Farchynys Flood Bank

National Vegetation Classification (NVC) Survey

September 2020

CPF 7174







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1.0 Introduction

Farchynys is a coastal area located to the south of the A496 road between Barmouth and Bont Ddu, on the north side of the Mawddach estuary (see Figures 1 and 2 below). The land at Farchynys is partly owned by the Snowdonia National Park Authority (SNPA) and partly owned by Tyddyn Du campsite. The vast majority of the area is located within the tidal floodplain (see Figure 1 below), despite the presence of a flood embankment separating the foreshore (mud/sand flats and saltmarsh) and the tidally inundated grazed fields and reedbeds to the north, which are divided by a network of drainage ditches.

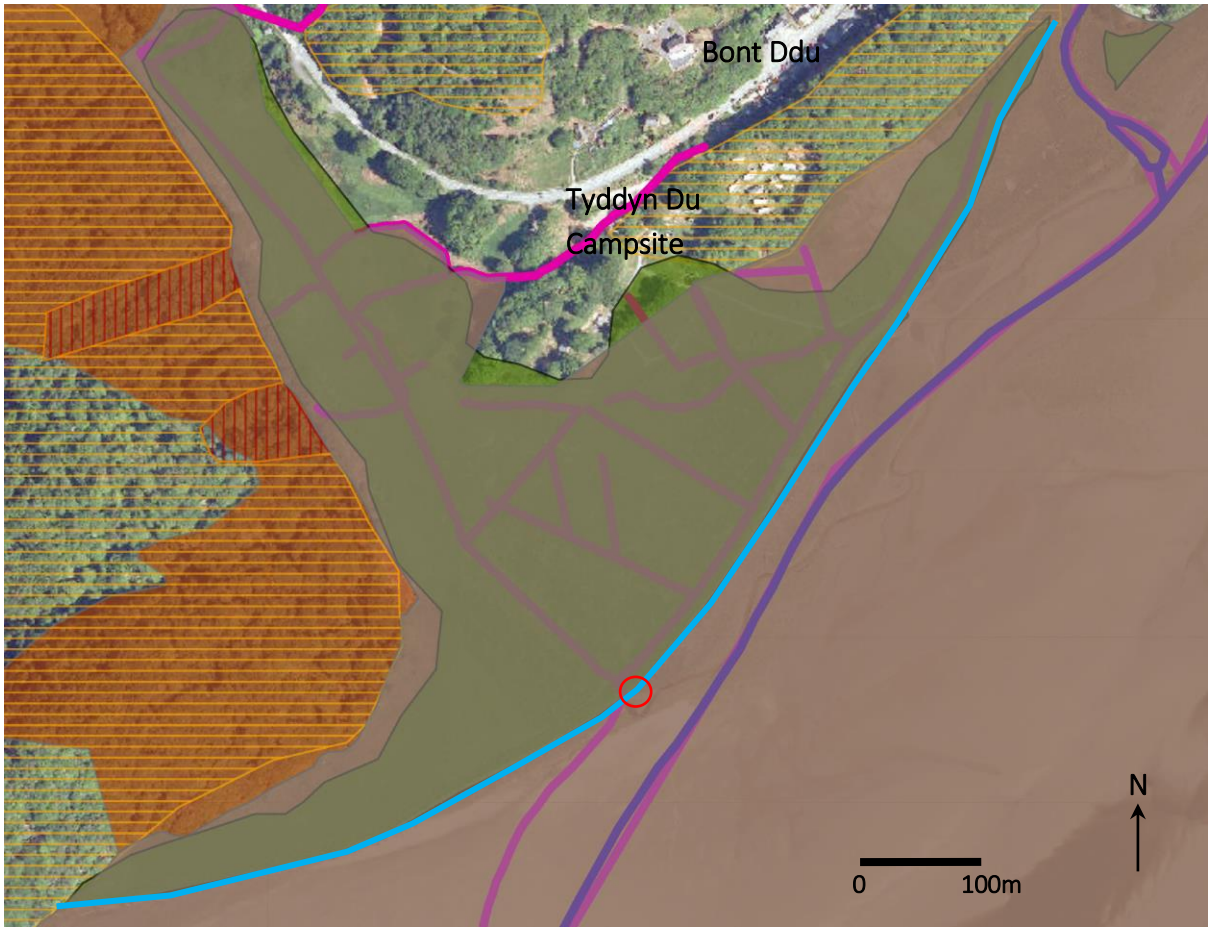


Figure 1: Location of Farchynys flood bank (light blue) and breach reported in 2018 (red circle), in relation to the tidal floodplain (green poygon), Pen Llyn a'r Sarnau SAC (grey/brown), Meirionnydd Oakwoods and Bat Sites SAC (orange/brown), drainage network (pink = ordinary watercourse; blue = main river), Ancient Semi-natural woodland (Orange horizontal hatch) and Plantation on Ancient Woodland Site (red vertical hatch)

In 2018, a breach in the flood bank within the SNPA-owned land was reported (see Figure 1 above) at NGR SH 66690 18057. Due to the ecologically sensitive nature of the site, within and adjacent to the internationally and nationally designated sites for nature conservation, Coedydd Derw a Safleoedd Ystlum Meirion Special Area of Conservation (SAC), Pen Llyn a'r Sarnau SAC and Aber Mawddach Site of Special Scientific Interest (SSSI), the SNPA commissioned YGC to undertake a Preliminary Ecological Appraisal (PEA) to assess possible options for a potential repair of the flood bank or other solution to try and prevent tidal

inundation of the Tyddyn Du campsite fields. See Figure 1 above for the location of these designated sites.

The PEA undertaken by YGC raised the need for a National Vegetation Classification (NVC) Survey to form the basis of any Habitats Regulations Assessment (HRA) that would be needed to assess the impact of any proposals on the internationally protected sites. Of particular concern is the Pen Llyn a'r Sarnau SAC which includes the estuary, flood embankment and much of the land to the north of the flood embankment, including the lower-lying campsite fields. The boundary of the Pen Llyn a'r Sarnau SAC can be seen to roughly coincide with the tidal floodplain in Figure 1 above.

The habitat features of the Pen Llyn a'r Sarnau SAC that could be affected by any proposals in this area include:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*); and
- *Salicornia* and other annuals colonising mud and sand.

1.1 Report Purpose

The purpose of this report is to document the findings of the NVC survey undertaken by YGC in September 2020, including mapping the extent of the vegetation communities present within the survey area, to allow further ecological assessment of any proposals put forward, including potential loss or alteration of habitat and the impacts this could have on the protected sites. Figure 2 below shows the NVC survey area.

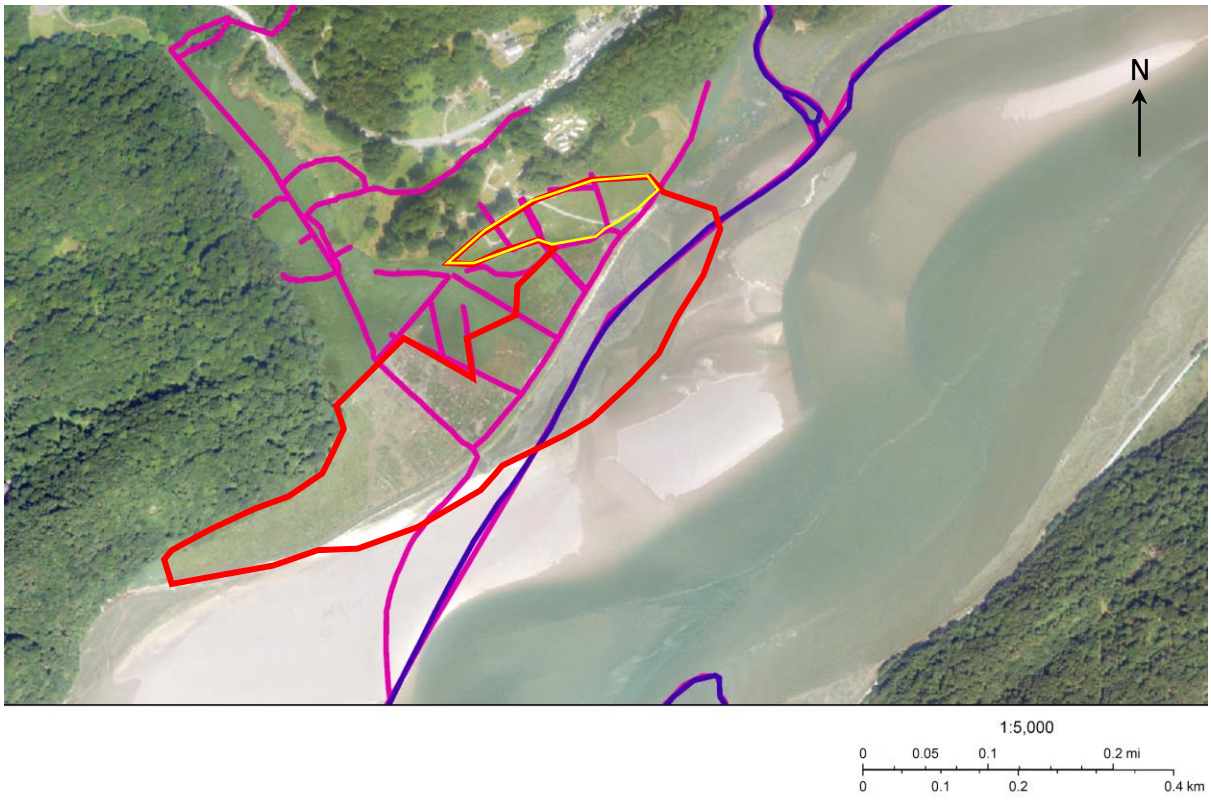


Figure 2: Location of Farchynys NVC Survey Area (red polygon), to the southwest of Bont Ddu on the Mawddach Estuary (pink = ordinary watercourse; blue = main river). Tyddyn Du campsite fields are shown within the yellow polygon (also within the survey area)

2.0 Policy and Legislation

The following legislation and policy is of relevance to plant communities and habitats in relation to any proposals in the vicinity of Farchynys flood bank.

2.1 The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

These regulations came into force when the UK formally left the EU on 31st January 2020. The Regulations ensure that the habitat and species protection and standards derived from EU law continue to apply after Brexit. The Regulations provide for the designation and protection of European sites and the protection of European protected species and habitats as listed in the EC Habitats Directive and EC Birds Directive (Council Directive 2009/147/EC). The regulations provide guidance on undertaking assessment of impacts on European and internationally Protected Sites (Special Areas of Conservation - SACs, Special Protection Areas – SPAs and Ramsar sites) through the Assessment of Implications on European Sites (AIES) process. Pen Llyn a'r Sarnau SAC, within which the flood bank and adjacent habitat are located, is a European protected site covered by this legislation.

2.2 Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act (WCA) governs the designation and protection of Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR), and protection of various plant and animal species. Schedule 1 of the Act lists protected bird species, Schedule 5 lists other protected animal species, and Schedule 8 lists protected plant species. Schedule 9 of the Act lists invasive alien species which it is an offence to introduce or allow to spread in the wild. Aber Mawddach SSSI, within which the flood bank and adjacent habitat are located, is a protected site covered by this legislation.

2.3 Environment (Wales) Act 2016

This act became law in Wales on 21st March 2016, and includes legislation that supersedes the Natural Environment and Rural Communities (NERC) Act 2006. Part 1 of the Act sets out Wales' approach to planning and managing natural resources at a national and local level with a general purpose linked to statutory 'principles of sustainable management of natural resources' defined within the Act.

Section 6 of the Act places a duty on public authorities to 'seek to maintain and enhance biodiversity' so far as it is consistent with the proper exercise of those functions. In doing so, public authorities must also seek to 'promote the resilience of ecosystems.' Public authorities will be required to report on the actions they are taking to improve biodiversity and promote ecosystem resilience.

Section 7 replaces the duty in Section 42 of the NERC Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of principle importance for the conservation and enhancement of biodiversity in Wales. The Welsh Ministers must also take all reasonable steps to maintain and enhance the living organisms and habitats included in any list published under this section, and encourage others to take such steps.

Coastal saltmarsh (comprising most of the habitat along and adjacent to Farchynys flood bank) is a habitat listed on Section 7 of this Act.

2.4 Planning Policy Wales - Edition 10 (December 2018)

Of particular relevance to any proposals in relation to the Farchynys flood bank are:

- Section 6.4: Biodiversity and Ecological Networks, including implementing the Section 6 (biodiversity and resilience of ecosystems) duty, protection and management of designated sites and non-statutory designations, maintaining and enhancing biodiversity, and protected species; and
- Section 6.5: Coastal Areas, including development on the coast, protected sites on the coast, and coastal change.

2.5 Wales Action Plan for Pollinators (2013)

The Action Plan for Pollinators in Wales recognises that:

> 'Pollinators are an essential component of our environment. Honey bees and wild pollinators including bumblebees, solitary bees, parasitic wasps, hoverflies, butterflies, moths and some beetles are important pollinators in Wales for crops such as fruit and oilseed rape, clovers and other nitrogen-fixing plants that are important to improving the productivity of pasture systems for livestock grazing and wildflowers.'

The Welsh government has worked with industry and stakeholders to look in more detail at the evidence and issues around pollinators and their conservation in Wales. The action plan produced aims to reduce and reverse the decline in wild and managed pollinator populations.

2.6 Local Biodiversity Action Plans (LBAPs)

Biodiversity: The UK Biodiversity Steering Group Report was published in 1995. This recognised that to successfully implement the UKBAP at a local level and translate national policy into action, it would be necessary to produce Local Biodiversity Action Plans (LBAPs) across the UK. In response to this, local authorities throughout the UK produced LBAPs; the Snowdonia BAP (or Eryri BAP) is the LBAP of relevance in the location of Farchynys flood bank, as it is located within Snowdonia National Park.

2.7 Eryri Local Development Plan 2016 - 2031 (Snowdonia National Park Authority, 2019)

The Eryri Local Development Plan has replaced the existing Eryri Local Plan, the Gwynedd Structure Plan relating to the National Park and the Eryri Affordable Housing Delivery Statement (2009) as the policy context for assessing development proposals within Snowdonia National Park, up to 2031. The plan was formally adopted on 6th February 2019. The policies relevant to nature conservation include:

Strategic Policy D: Natural Environment

The natural resources, biodiversity, geodiversity and 'Special Qualities' of the Snowdonia National Park will be protected from inappropriate development. Where development is deemed acceptable developers will be expected to ensure that the natural environment is protected and enhanced.

Proposals should not adversely affect the National Park's biodiversity resources including designated sites from an international through to a local level, as well as wider biodiversity resources e.g. habitats and species outside designated sites.

Development will only be permitted within the Undeveloped Coast where it can be demonstrated that a coastal location is essential. Development which harms the unspoilt landscape character of wildlife habitats will not be permitted.

Development proposals which are likely to adversely affect habitats and species listed in the Local Biodiversity Action Plan will be subject to the guidelines of the Supplementary Planning Guidance on Local Biodiversity.

3.0 Methodology

3.1 Field Survey

NVC field survey was undertaken by Nancy Wilkinson (BSc PGDip MCIEEM) generally according to the methodology described in 'National Vegetation Classification: Users' Handbook' (JNCC, 2006). However, some environmental details such as geology and soil data were not recorded. Nancy Wilkinson has 12 years of experience as a consultant ecologist, including vegetation surveys, and has attended several vegetation surveying training courses, including the CIEEM courses 'Using Species for Habitat Assessment' and 'NVC: What You Need to Know' (both in June 2018). To achieve full membership of CIEEM, she has demonstrated and been accepted as being accomplished at the following competencies: 'Professional conduct', 'Effective communication, negotiation and influencing', 'Information technology', 'Species identification, handling and evaluation', 'Outcome monitoring, data management and reporting', 'Risk management during project implementation' and 'Ecological assessment including Preliminary Ecological Appraisal and Ecological Impact Assessment'.

To summarise, the survey area (see Figure 2 above) was divided into homogenous stands of vegetation using aerial photography and visible differences in structure and composition in the field. These distinct areas were marked out on a plan and either three or five 2x2m quadrats were analysed within each separate stand, avoiding obviously transitional or boundary habitats where possible. Within each quadrat (marked out roughly on the ground using bags or other objects in each corner), all higher plant species were identified and recorded, and the coverage of each estimated and assigned a value using the DOMIN scale, as shown in Table 1 below. Lower plant species were also recorded and identified where possible. Plant identification guides were used to aid in the identification of the plant species (Atherton, Bosanquet and Lawley (2010); Rose (2006); Rose (1989); and Price (2017)). The locations of the quadrats were also recorded, along with the date and any other relevant details about each stand. Any species recorded within 1m of each quadrat were also recorded as a '+' and other species observed in the stand but not recorded within any of the quadrats were also noted with some location details.

Several other small patches of homogenous vegetation (on the seaward side of the flood bank) were sampled without quadrats by compiling a species list, with Domin scores to show relative abundance. The top of the embankment and higher part of the campsite fields were also sampled by compiling species lists only.

Details of the different areas and stands of vegetation sampled, along with the survey dates, are provided in Table 2 below. All quadrat and other sampling locations are shown on the survey plan (Figure 3 below).

Table 1: The DOMIN Scale for recording vegetation cover

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

Table 2: Details of the areas surveyed for NVC in September 2020 (locations provided in Figure 3 below)

Stand ID and Description	Dates Surveyed	No. of Quadrats / Sampling Method	Description of Vegetation Structure
A: Water-logged fields on landward side of flood bank (within tidal floodplain). Bordered by ditches. Light grazing by sheep, although some is inaccessible	01/09/2020 03/09/2020 10/09/2020	5 Quadrats (2mx2m)	Lots of sea rush, interspersed with shorter lush green vegetation with sea aster and pools often dominated by cord-grass
B: Field with footpath on landward side of flood bank (area within tidal floodplain). Moderate grazing by sheep and evidence of cattle grazing. Drier than Stand A but still wet, with occasional pools	04/09/2020	5 Quadrats (2mx2m)	Shorter sward than Stand A although also interspersed with lots of clumps of sea rush
C: Northern drier edge of field with footpath on landward side of flood bank (area outside tidal floodplain), bordering wooded hillside. Slightly more elevated. Moderate grazing by sheep and evidence of cattle grazing	03/09/2020	3 Quadrats (2mx2m)	Short grassy sward with scattered gorse scrub and some rush
D: Strip of land along the foot of the flood bank, between the flood bank and the parallel ditch to the north. Occasional pools	04/09/2020 10/09/2020 28/09/2020	5 Quadrats (2mx2m)	Long grassy sward with sea rush

E: Campsite fields within tidal floodplain. Wet	09/09/2020	5 Quadrats (2mx2m)	Lush short green even sward with grass and herbs but no rush visible
F: Established saltmarsh interspersed by creeks and pools on seaward side of flood bank.	29/09/2020	5 Quadrats (2mx2m)	Mostly short-cropped grassy sward (grazed) with stands of taller cord-grass
G: Small patch on seaward side of flood bank on west side of pool adjacent to breach	29/09/2020	Species list with Domin scores	Small grassy patch with lots of sea club-rush
H: Other side (south) of creek from G, west side of pool adjacent to breach in flood bank	29/09/2020	Species list with Domin scores	Short-cropped green grassy area with some patches of dry sand
I: Several sparse grassy patches within areas of bare sand on seaward side of flood bank	29/09/2020	Species list with Domin scores	Dominated by saltmarsh-grass but with dry bare sand visible throughout sparse sward. Species-poor
J: Grassy area along base of flood bank on seaward side to west of breach	29/09/2020	Species list with Domin scores	Continuous short-cropped sward with some sea rush
K: Patches between flood bank and mud/sand flats on seaward side to west of breach	29/09/2020	Species list with Domin scores	Browny-yellow/green patches of fairly sparse short vegetation
L: Vegetation along the top of the flood bank	29/09/2020	Species list	Long grassy vegetation with scattered thistles, dock, saltmarsh and other herbs, and occasional sea rush
M: Patch between established salt-marsh and bare mud/sandflats to east of breach on seaward side	29/09/2020	Species list	Annual glasswort and bare damp sand/mud only
N: Drier area within campsite fields (northern edge), outside of tidal floodplain	09/09/2020	Species list	Lush green grassland. Even fairly short sward. Species-poor

3.2 Data Analysis

Data for each stand of quadrats were pooled and Constancy and Coverage values assigned to each species according to how often it occurred and at what percentage cover within the quadrats (Domin Scale), in the format utilised in the NVC British Plant Communities Volumes (Rodwell, 1991 – 2000). The Domin Scale was used for coverage (Table 1), and Roman numerals were assigned according to the percentage of quadrats the species was recorded within each stand, as shown in Table 3 below.

Table 3: Constancy scores for quadrat data

Percentage of Quadrats where Species Recorded within Stand	Constancy Score
81 – 100%	V
61 – 80%	IV
41 – 60%	III
21 – 40%	II
1 – 20%	I

For example, III(1) = occurred in 3 out of the 5 quadrats in the stand at a coverage of 1 on the Domin Scale every time (<4% cover, see Table 1 above); V(4-6) = occurred in 5 out of 5 quadrats at a coverage of between 4 and 6 on the Domin Scale (4 – 33% cover). The species were then tabulated in order from greatest coverage and most frequent to least coverage and frequency, with the Constant species (those with a Frequency of IV or V) highlighted.

The keys in the most relevant British Plant Communities Volume were then used to ascertain a possible plant community for the data for each stand, and this was followed by a comparison of the Floristic Tables with the Frequency and Cover values obtained in the survey, particularly for Constant species. Using this method, the plant communities within each stand were identified to sub-community level where possible. The species lists obtained from Areas G to N were also assigned an NVC community in a similar way using the keys and comparison with the floristic tables.

Where quadrats from one stand appeared to fit more closely with the community identified for a neighbouring stand, the boundaries were changed on the plans to allow for this, until a final map was produced showing the approximate boundaries of the different plant communities within the area surveyed.

3.3 Survey Conditions and Limitations

Surveys were undertaken on days when the weather and tidal conditions were suitable, *i.e.* dry, calm conditions with no tidal/fluvial inundation of the areas surveyed. They were also undertaken at an appropriate time of year (September) for this type of survey, as saltmarsh surveys should ideally be undertaken between June 1st and September 30th when saltmarsh growth is at its maximum and plants are easiest to identify (A Guide to Characterising and Monitoring Saltmarsh, NRW, 2019). However, all species have their own flowering season and inevitably some of the plants recorded were not in flower during the survey. Generally, this did not cause an issue and plants were identifiable using vegetative characteristics but two sedge (*Carex*) species recorded during the survey were not able to be identified beyond genus level for this reason. It is not considered that this has affected the allocation of NVC communities.

It is possible that the abundance or even presence of some species, such as *Juncus gerardii*, may have been overlooked in some quadrats due to the cutting/grazing regime in some areas such as the campsite fields. However, it is not considered that this would have altered the outcome of the NVC community allocation.

An up-to-date aerial photograph was not available to use as a base map to plot the distribution of the communities recorded. However, a Google Maps aerial image was used that is thought

to be no older than 2017 and although there will have been some shifting due to the mobile nature of these types of habitat, it is not considered that the boundaries of the various communities have changed significantly since then. The main limitation resulting from this is that the community SM6 *Spartina anglica* or common cord-grass was not mapped in detail during this survey but described as patches within the communities SM16c and also present (to a lesser extent) within SM18a. It would be a good idea to comprehensively map this community as a separate survey using a recent aerial image as a basemap in order to better assess impacts on the Pen Llyn a'r Sarnau SAC and Aber Mawddach SSSI.

4.0 Survey Results

A list of all the plant species recorded during the surveys in 2020, along with the raw NVC data, is provided in Appendix I (common and scientific names). Details of the NVC communities and sub-communities recorded within the survey area are provided below and mapped in Figure 3 below.

4.1 Saltmarsh Communities

4.1.1 Upper Marsh

SM28: *Elymus repens* salt-marsh community, *Elymetum repentis maritimum*

A community likely to be SM28 was recorded for a narrow strip (c.1 - 3m wide) along the top of the flood bank (Stand L, see photograph 1 below) between the stile at NGR SH 66485 17937 and the part of the bank at the eastern end in the vicinity of the campsite where additional material has been more recently deposited to raise the height of the bank.



Photograph 1: 29/09/2020: Stand L (top of flood bank) showing a moderate to good fit for an SM28 upper salt-marsh community. This stand was dominated by red fescue, creeping bent and couch-grass. Clumps of sea rush (*Juncus maritimus*) can be seen on both sides of the flood bank and in the fields to the right, representing the SM18a mid to upper saltmarsh community. This qualifies as Section 7 but not SAC habitat although it lies within the Pen Llyn a'r Sarnau SAC

There are many similarities between the species list recorded in Stand L and the floristic table for this community. All the constants from the table are present in Stand L, as well as six out of the seven species listed in the Table as II or III on the Domin Scale and six of the remaining species recorded in the stand are also listed in the floristic table. As described in the British Plant Communities Volume 5 (Rodwell, 2000), the community had a closed grassy sward up to about 1m tall, dominated by couch-grass, red fescue and creeping bent, with an open ground cover of silverweed and occasional parsley water-dropwort, perennial sow-thistle curled dock and creeping thistle.

This community is likely to represent the Section 7 habitat 'Coastal saltmarsh' but is not listed in the descriptions of the two qualifying saltmarsh features of the Pen Llyn a'r Sarnau SAC (JNCC web-page). This stand had one of the highest numbers of species recorded during the survey (22 species) as would be expected of an upper marsh community compared with communities lower down the marsh, where only a lower number of more specialised species are able to survive the frequency and duration of tidal inundation.

4.1.2 Mid to Upper Marsh

SM18a: *Juncus maritimus* salt-marsh, *Plantago maritima* sub-community

Stands A, B, D and J all keyed out as this sub-community, demonstrating either a good or very good fit with the sub-community detailed in the floristic table (Rodwell, 2000). These areas include the narrow strips of habitat along the sides and base of the flood bank (both sides) and the wet fields within the tidal floodplain on the northwest (landward) side to the south of the campsite and southwest half of the survey area. See Photograph 2 below.



Photograph 2: 10/09/2020: Quadrat 4 of Stand A (wet fields on northwest side of flood bank) showing a good fit for an SM18a mid to upper salt-marsh community. This stand was dominated by red fescue, sea aster and sea plantain. Clumps of sea rush (*Juncus maritimus*) can also be seen here as a constant and occasional stands of cord-grass, as visible on the left. The green campsite fields are visible behind. This qualifies as Section 7 and SAC ('Atlantic salt meadow') habitat

Stand B was the best fit for this sub-community, with all the constants listed in the floristic table also present in Stand B and seven out of the remaining 13 species in Stand B also listed in the floristic table. The main difference was the lack of sea thrift within the stand, listed as fairly frequent in the floristic table. Small stands of the invasive common cord-grass (*Spartina anglica*) were present within Stand A but not extensively. Stand D between the flood bank and the ditch along its northern side is in poorer condition, with higher grass coverage and much lower coverage of saltmarsh herb species. It seems to receive less grazing, allowing the grasses to grow tall and dominate the sward.

This community represents the Section 7 habitat 'Coastal Saltmarsh' and is also one of the communities listed as representing the 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)' feature of Pen Llyn a'r Sarnau SAC on the JNCC web-page describing the SAC features.

SM16c: *Festuca rubra* salt-marsh community *Juncetum gerardi, Festuca rubra-Glaux maritima* sub-community

Stands F and K demonstrated a poor to moderate fit for the SM16c mid to upper marsh sub-community. These areas comprise the main areas of more established saltmarsh on the seaward side of the flood bank, and were interspersed with stands of SM6 *Spartina anglica* salt-marsh community, *Spartinetum townsendii*. See Photographs 3 to 5 below.



Photograph 3: 29/09/2020: Quadrat 3 of Stand F (established saltmarsh on seaward side of flood bank) showing a poor to moderate fit for an SM16c mid to upper salt-marsh community. This stand was dominated by red fescue, sea aster and sea milkwort. A stand of common cord-grass (*Spartina anglica*), or SM6, can be seen behind (bright green). SM16c qualifies as Section 7 and SAC ('Atlantic salt meadow') habitat

Four out of the seven constants for sub-community SM16c were recorded in both Stands F and K and three of the remaining species recorded in both stands are also listed in the floristic table

for this sub-community. Although creeping bent (*Agrostis stolonifera*) and saltmarsh rush (*Juncus gerardii*), constants in the floristic table, were not recorded in either stand, Rodwell does note that in this sub-community saltmarsh rush is rather variable in amount and even when abundant may be difficult to detect in close-cropped turf. This divergence from the tabulated SM16c community may also be because these stands are transitional with a lower marsh community such as SM13.



Photograph 4: 29/09/2020: Lax-flowered sea lavender located within Stand F (one plant recorded)



Photograph 5: 10/10/2020: Stand K, dominated by red fescue, with thrift, sea aster, sea plantain, saltmarsh grass and greater sea-spurrey. Likely to represent an SM16c transitional with a lower marsh community such as SM13

This sub-community represents Section 7 habitat 'Coastal Saltmarsh' and is also one of the communities listed as representing the 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)' feature of Pen Llyn a'r Sarnau SAC on the JNCC web-page describing the SAC features.

Lax-flowered sea lavender (*Limonium humile*) was also recorded in Stand F (see Photograph 4 above and Figure 3 below), which is listed as Nationally Scarce on the National Biodiversity Network (NBN) Atlas.

SM16ci: *Festuca rubra* salt-marsh community *Juncetum gerardi, Festuca rubra-Glaux maritima* sub-community, *Agrostis stolonifera* variant

Stands E, G and H also seem to have most in common with an SM16c sub-community. These areas cover the campsite fields within the tidal floodplain and two small patches of vegetation on the west side of the pool on the seaward side of the breach in the flood bank (see Photographs 6 and 7 and Figure 3 below). These areas were dominated by red fescue and creeping bent but no saltmarsh rush was recorded, so seem to be best described by the *Agrostis stolonifera* variant of the SM16c sub-community, SM16ci, in which *Juncus gerardii* (saltmarsh rush) is very poorly represented. According to Rodwell (2000), this community can be achieved over a number of years by mowing during the growing season and application of fertiliser and sometimes of selective herbicides, which could be the case in Stand E (campsite fields). Stand E is a moderate to good fit for the SM16ci sub-community. It is also possible that these areas are actually an SM16c but that the presence of saltmarsh rush was overlooked due to the close-cropped / mown sward.



Photograph 6: 09/09/2020: Quadrat 1 of Stand E (campsite fields within the tidal floodplain), dominated by red fescue, creeping bent and sea arrowgrass, and likely to represent an SM16ci whereby saltmarsh rush is poorly represented due to mowing and possible application of fertiliser and selective herbicides



Photograph 7: 29/09/2020: Stands G and H adjacent to the pool on the seaward side of the breach in the flood bank (visible behind), dominated by red fescue and creeping bent, with sea club-rush also abundant in Stand G, sea milkwort frequent in both and sea plantain also frequent in Stand H. Likely to represent an SM16ci

Four out of the five constants for sub-community SM16ci were recorded in Stand E and three out of the nine remaining species recorded in Stand E are also listed in the floristic table for an SM16ci. The main differences were that thrift (*Armeria maritima*), a constant in the floristic table, was not recorded in Stands E, G or H and that sea milkwort (*Glaux maritima*) and sea plantain (*Plantago maritima*) were not as abundant in Stand E as they are shown to be in the floristic table. In Stand G, sea club-rush (*Scirpus maritimus*) was also abundant but is not listed in the floristic table for any of the SM16 sub-communties.

This sub-community represents Section 7 habitat 'Coastal Saltmarsh' and is also one of the communities listed as representing the 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)' feature of Pen Llyn a'r Sarnau SAC on the JNCC web-page describing the SAC features.

4.1.3 Lower Marsh

SM13a: *Puccinellia maritima* salt-marsh community *Puccinellietum maritimae*, sub-community with *Puccinellia maritima* dominant

The small patches of habitat on the seaward side of the flood bank, identified as Stand I on Figure 3, are sparsely vegetated and species-poor, dominated by saltmarsh grass (*Puccinellia maritima*), with occasional sea plantain (*Plantago maritima*), glasswort (*Salicornia* species) and annual sea-blite (*Suaeda maritima*). See Photograph 8 below. This keys out as an SM13a, which represents Section 7 habitat 'Coastal saltmarsh' and is also one of the communities listed as representing the 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)' feature of Pen Llyn a'r Sarnau SAC on the JNCC web-page describing the SAC features.



Photograph 8: 29/09/2020: One patch of Stand I, adjacent to the pool on the seaward side of the breach in the flood bank (visible behind), dominated by saltmarsh grass, with occasional sea plantain and resembling an SM13a community



Photograph 9: 29/09/2020: Corner of a patch of SM13d, dominated by saltmarsh grass with sea plantain and thrift, with SM18a (dominated by sea rush) at the base of the flood bank behind

SM13b: *Puccinellia maritima* salt-marsh community *Puccinellietum maritimae*, *Glaux maritima* sub-community
and
SM13d: *Puccinellia maritima* salt-marsh community *Puccinellietum maritimae*, *Plantago maritima Armeria maritima* sub-community
Small patches of both these sub-communities were also present on the lower marsh (see Figure 3 below), comprising saltmarsh grass with either sea milkwort (*Glaux maritima*) or sea plantain (*Plantago maritima*) and thrift (*Armeria maritima*) prominent in the sward (see Photograph 9 above and Figure 3 below). These communities are also Section 7 habitat 'Coastal saltmarsh' and part of the 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)' feature of Pen Llyn a'r Sarnau SAC.

SM8: Annual *Salicornia* salt-marsh community
A few small to medium patches, almost entirely comprising annual *Salicornia*, bare mud and algal mat, with scattered saltmarsh grass, were present in the lower marsh area (see Figure 3 and Photograph 10 below). This is best described by the SM8 community, which would be categorised as Section 7 'Coastal saltmarsh' and also forms part of the '*Salicornia* and other annuals colonising mud and sand' feature of Pen Llyn a'r Sarnau SAC.



Photograph 10: 29/09/2020: One patch of SM8, almost entirely comprising annual *Salicornia* species, bare mud and algal mat, with scattered saltmarsh grass, as shown in Figure 3

4.2 Grassland Communities

4.2.1 Semi-improved Grassland

MG11: *Festuca rubra-Agrostis stolonifera-Potentilla anserine* grassland

At the upper limit of the saltmarsh, where it transitions into terrestrial grassland, in Stand C (part of field in the southwest part of the survey area, lying outside the tidal floodplain) and Quadrat 5 of Stand E in the campsite fields, the community is a good fit for an MG11 mesotrophic grassland. This species-poor grassland community is characteristic of a wide variety of moist but free-draining neutral soils which are, in many cases, frequently inundated by fresh or brackish surface water and is widespread in the UK near sea level and on the upper saltmarsh where it is frequently used as pasture.

At Farchynys, this community was dominated by red fescue (*Festuca rubra*), perennial rye-grass (*Lolium perenne*), silverweed (*Potentilla anserine*) and white clover (*Trifolium repens*), with frequent creeping bent (*Agrostis stolonifera*), autumn hawkbit (*Leontodon autumnalis*), unidentified sedge (*Carex*) species and soft rush (*Juncus effusus*). See Figure 3 and Photograph 11 below.



Photograph 11: 03/09/2020: Quadrat 3 of Stand C between the SM18a mid to upper salt-marsh in Stand B and the broad-leaved woodland on the hillside to the north, representing an MG11 mesotrophic grassland. This stand was dominated by red fescue, perennial rye-grass, silverweed and white clover, with frequent creeping bent, autumn hawkbit, unidentified sedge species and soft rush, and occasional scattered gorse

All the constants for MG11 were recorded in Stand C and Quadrat 5 of Stand E, and 11 out of 19 of the remaining species recorded in Stand C are listed in the floristic table for this community.

In terms of value for conservation, this is a species-poor semi-improved grassland and not a priority or protected habitat. It is therefore not of importance for nature conservation in its own right, although could provide suitable habitat for other species such as birds, invertebrates, reptiles, etc.

4.2.2 Improved Grassland

MG7: *Lolium perenne* leys and related grasslands *Lolio-Plantaginion*

Within sampling point N (see Figure 3 below) in the drier parts of the campsite fields, outside the tidal floodplain, the sward was found to be dominated by perennial rye-grass (*Lolium perenne*), and likely to represent an improved grassland community such as MG7 (see Photograph 12 below). This community was comprised of over 50% perennial rye-grass, with occasional rough meadow-grass (*Poa trivialis*), meadow foxtail (*Alopecurus pratensis*) and autumn hawkbit (*Leontodon autumnalis*). It therefore seems that this area outside the tidal floodplain but still within the low fields grading down into the SM16 saltmarsh within Stand E, is a combination of MG11 in the wetter areas subject to occasional inundation, and MG7 improved grassland.



Photograph 12: 09/09/2020: Improved grassland likely to represent an MG7 in the parts of the low campsite fields that lie outside the tidal floodplain, dominated by perennial rye-grass

4.3 Other Areas/Species

The northeast end of the flood bank, in the vicinity of the campsite, appears to have been raised fairly recently by the addition of rock and other material, and is dominated by gorse scrub for much of its length. This area was not included in the NVC survey. A couple of Japanese knotweed (*Reynoutria japonica*) plants were recorded growing on the flood bank in this area during the survey (see Figure 3 below). This is a non-native invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981.

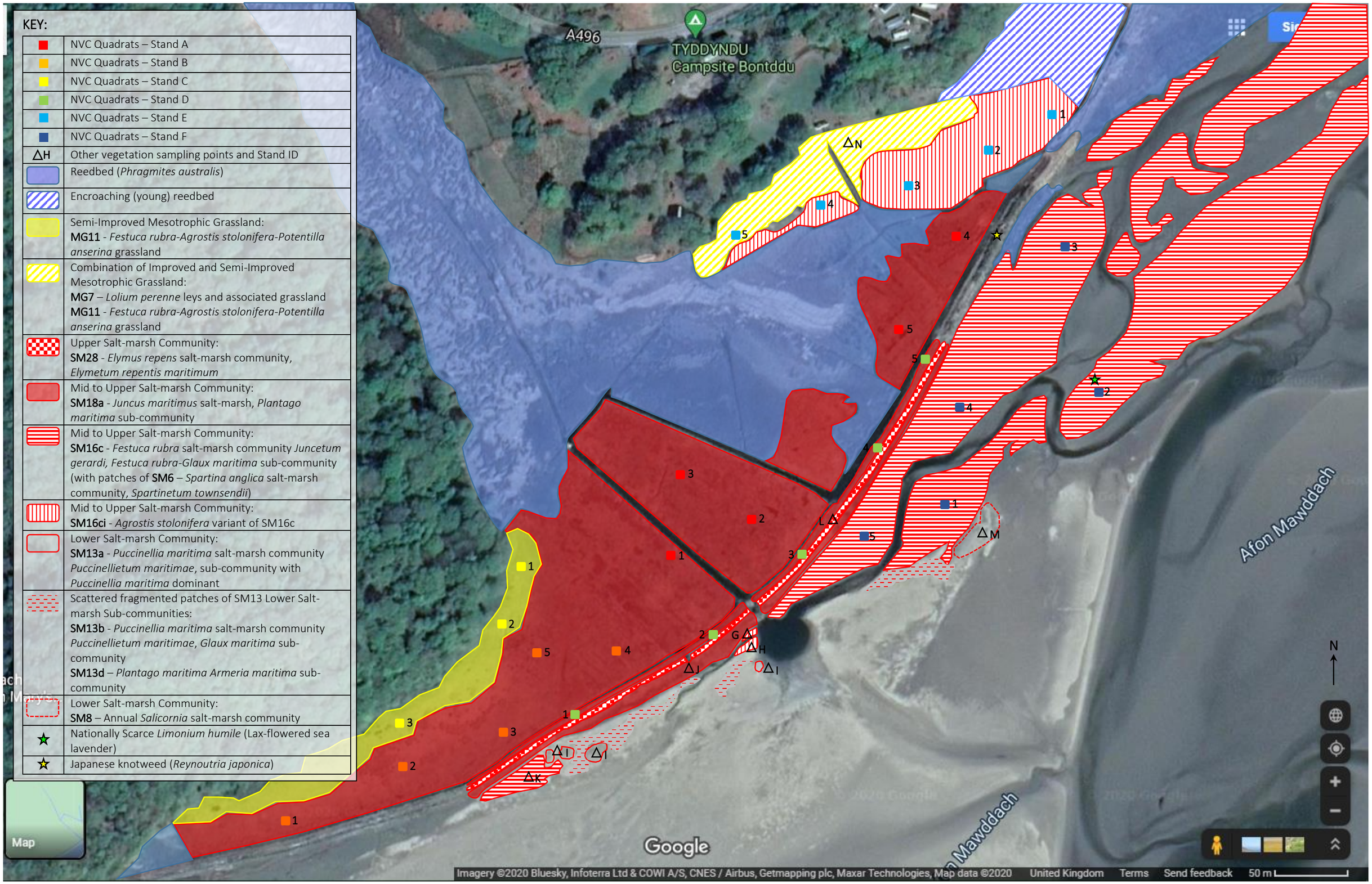


Figure 3: NVC Survey Results from September 2020 for land within and outside the flood embankment at Farchynys, adjacent to Tyddyn Du campsite, Bont Ddu (Aerial photograph taken from Google Maps as referenced above, date unknown but no earlier than 2017)

5.0 Conclusions

5.1 Summary of NVC Communities

On the seaward side of the flood bank, the survey area was found to be comprised of lower saltmarsh communities (SM8 and SM13a, b and d) and mid to upper saltmarsh (SM16c and ci and SM18a), with some stands of SM6 (*Spartina anglica*). The flood bank itself generally comprised SM18a mid to upper saltmarsh on the sides and an SM28 upper saltmarsh community along the very top of the bank. On the landward side of the flood bank, the areas within the tidal floodplain were mainly comprised of SM18a mid to upper saltmarsh (also with sporadic patches of SM6 *Spartina anglica*), becoming dominated by *Phragmites australis* reedbed further up the inlet. However, the campsite fields within the tidal floodplain were most similar to an SM16ci community, possibly due to mowing and some improvement with fertiliser and selective herbicides. Outside the tidal floodplain, the saltmarsh graded into MG11 mesotrophic grassland both in the field at the bottom of the wooded hillside at the southwest end of the survey area and in the campsite fields, where there were also areas of the improved perennial ryegrass-dominated grassland community MG7.

5.2 Important Ecological Features

In terms of important ecological features that would need to be considered in an ecological impact assessment of any proposals in this area, including Habitats Regulations Assessment (HRA) where relevant, the following were identified (see Figure 3 above for locations):

- 'Coastal saltmarsh' Section 7 habitat (= SM8, SM13a, b and d, SM16c and ci, SM18a and SM28);
- 'Reedbeds' Section 7 habitat;
- 'Coastal and floodplain grazing marsh' Section 7 habitat (= MG11);
- 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)' feature of Pen Llyn a'r Sarnau SAC (= SM13a, b and d, SM16c and ci and SM18a);
- '*Salicornia* and other annuals colonising mud and sand' feature of Pen Llyn a'r Sarnau SAC (= SM8);
- Lax-flowered sea lavender (*Limonium humile*) as a nationally scarce plant species; and
- Japanese knotweed (*Reynoutria japonica*) as a Schedule 9 non-native invasive plant species;
- Common cord-grass (*Spartina anglica*) should also probably be included, as an invasive species of saltmarsh habitat, with the Site Management Statement (SMS) for Aber Mawddach SSSI specifying a vision for cord-grass to be decreasing within the site, since it was mapped in 1994.

Please note that this survey only concentrated on vegetative features and other important ecological features may also be present within the area. For example, otter spraints and an otter resting site were also identified on the flood bank within the area not surveyed adjacent to the campsite at the northeast end.

5.3 Further Survey

Further NVC survey may be required following the submission of more detailed proposals. For example, the areas shown on Figure 4 below are shown to lie within the tidal floodplain but

were not included in this NVC survey and could potentially include important NVC communities such as SAC features or Section 7 habitat.

As mentioned above, it would be a good idea to map the extent and distribution of common cord-grass stands within the survey area and any additional areas required. It would then be possible to assess whether any proposals would be likely to cause this species to spread within the saltmarsh habitat causing an adverse impact on the protected sites. This should be plotted using a recent aerial photograph as a basemap to aid the accuracy of the mapping.

The NVC and cord-grass survey results should also be digitised as GIS files to enable more accurate calculations of areas involved and improve the assessment of impacts.



Figure 4: Tidal floodplain at Farchynys (green) showing area within the floodplain but not shown as reedbed and not included within this NVC survey (orange polygon), which may include further ecologically important NVC communities

6.0 References

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Appendix I:
2020 NVC Survey Data

NVC Record Form

Project CPF and Name:	7174 Farchynys
Survey Location:	Coastal floodplain between Farchynys Hall and Bont Ddu (adjacent to and including some of Tyddyn Du Campsite. NGR SH 6669 1810
Survey Date(s):	01/09/20; 03/09/20; 04/09/20; 09/09/20; 10/09/20; 28/09/20; 29/09/20
Description of Habitat (e.g. Hydrology, Altitude, Geology, Land Use):	Saltmarsh within tidal floodplain on both sides of flood embankment, grassland strip along top of embankment and strip of grassland just outside coastal floodplain along woodland edge. Low intensity sheep-grazed. Part of saltmarsh within campsite (Tyddyn Du)
No. of Homogenous Stands and Quadrat Size:	6 stands (A - F). 2mx2m quadrats (3 or 5 in each stand). Also species composition and proportions for 5 further small stands (G - K) and species list for Stand L.
Stand Name (and Description):	A: Water-logged saltmarsh with mosaic of rushes and shorter greener sward with scattered pools on landward side of embankment, enclosed by ditches B: Area within tidal floodplain within field bordering woodland at western end of survey area. Quite wet with scattered rushes and cattle poaching in eastern corner C: Strip of drier grassland along northern edge of Stand B, bordered by wooded hillside to north D: Strip of grassy saltmarsh with scattered rush between flood embankment and ditch to north E: Campsite fields located within tidal floodplain with bright green short sward. Quite wet F: Established saltmarsh with creeks and pools on seaward side of embankment G-K: Pioneer to mid-marsh communities on the lower saltmarsh (seaward side of embankment); L = Top of embankment

Species		Quadrat No. (Species Cover recorded using Domin Scale)																										Constancy and Cover Values (for pooled stand data)						Cover Values for Pioneer and Lower Marsh Communities (Quadrats not undertaken) and Species List for top of embankment (L)					
		Stand A					Stand B					Stand C			Stand D					Stand E					Stand F														
Scientific name	**Common name**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
Agrostis stolonifera	Creeping bent	-	-	5	3	5	6	5	3	-	3	-	7	5	6	+	4	9	6	6	5	4	6	6						III(3-5)	IV(3-6)	III(5-7)	IV(4-9)	V(4-6)		10	4				✓
Armeria maritima	Thrift														-	-	-	-	+														+						3	✓
Aster tripolium	Sea aster	7	5	6	4	4	1	-	1	3	+				1	3	3	2	3	-	1	-	-	-	5	3	5	+	6	V(4-7)	III(1-3)		V(1-3)	I(1)	IV(3-6)	2	2		4	3	✓
Atriplex patula	Common orache						-	1	+	-	-	1	-	-	4	-	3	+	1												I(1)	II(1)	III(1-4)								✓
Atriplex prostrata	Spear-leaved orache														-	-	-	1	1														III(1)							✓
Carex species A	Unknown sedge species A						-	3	1	-	-	-	1	4						-	1	-	-	+							II(1-3)	III(1-4)		I(1)							✓
Carex species B	Unknown sedge species B																			-	-	-	-	1									I(1)							
Carex extensa	Long-bracted sedge	-	-	-	+	-																								+									2		
Cirsium arvense	Creeping thistle																																								✓
Cochlearia anglica	English scurvygrass	1	2	1	3	+	-	3	+	+	+				+	-	2	2	+											IV(1-3)	I(3)		II(2)								
Cochlearia officinalis	Common scurvygrass	-	2	-	+	-	1	+	1	2	1	-	-	+	-	1	2	1	1						1	-	-	-	-	I(2)	IV(1-2)	+	IV(1-2)		I(1)				1		✓
Eleocharis uniglumis	Slender spike-rush						2	-	-	-	-																			I(2)										
Elymus repens	Common couch-grass																																							✓
Eurhynchum praelongum	Common feather moss						-	1	-	-	-	2	-	-																I(1)	II(2)										
Festuca rubra	Red fescue	8	9	7	8	8	7	7	9	6	8	4	7	8	8	4	9	7	8	6	6	6	7	6	9	10	9	7	7	V(7-9)	V(6-9)	V(4-8)	V(4-9)	V(6-7)	V(7-10)	5	10		9	8	✓
Glaux maritima	Sea milkwort	4	5	3	3	3	3	5	4	3	5				-	1	+	-	4	-	1	2	-	-	5	7	3	-	1	V(3-5)	V(3-5)		II(1-4)	II(1-2)	IV(1-7)	4	4		3	1	✓
Holcus lanatus	Yorkshire fog											5	-	-																		II(5)								
Juncus effusus	Soft rush											3	-	2																		III(2-3)								
Juncus gerardii	Saltmarsh rush	-	-	-	5	5	2	2	-	3	4				-	-	-	-	4											II(5)	IV(2-4)		I(4)							✓
Juncus maritimus	Sea rush	+	5	8	6	2	-	6	3	3	1	-	-	+	5	10	4	2	7											IV(2-8)	IV(1-6)	+	V(2-10)						5		✓
Leontodon autumnalis	Autumn hawkbit						-	+	-	-	-	-	2	4						-	3	-	1	1							+	III(2-4)		III(1-3)							✓
Lolium perenne	Perennial rye-grass											5	5	4						-	-	-	-	4							V(4-5)		I(4)							
Oenanthe lachenalii	Parsley water dropwort														-	+	-	1	-														I(1)							✓
Phragmites australis	Common reed																			2	-	1	-	-										II(1-2)							
Plantago coronopus	Bucks-horn plantain						1	1	-	-	-	-	-	+																	II(1)	+									
Plantago maritima	Sea plantain	6	5	4	4	4	3	+	2	3	1	-	+	+	-	3	+	3	2	-	-	1	1	-	2	2	+	-	-	V(4-6)	IV(1-3)	+	III(2-3)	II(1)	II(2)		4	3	5	3	✓
Potentilla anserina	Silverweed											3	3	3						-	-	-	-	1							V(3)		I(1)							✓
Puccinellia maritima	Common saltmarsh-grass																																					9		3	
Rumex crispus	Curled dock																																								✓
Salicornia species	Annual glasswort species																																					2			
Scirpus maritimus	Sea club-rush																								2	-	4	5	3						IV(2-5)	6			4		
Sonchus arvensis	Perennial sow-thistle																																								✓
Spartina anglica	Common cordgrass	+	+	-	+	-																			5	+	+	6	8	+					III(5-8)	4	1		3	3	✓
Spergularia media	Greater sea-spurrey	1	-	-	-	-	1	-	-	-	-														3	-	1	-	-	I(1)	I(1)				II(1-3)				3	
Suaeda maritima	Annual sea-blite																																					1		1	
Trifolium repens	White clover						1	1	-	-	-	3	2	2						-	2	-	-	-							II(1)	V(2-3)		I(2)							
Triglochin maritima	Sea arrow-grass	5	3	4	4	3	6	5	5	7	7	-	+	1	-	-	3	-	2	9	8	8	6	-	1	-	4	6	4	V(3-5)	V(5-7)	II(1)	II(2-3)	IV(6-9)	IV(1-6)				2		
Tripleurospermum maritimum (*Ma*	Sea mayweed																																								✓
Ulex europaeus	Gorse											-	-	+																		+									✓
?	Filamentous alga						-	-	-	3	-				-	5	-	-	-						-	-	3	-	-		I(3)		I(5)		I(3)					

Analysis of Pooled Data (green = constant species)

Stand A		
Species (in order of constancy / abundance)*	**Constancy and Cover Values**	
Festuca rubra	V(7-9)	f
Aster tripolium	V(4-7)	f
Plantago maritima	V(4-6)	f
Glaux maritima	V(3-5)	f
Triglochin maritima	V(3-5)	f
Juncus maritimus	IV(2-8)	
Cochlearia anglica	IV(1-3)	
Agrostis stolonifera	III(3-5)	o
Juncus gerardii	II(5)	o
Cochlearia officinalis	I(2)	r
Spergularia media	I(1)	r
Carex extensa	+	
Spartina anglica	+	

Additional Species:

Atriplex patula (Common orache)

Conclusion:

In 'British Plant Communities: Volume 5', this keys out as SM18 *Juncus maritimus* salt-marsh, *Plantago maritima* sub-community (**SM18a**). This is a mid to upper marsh community. Stand A is a **good fit** for this sub-community.

Similarities:

All the constants for this sub-community are present in Stand A, with 5 out of 7 of these also appearing as constants in Stand A. 3 out of the 7 remaining species recorded in Stand A are also listed in the floristic table for Sub-community SM18a.

Differences:

Agrostis stolonifera is not quite as abundant in Stand A as it is in the floristic table for SM18a but it could have been over-looked in some quadrats. The same applies to *Juncus gerardii*. *Leontodon autumnalis* and *Armeria maritima* are listed in the floristic table as being fairly frequent in the sward (III) but were not recorded in Stand A. Conversely, *Aster tripolium* was more abundant in Stand A (V) than in the floristic table (III).

Stand B		
Species (in order of constancy/abundance)	**Constancy and Cover Values**	
Festuca rubra	V(6-9)	f
Triglochin maritima	V(5-7)	f
Glaux maritima	V(3-5)	f
Agrostis stolonifera	IV(3-6)	f
Juncus maritimus	IV(1-6)	
Juncus gerardii	IV(2-4)	f
Plantago maritima	IV(1-3)	f
Cochlearia officinalis	IV(1-2)	f
Aster tripolium	III(1-3)	o
Carex species *A*	II(1-3)	
Plantago coronopus	II(1)	
Trifolium repens	II(1)	
Cochlearia anglica	I(3)	
Filamentous alga	I(3)	
Eleocharis uniglumis	I(2)	r
Atriplex patula	I(1)	
Eurhynchum praelongum	I(1)	
Spergularia media	I(1)	r
Leontodon autumnalis (Scorzon	+	

Additional Species:

Carex extensa (Long-bracted sedge)

Conclusion:

In 'British Plant Communities: Volume 5', this keys out as SM18 *Juncus maritimus* salt-marsh, *Plantago maritima* sub-community (**SM18a**). This is a mid to upper marsh community. Stand B is a **very good fit** for this sub-community.

Similarities:

All the constants for this sub-community are present as constants in Stand B. 7 out of the remaining 13 species recorded in Stand B are also listed in the floristic table for SM18a.

Differences:

Armeria maritima is listed in the floristic table as being fairly frequent in the sward (III) but was not recorded in Stand B.

Stand C		
Species (in order of constancy/abundance)	**Constancy and Cover Values**	
Festuca rubra	V(4-8)	f
Lolium perenne	V(4-5)	
Potentilla anserina	V(3)	
Trifolium repens	V(2-3)	
Agrostis stolonifera	III(5-7)	o
Leontodon autumnalis (Scorzon	III(2-4)	
Carex species A	III(1-4)	
Juncus effusus	III(2-3)	
Holcus lanatus	II(5)	
Eurhynchum praelongum	II(2)	
Atriplex patula	II(1)	
Triglochin maritima	II(1)	o
Cochlearia officinalis	+	r
Juncus maritimus	+	
Plantago coronopus	+	
Plantago maritima	+	r
Ulex europaeus	+	

Additional Species:

Rumex crispus (Curled dock)

Eleocharis uniglumis (Slender spike-rush) r

Glaux maritima (Sea milkwort) r

Juncus articulatus (Jointed rush)

Juncus gerardii (Saltmarsh rush) r

Conclusion:

This keys out as **MG11** although the sub-community is not clear. This is the Mesotrophic Grassland community *Festuca rubra-Agrostis stolonifera-Potentilla anserina* grassland. This species-poor community is characteristic of a wide variety of moist but free-draining circumneutral soils which are, in many cases, frequently inundated with fresh or brackish surface water. It is a lowland vegetation type, especially frequent near sea-level, and it occurs as extensive stands in the flood-plains of major rivers and on the upper salt-marsh where it is frequently used as pasture.

Similarities:

All the constants for this community are present in Stand C, with 2 out of 3 of these also appearing as constants in Stand C. 11 out of the remaining 19 species recorded in Stand C are also listed in the floristic table for MG11.

Differences:

Lolium perenne, Trifolium repens and *Leontodon autumnalis* were all more abundant in Stand C than indicated in the floristic table for MG11.

Stand D		
Species (in order of constancy / abundance)	**Constancy and Cover Values**	
Festuca rubra	V(4-9)	f
Juncus maritimus	V(2-10)	
Aster tripolium	V(1-3)	f
Agrostis stolonifera	IV(4-9)	f
Cochlearia officinalis	IV(1-2)	f
Atriplex patula	III(1-4)	
Plantago maritima	III(2-3)	o
Glaux maritima	II(1-4)	o
Triglochin maritima	II(2-3)	o
Cochlearia anglica	II(2)	
Atriplex prostrata	II(1)	
Filamentous alga	I(5)	
Juncus gerardii	I(4)	r
Oenanthe lachenalii	I(1)	
Armeria maritima	+	r

Conclusion:

In 'British Plant Communities: Volume 5', this keys out as SM18 *Juncus maritimus* salt-marsh, *Plantago maritima* sub-community (**SM18a**). This is a mid to upper marsh community. Stand C is a **good fit** for this sub-community.

Similarities:

All the constants of this sub-community are present in Stand D, with 3 out of 7 of these also appearing as constants in Stand D. 6 out of the 8 remaining species recorded in Stand D are also listed in the floristic table for sub-community SM18a.

Differences:

Plantago maritima, Glaux maritima, Triglochin maritima and especially *Juncus gerardii* and *Armeria maritima* are not as abundant in Stand D as they are shown to be in the floristic table for SM18a. *Leontodon autumnalis, Trifolium repens* and *Carex extensa* are listed in the floristic table as being fairly frequent in the sward but were not recorded in Stand D. Conversely, *Aster tripolium* and *Cochlearia officinalis* were more abundant in Stand D than in the floristic table.

Stand E		
Species (in order of constancy / abundance)	**Constancy and Cover Values**	
Festuca rubra	V(6-7)	f
Agrostis stolonifera	V(4-6)	f
Triglochin maritima	IV(6-9)	f
Leontodon autumnalis (Scora	III(1-3)	
Glaux maritima	II(1-2)	o
Phragmites australis	II(1-2)	
Plantago maritima	II(1)	o
Lolium perenne	I(4)	
Trifolium repens	I(2)	
Aster tripolium	I(1)	r
Carex species A	I(1)	
Carex species B	I(1)	
Potentilla anserina	I(1)	

Conclusion:

In 'British Plant Communities: Volume 5', this keys out as SM16 *Festuca rubra* salt-marsh community *Juncetum gerardi* , *Festuca rubra-Glaux maritima* sub-community (**SM16c**), and specifically, the *Agrostis stolonifera* variant in which *Juncus gerardii* is very poorly represented (= **SM16ci**). This is a mid to upper marsh community. This community can be achieved over a number of years by mowing during the growing season and application of fertiliser and sometimes of selective herbicides. Stand E is a **moderate to good fit** for this sub-community.

Similarities:

4 out of 5 of the constants for this sub-community variant are present in Stand E, including 2 of the 3 constants recorded in this stand. 3 out of the 9 remaining species recorded in Stand E are also listed in the floristic table for sub-community SM16ci.

Differences:

Armeria maritima is listed as a constant in the floristic table for this sub-community but was not recorded in Stand E. *Glaux maritima* and *Plantago maritima* are not as abundant in Stand E as they are in the floristic table for SM16ci. *Leontodon autumnalis* was a bit more abundant in Stand E than in the floristic table for SM16c.

Stand F		
Species (in order of constancy / abundance)	**Constancy and Cover Values**	
Festuca rubra	V(7-10)	f
Aster tripolium	IV(3-6)	f
Glaux maritima	IV(1-7)	f
Scirpus maritimus	IV(2-5)	
Triglochin maritima	IV(1-6)	f
Spartina anglica	III(5-8)	
Plantago maritima	II(2)	o
Spergularia media	II(1-3)	o
Filamentous alga	I(3)	
Cochlearia officinalis	I(1)	r

Additional Species:

Juncus maritimus (Sea rush)

Limonium humile (Lax-flowered sea lavender) r

Conclusion:

In 'British Plant Communities: Volume 5', this keys out as SM16 *Festuca rubra* salt-marsh community *Juncetum gerardi, Festuca rubra-Glaux maritima* sub-community (**SM16c**). This is a mid to upper marsh community. Stand F is a **poor to moderate fit** for this sub-community.

Similarities:

4 out of 7 of the constants for this sub-community are present in Stand F, including 3 of the 5 constants recorded in this stand. 3 out of the 8 remaining species recorded in Stand F are also listed in the floristic table for sub-community SM16c.

Differences:

Juncus gerardii, Agrostis stolonifera and *Armeria maritima* are listed as constants in the floristic table for this sub-community but were not recorded in Stand F. *Scirpus maritimus* was recorded as a constant in Stand F but is not listed in the floristic table for the sub-community. *Spartina anglica* was also recorded frequently in Stand F but is not listed in the floristic table for SM16c.

Alternatives: This may be just SM16c and *Juncus gerardii* may have been over-looked due to the close-cropped (mown?) sward.

***Species in bold are constants for the relevant NVC community and/or sub-community**

Analysis of Pioneer Communities Data

Stand G

Agrostis stolonifera	10
Scirpus maritimus	6
Festuca rubra	5
Glaux maritima	4
Spartina anglica	4
Aster tripolium (rayed)	2

Keys out as **SM16ci**

Mid to upper marsh community

Stand H

Festuca rubra	10
Agrostis stolonifera	4
Glaux maritima	4
Plantago maritima	4
Aster tripolium (rayed)	2
Spartina anglica	1

Keys out as **SM16ci**

Mid to upper marsh community

Stand I

Puccinellia maritima	9
Plantago maritima	3
Salicornia species	2
Suaeda maritima	1

Keys out as **SM13a**

Puccinellia maritima salt-marsh community *Puccinellietum maritimae* , sub-community with *Puccinellia maritima* dominant

Lower marsh community

Stand J

Festuca rubra	9
Juncus maritimus	5
Plantago maritima	5
Aster tripolium	4
Scirpus maritimus	4
Glaux maritima	3
Spartina anglica	3
Carex extensa	2
Triglochin maritima	2
Cochlearia officinalis	1

Keys out as **SM18a**

Mid to upper marsh community

Stand K

Festuca rubra	8
Armeria maritima	3
Aster tripolium	3
Plantago maritima	3
Puccinellia maritima	3
Spartina anglica	3
Spergularia media	3
Glaux maritima	1
Suaeda maritima	1

Probably **SM16c** because, according to British Plant Communities, Volume 5, on heavily-grazed marshes, especially in northwest England, swards lacking *Trifolium repens* , *Leontodon autumnalis* and *Potentilla anserina,* may also have a very low cover of either *Festuca rubra, Agrostis stolonifera* or *Juncus gerardii.* These are best considered as derivatives of the *Festuca-Glaux* sub-community of the *Juncetum gerardi* .

Mid to upper marsh community

Stand L - Top of Embankment

Agrostis stolonifera
Armeria maritima
Aster tripolium
Atriplex patula
Atriplex prostrata
Carex species A
Cirsium arvense
Cochlearia officinalis
Elymus repens
Festuca rubra
Glaux maritima
Juncus gerardii
Juncus maritimus
Leontodon autumnalis
Oenanthe lachenalii
Plantago maritima
Potentilla anserina
Rumex crispus
Sonchus arvensis
Spartina anglica
Tripleurospermum maritimum (Matricaria ma
Ulex europaeus

Likely to be **SM28**, *Elymus repens* salt-marsh community, *Elymetum repentis maritimum,* as there are many similarities between the species list above and the floristic table for this community. All the constants from the table are present in Stand L, 6 out of the 7 species listed in the Table as II or III on the Domin Scale are present in Stand L and 6 of the remaining species recorded in the stand are also listed in the floristic table. However, due to the time of year the survey was undertaken (September) and the lack of time to undertake a full NVC of this stand, identification of the grasses may not be 100% accurate. For example, the couch-grass species may have been Sea couch, or a combination of Sea and Common couch or a hybrid of the two.

Upper marsh community