater bird's-foot trefoil	O	
Plantago lanceolata	Ribwort plantain	O	
Senecio jacobaea	Common ragwort	O	
Trifolium campestre	Hop trefoil	O	
Vicia cracca	Tufted vetch	O	
Achillea millefolium	Yarrow	R	
Agrimonia eupatoria	Agrimony	R	
Athyrium filix-femina	Lady fern	R	
Centranthus ruber	Red valerian	R	
Daucus carota	Wild carrot	R	
Dipsacus fullonum	Teasel	R	
Dryopteris filix-mas	Male fern	R	
Galium verum	Lady's bedstraw	R	
Knautia arvensis	Field scabious	R	
Leontodon hispidus	Rough hawkbit	R	
Lotus corniculatus	Bird's-foot trefoil	R	
Melilotus altissimus	Tall melilot	R	
Prunella vulgaris	Selfheal	R	
Rumex acetosa	Common sorrel	R	
Senecio erucifolius	Hoary ragwort	R	
Serratula tinctoria	Saw-wort	R	
Trifolium pratense	Red clover	R	
Vicia hirsuta	Hairy tare	R	

6.16.13 The following quadrat data was recorded in MG12a;

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid TA	1003 8288	0995 8298	1211 8111	1197 7843	1412 7631		
Sward height (cm)	70	60	70	80	60		
Festuca arundinacea	8	7	8	6	5	V	(5-8)
Festuca rubra	4		3	4	5	IV	(3-5)
Pulicaria dysenterica		5	2	3	1	IV	(1-5)
Centaurea nigra	2		2	1	1	IV	(1-2)
Lathyrus pratensis			2	2	4	III	(2-4)
Tussilago farfara	2			2	3	III	(2-3)
Agrostis stolonifera		2	3	2		III	(2-3)
Arrhenatherum elatius		1	4	4		III	(1-4)
Heracleum sphondylium	2		1	1		III	(1-2)
Dactylis glomerata	2			2		II	(2_)
Senecio jacobaea	2		1			II	(1-2)
Calliergonella cuspidata		8			4	II	(4-8)
Plantago lanceolata	3				2	II	(2-3)
Holcus lanatus				3	2	II	(2-3)
Cirsium arvense	2		2			II	(2_)
Equisetum arvense		2	2			II	(2_)
Galium verum			2		2	II	(2_)
Brachypodium sylvaticum				3	1	II	(1-3)
Rubus fruticosus agg.	1				1	II	(1_)
Epilobium hirsutum		4				I	(4_)
Juncus inflexus		3				I	(3_)
Carex flacca					3	I	(3_)
Brachythecium rutabulum					3	I	(3_)
Daucus carota			2			I	(2_)
Vicia hirsuta				2		I	(2_)
Lotus corniculatus					2	I	(2_)
Dipsacus fullonum	1					I	(1_)
Rumex acetosa			1			I	(1_)
Dryopteris filix-mas				1		I	(1_)
Epilobium montana				1		I	(1_)
Cirsium palustre				1		I	(1_)
Achillea millefolium				1		I	(1_)
Angelica sylvestris				1		I	(1_)
Trifolium pratense					1	I	(1_)
Prunella vulgaris					1	I	(1_)
Leontodon hispidus					1	I	(1_)

6.17 Open Habitat Communities: OV25 *Urtica dioica – Cirsium arvense* community, OV26 *Epilobium hirsutum* community and OV27 *Chamerion angustifolium* community

6.17.1 Dominated by great willowherb, OV26 forms often in species-poor stands, where moist but well-aerated soils occur in the soft cliff matrix and on watercourses. Stands on the soft cliff and flushes on the top of the hard cliffs are usually on a slight slope and in areas that accumulate freshwater run-off. The community often abuts M22 mire or S12 reedmace swamp. Meadowsweet and common nettle may accompany this species, but few other associates are common.

6.17.2 On soft cliffs south of Filey, OV26 occurs with hemp agrimony and common fleabane, and in Butcher Haven OV26 is associated with the beck.

6.17.3 Common nettle is usually overwhelmingly dominant in OV25 which has a restricted distribution occurring in fertile, well-drained soils.

6.17.4 OV25 was also recorded on the cliff top where eutrophication has occurred due to fertiliser drift, and very occasionally on the soft cliff where eutrophication was apparent. Tipping of garden waste has promoted development of OV25 near habitation where it occurs in mosaic with OV26 and scrub. This mosaic was recorded extensively at Flat Cliff (Mosaics U and V).

6.17.5 Rose-bay willowherb is relatively scarce in the study area, however, stands dominated by this species were encountered at Hunmanby Gap, once again associated with tipping of garden refuse.

6.17.6 The following species were recorded in OV25;

Species	Common name	DAFOR
Urtica dioica	Common nettle	D
Cirsium arvense	Creeping thistle	A
Arrhenatherum elatius	False oat-grass	A
Epilobium hirsutum	Great willowherb	LF
Chamerion angustifolium	Rosebay willowherb	R

6.17.7 The following species were recorded in OV26;

		DAFOR	
Species	**Common name**	Pre-Filey	Post Filey
Epilobium hirsutum	Great willowherb	A	D
Tussilago farfara	Colt's foot	F	F
Rumex crispus	Curled dock	LF	O
Calliergonella cuspidata	Pointed spear-moss	A	LA
Agrostis stolonifera	Creeping bent	F	F
Pulicaria dysenterica	Common fleabane	LF	F
Pellia endiviifolia	Endive pellia	LF	LF
Calystegia sepium	Hedge bindweed	LF	
Equisetum arvense	Field horsetail	F	F
Festuca arundinacea	Tall fescue	O	O
Deschampsia cespitosa	Tufted hair-grass	O	O
Filipendula ulmaria	Meadowsweet	O	O
Eupatorium cannabinum	Hemp agrimony		LF
Cirsium arvense	Creeping thistle		O
Chamerion angustifolium	Rosebay willowherb	R	R
Carex otrubae	False fox sedge		R

6.18 Community; S4diii *Phragmites australis* reedbed *Atriplex prostrata* sub-community *Agrostis stolonifera* variant and S26 *Phragmites australis – Urtica dioica* tall-herb fen

6.18.1 Dominated by common reed, S4 community occurs in limited stands in flushed areas on soft cliff and steeper flushed zones on Filey Brigg. A degree of stability is necessary to allow common reed to develop a sward, however, this plant is at home in brackish water, and once established persists until eroded away by the sea.

6.18.2 As is typical in these situations, common reed is short and forms an open sward. A ground layer dominated by creeping bent is present, with halophytes represented by sea-milkwort and annual sea-blite. The presence of these associates indicate most affinity with S4diii *Atriplex prostrata* sub-community *Agrostis stolonifera* variant.

6.18.3 S26 *Phragmites australis – Urtica dioica* tall-herb fen was recorded in a limited stand at NVC Note 9 in Mile Haven associated with the watercourse.

6.18.4 Whilst limited in extent, communities featuring common reed are of nature conservation significance, and their persistence in the matrix of coastal communities should be monitored. At present, all communities featuring common reed appeared stable and in favourable condition.

6.18.5 The following species were recorded in S4diii;

Species	Common name	DAFOR
Phragmites australis	Common reed	D
Agrostis stolonifera	Creeping bent	A
Festuca rubra	Red fescue	F
Glaux maritima	Sea milkwort	LF
Suaeda maritima	Annual sea-blite	R

6.19 Community: S12b *Typha latifolia* swamp *Mentha aquatica* sub-community

6.19.1 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).

6.19.2 Common reedmace was the most widespread dominant, however, stands of this community were very limited being recorded in small amount on Gristhorpe Cliff and between Hunmanby Gap and Reighton Sands.

6.19.3 S12 wetlands encountered tended to be species poor and not well developed, however, a small stand at NVC Note 15 has permanent water with common spike-rush and pondweed (*Potamogeton natans*).

6.19.4 The following species were recorded in S12;

Species	Common name	DAFOR
Typha latifolia	Common bulrush	D
Carex flacca	Glaucous sedge	LA
Agrostis stolonifera	Creeping bent	F
Ranunculus repens	Creeping buttercup	F
Pulicaria dysenterica	Common fleabane	LF
Tussilago farfara	Colt's foot	LF
Potentilla anserina	Silverweed	LF
Epilobium hirsutum	Great willowherb	LF
Lathyrus pratensis	Meadow vetchling	O
Cirsium palustre	Marsh thistle	O
Holcus lanatus	Yorkshire fog	O
Senecio jacobaea	Common ragwort	O
Triglochin palustris	Marsh arrow-grass	O
Potentilla reptans	Creeping cinquefoil	O
Rumex crispus	Curled dock	O
Prunella vulgaris	Self-heal	O
Epilobium montana	Broad-leaved willowherb	R
Eleocharis palustris	Common spike-rush	R
Potamogeton natans	Broad-leaved pondweed	R

6.20 Salt-marsh and Strandline Communities: SD2 *Honkenya peploides – Cakile maritima* strandline community and SM28 *Elytrigia repens* salt-marsh community

6.20.1 The strand-line community, SD2 is represented by species poor associations in the few places where a strandline exists in front of cliffs. A coherent community has formed under chalk cliffs on North Cliff (for example at NVC Note 27) with a well developed community fertilised by seabird colonies above.

6.20.2 SD2 is also found where there is stabilised talus in front of hard cliff, and is associated with SM28 at NVC Note 19 forming a transition from foreshore to salt marsh. However, both strandline and saltmarsh have very limited extent at this location.

6.20.3 This community is also sparsely distributed under the soft cliff from Muston Sands to Reighton Sands where suitable strandline exists, for example at NVC Note 7 and at Butcher Haven where a shingle beach is maintained by the incoming beck.

6.20.4 SD2 is characterised by spear-leaved orache and common orache joined by sparsely distributed common scurvy-grass, curled dock and, locally, sea mayweed. Population levels are low where this community occurs.

6.20.5 Extremely limited stands of saltmarsh community were recorded during the survey dominated by common couch with common scurvy-grass.

6.20.6 This community is widespread in upper zone of salt marshes in England occurring in low lying areas which are periodically inundated with sea water.

6.20.7 The following species were recorded in SD2;

Species	Common name	DAFOR
Atriplex prostrata	Spear-leaved orache	F
Cochlearia officinalis	Common scurvy grass	F
Tripleurospermum maritimum	Sea mayweed	LF
Matricaria discoidea	Pineappleweed	LF
Agrostis stolonifera	Creeping bent	LF
Sonchus asper	Prickly sowthistle	LF
Galium aparine	Goosegrass	LF
Rumex crispus	Curled dock	O
Atriplex patula	Common orache	O
Anagallis arvensis	Scarlet pimpernel	R

6.20.8 The following species were recorded in SM28;

		DAFOR	DAFOR
Species	**Common name**	**North of Filey Brigg**	**South of Filey Brigg**
Elytrigia repens	Couch grass	D	D
Cochlearia officinalis	Common scurvy grass	A	F
Pseudoscleropodium purum	Neat feather-moss		LA
Ononis spinosa	Spiny restharrow		LF
Senecio jacobaea	Common ragwort		O
Achillea millefolium	Yarrow		O
Cerastium fontanum	Common mouse-ear		O

6.21 Community: U4b *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland; *Holcus lanatus – Trifolium repens* sub-community

6.21.1 The sward encountered was dominated by common bent, with sweet vernal-grass also featuring. Where the community was well developed (often associated with gorse scrub), species preferential in U4b such as yarrow and Yorkshire fog occur, along with sheep's sorrel, harebell and autumn hawkbit. Taken together these species suggest most affinity with U4b *Holcus lanatus – Trifolium repens* sub-community.

6.21.2 U4b has a restricted distribution in the study area, being recorded in eluviated, thin soils on the ridge above Gristhorpe Sands (associated with gorse scrub) and at Reighton on previously developed land (quadrats 3 and 4). A large area dominated by common bent also occurs at Cunstone Nab, however, this is species poor and may be derived from arable land.

6.21.3 Examples encountered were generally species-poor, dominated by common bent with red fescue, creeping bent and Yorkshire fog also constant. Forbs are represented by autumn hawkbit, black knapweed, sheep's sorrel and ribwort plantain. Pignut was recorded in established U4 grassland on the golf course at NVC note 28.

6.21.4 No maritime species were recorded in this community, and maritime influence is not considered to be a factor in its establishment. Similarly, acid grassland does not appear to be a factor in maintaining diversity on soft cliff communities.

6.21.5 The following species were recorded in U4 grassland;

Species	Common name	DAFOR
Agrostis capillaris	Common bent	D
Centaurea nigra	Black knapweed	F
Rumex acetosa	Common sorrel	F
Dactylis glomerata	Cock's foot	F
Holcus lanatus	Yorkshire fog	F
Leontodon autumnalis	Autumn hawkbit	F
Plantago lanceolata	Ribwort plantain	F
Agrostis stolonifera	Creeping bent	LF
Creeping buttercup	Ranunculus repens	LF
Festuca rubra	Red fescue	LF
Lolium perenne	Perennial rye-grass	LF
Rhytidiadelphus squarrosus	Springy turf-moss	LF
Anthoxanthum odoratum	Sweet vernal grass	O/LF
Achillea millefolium	Yarrow	O
Bellis perennis	Daisy	O
Brachythecium rutabulum	Common feather-moss	O
Calliergonella cuspidata	Pointed spear-moss	O
Cynosurus cristatus	Crested dog's-tail	O

Species	Common name	DAFOR
Dactylorhiza fuchsii	Common spotted orchid	O
Galium verum	Lady's bedstraw	O
Lathyrus pratensis	Meadow vetchling	O
Lotus corniculatus	Bird's foot trefoil	O
Poa annua	Annual meadow-grass	O
Ranunculus acris	Meadow buttercup	O
Taraxacum officinale agg.	Dandelion	O
Trifolium dubium	Lesser trefoil	O
Trifolium pratense	Red clover	O
Tussilago farfara	Colt's foot	O
Campanula rotundifolia	Harebell	R
Cirsium arvense	Creeping thistle	R
Rumex acetosella	Sheep's sorrel	R

6.21.6 The following quadrat data was recorded for U4b;

Species	Q1	Q2	Q3	Q4	Q5	Frequency	Abundance
Quadrat location - OS Grid TA	0984 8293	0990 8291	1384 7640	1388 7635	0854 8358		
Sward height (cm)	25	30	25	20	25		
Agrostis capillaris	8	8	8	9	6	V	(6-9)
Plantago lanceolata	4	2	3	3	3	V	(2-4)
Leontodon autumnalis		3	4	4	4	IV	(3-4)
Centaurea nigra	2	4	2	2		IV	(2-4)
Rumex acetosa	4	4			6	III	(4-6)
Rhytidiadelphus squarrosus		1	3	3		III	(1-3)
Festuca rubra		1	2	2		III	(1-2)
Agrostis stolonifera	3	4				II	(3-4)
Lolium perenne			4	3		II	(3-4)
Brachythecium rutabulum				2	3	II	(2-3)
Dactylorhiza fuchsii	2	2				II	(2_)
Trifolium dubium			2	2		II	(2_)
Taraxacum officinale agg.			1	2		II	(1-2)
Holcus lanatus	1				2	II	(1_)
Anthoxanthum odoratum			1	1		II	(1_)
Ranunculus acris			1	1		II	(1_)
Tussilago farfara					4	I	(4_)
Calliergonella cuspidata			3			I	(3_)
Trifolium pratense		2				I	(2_)
Cynosurus cristatus				2		I	(2_)
Bellis perennis				2		I	(2_)
Poa annua				2		I	(2_)
Galium verum					2	I	(2_)
Achillea millefolium				1		I	(1_)
Dactylis glomerata				1		I	(1_)
Cirsium arvense					1	I	(1_)

6.22 Community: Artificial Wetlands at Filey Brigg

6.22.1 Located at NVC Note 5 are two artificial wetlands. One is dominated by emergent vegetation leaving little open water, with MG11 (creeping bent and silverweed being the main species) covering approximately 60% of the wetland area. Various other species occur with reed canary-grass next most abundant (approximately 10% cover) with further contributions from plicate sweet-grass, common spike-rush, yellow iris, jointed rush and New Zealand pygmyweed (covering around 5% of surface area at the time of the survey). White water lily is also present.

6.22.2 The occurrence of New Zealand pygmyweed suggests that plants have been introduced to this wetland, and vegetation does not appear natural.

6.22.3 An adjacent waterbody also appears to be artificial with white water lily present. Open water is fringed by common spike-rush, amphibious bistort and plicate sweet-grass. This waterbody receives run-off from nearby farmland and appears eutrophic.

6.22.4 The following species were recorded in these waterbodies;

Species	**Common name**	**DAFOR**
Agrostis stolonifera	Creeping bent	LD
Phalaris arundinacea	Reed canary-grass	LD
Crassula helmsii	New Zealand pygmyweed	LA
Glyceria notata	Plicate sweet-grass	LF
Iris pseudacorus	Flag iris	LF
Eleocharis palustris	Common spike-rush	F
Potentilla anserina	Silverweed	O
Juncus articulatus	Jointed rush	O
Nymphaea alba	White water lily	O
Persicaria amphibia	Amphibious bistort	O
Elytrigia repens	Common couch	R

6.23 Community: Woodland, Bracken and Scrub

6.23.1 Whilst not a focus of the current study, woodland and scrub was recorded where it occurs. Scrub consists mainly of blackthorn (W22) with hawthorn (W21) and European gorse (W23) also present in limited areas. Where scrub is dense a rudimentary woodland groundflora is often present with male fern, red campion, broad buckler fern and primrose.

6.23.2 Much scrub has formed in sheltered valleys along the shore south of Filey where, along with bracken (U20), it threatens to smother all grassland. Large, continuous scrub areas include W21 and W22 at Mile Haven (NVC Note 11), W22, W21, and W23 at Butcher Haven (NVC Note 22), dense W22 and U20 at Hunmanby Gap (NVC Note 24), extensive W22 and U20 with tall ruderal at Reighton Gap (NVC Note 26) and W23 at NVC Note 30.

6.23.3 Mature woodland is limited to W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland south of Wool Dale (at NVC Note 6) and W8 with W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland in flushed areas (at NVC Note 12). The former woodland has a canopy dominated by non-native species, however, the latter woodland appears to be of high nature conservation value.

6.23.4 Areas of scrub can form a focus for invasive non-native species; for instance at NVC Note 25 scrub is interspersed with tall ruderal vegetation dominated by garden ox-eye daisy.

7.0 COASTAL MORPHOLOGY

7.1.1 Plant communities recorded during the NVC surveys are often derived due to geomorphological processes tempered by a suite of other physical factors, as detailed above, with physical processes allowing opportunity for the development of communities not readily described by NVC criteria.

7.1.2 Coastal morphology has been divided into areas which are shown on Figure 7 and NVC communities have been tabulated in accordance with the morphological section in which they occur and are provided at Appendix 3.

8.0 BIBLIOGRAPHY

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FIGURES

FIGURES 1 AND 2

SECTION 1 AND 2 PHASE 1 HABITAT MAPS

FIGURE 3

SECTION 3 PHASE 1 HABITAT MAPS

(REPRODUCED FROM JBA 'PHASE 1 HABITATS AND MVCR BIOTOPES MAPS (2010))

FIGURE 4

SECTION 1 NVC VEGETATION COMMUNITY MAPS

(REPRODUCED FROM HJA CAYTON BAY SSSI NVC MAPPING (OCTOBER 2010))

FIGURE 5

SECTION 2 NVC VEGETATION COMMUNITY MAPS

FIGURE 6

SECTION 3 NVC VEGETATION COMMUNITY MAPS

(REPRODUCED FROM MILLIKEN AND PENDRY FLAMBOROUGH HEAD NVC MAPPING (OCTOBER 2002))

APPENDIX 1

PHASE 1 HABITAT SURVEY MAPPING - TARGET NOTES

APPENDIX 2

FULL PLANT SPECIES LIST

APPENDIX 3

NVC COMMUNITIES TABULATED BY MORPHOLOGICAL SECTION

APPENDIX 4

NVC VEGETATION MOSAICS