

NOTE TO FILE

JBA Project Code	2019s0183
Contract	Cardiff Coastal Design
Client	Cardiff City Council
Date	06 November 2019
Author	Steven Heathcote
Subject	Detailed Botanical Survey - Saltmarsh

1 Introduction

The original Cardiff Coastal Defences OBC was completed in March 2017 by JBA Consulting on behalf of Cardiff City Council (CCC) and subsequently approved by Welsh Government (WG) in the same year. In 2019 JBA Consulting were commissioned to undertake the detailed design and Full Business Case of the proposed scheme. As part of the design works an updated Preliminary Ecological Appraisal was undertaken and it was identified that there are significant areas of saltmarsh within the study area. As the saltmarsh habitat is a qualifying interest feature of the River Severn SAC, within which the project is located, a detailed botanical saltmarsh survey was undertaken to inform option design and potential mitigation requirements.

This report presents the results of the detailed botanical surveys, which assess the extent of saltmarsh habitat within the footprint of the proposed coastal and estuary defences.

1.1 Proposed Scheme

The Tremorfa and Pengam Green areas of Cardiff are at significant risk of flooding from the sea and the Rhymney River. Also, much of the coastline in this area is eroding due to wave action. Flood and erosion risk will increase into the future due to rising sea levels caused by climate change.

The proposed flood and erosion risk management scheme extends from Rover Way in the west to Lamby Way in the east, extending up the River Rhymney as far as the railway bridge (Figure 1). The project aims to improve the existing coastal and fluvial defences to provide improved protection to people and property in parts of south east Cardiff from coastal erosion and flood risk over the next 100 years, and prevent the erosion of two decommissioned landfill sites; The Frag Tip and Lamby Way Tip.

Much of the coastline across the project area is eroding and with predicted sea level rise due to climate change, the flood and erosion risk will increase into the future. The proposed scheme will manage flood risk to over 1,200 residential and over 70 non-residential properties over 100 years, as well as preventing erosion of landfill material, key road infrastructure and the Rover Way Travellers Site.

The scheme comprises rock revetment across the coastal frontages, with raising of the existing defence along much of the riverbank and new river defences where required. Further to this, erosion management will be undertaken along key eroding river sections either in the form of rock revetment or green bioengineering options.

Land uses within the site include Tremorfa Industrial Estate, a large steel works, the main municipal landfill site for Cardiff along with residential and commercial properties.

Environmental issues may be exacerbated by contaminated land located within the study area which could pollute the Severn Estuary if inundated by tidal waters. Figure 1—1 shows the current redline boundary for the defences, including an estimated associated working area for construction.

1.2 Site Location

The proposed project encompasses two areas of the city located east and west of the Rhymney River. The eastern area comprises the Lamby Way landfill site. The western half of the study area consists of large areas of 'made ground' and has been remediated and landscaped, whilst the eastern portion of the site is currently undergoing a capping process.

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The western area of the project comprises a mix of open land, residential, commercial and industrial land use located along Rover Way. Rover Way runs parallel to the foreshore and is an important transport route linking Cardiff city centre with the eastern suburbs of the city and the A48. The extensive Cardiff Waste Water Treatment Works operated by Dwr Cymru are located towards the western boundary of the project area and form part of an industrial park together with a range of recycling and reclamation yards and other manufacturing businesses. The Celsa steelworks plant is located to the west of Rover Way in this area, whilst an adjacent area to the east of Rover Way is used for the storage of waste generated by the plant. The Cardiff Motocross Centre now operates on an area of land located between the waste site and the existing flood defences on the site of a former 'frag tip'.

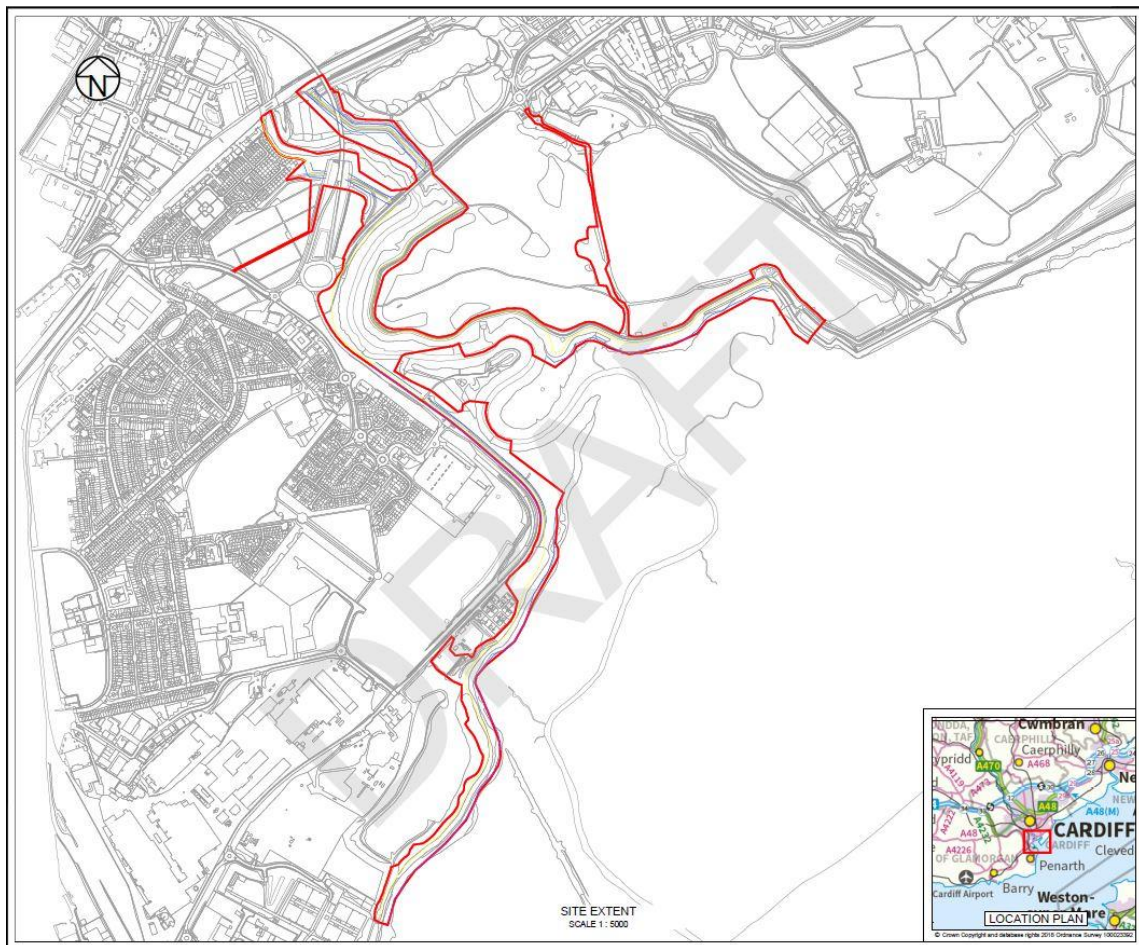


Figure 1—1: Site Location and Work Boundary

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2 Methodology

2.1 Approach

A vegetation survey was carried out on the 14th October 2019 by JBA Ecologists Steven Heathcote and Jon Harrison. This involved a walkover of all accessible areas of saltmarsh on the site. Stands of vegetation were identified by eye on site and mapped onto aerial imagery. Species within the vegetation were recorded along with their abundance. The vegetation stands could be relatively easily assigned to described vegetation so no quadrats were necessary. Vegetation was initially assigned to a community or sub-community of the National Vegetation Classification (Rodwell 1992, 2000). These communities were then assigned to a corresponding Annex I habitat using the interpretation manual (European Commission 2013). Botanical nomenclature follows Stace (2010).

2.2 Limitations

It was not possible to access all areas of saltmarsh. Some areas could be reliably assessed from viewpoints. However, the area associated with the boat club could not be surveyed. It is possible the extent of Annex 1 habitat is underestimated as a result.

Heavy grazing by ponies takes place on the right bank and as a result some of the vegetation is grazed very short meaning species might be overlooked. However, the classification of the habitat relies primarily on the main species present and these could be identified satisfactorily.

October is slightly late in the year for botanical survey, but many saltmarsh species flower later into the year, and the main species necessary to assign vegetation to NVC communities could be readily identified.

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3 Results

3.1 NVC Survey

3.1.1 Communities

In total six NVC communities were identified on site, one of these including three further sub-communities. The vegetation is spread over the upper banks of the river and a number of plateaus where River Rhymney joins the River Severn and the channel of the opens out. Around the plateaus the river is eroding into the banks, and vegetation at the fringes appears fragmentary. The spatial layout of vegetation communities is shown in Figure 2, which maps NVC communities and subcommunities across the site. The table in Appendix A lists the species present on site and the NVC communities in which they were found. A brief description of each community is given below.

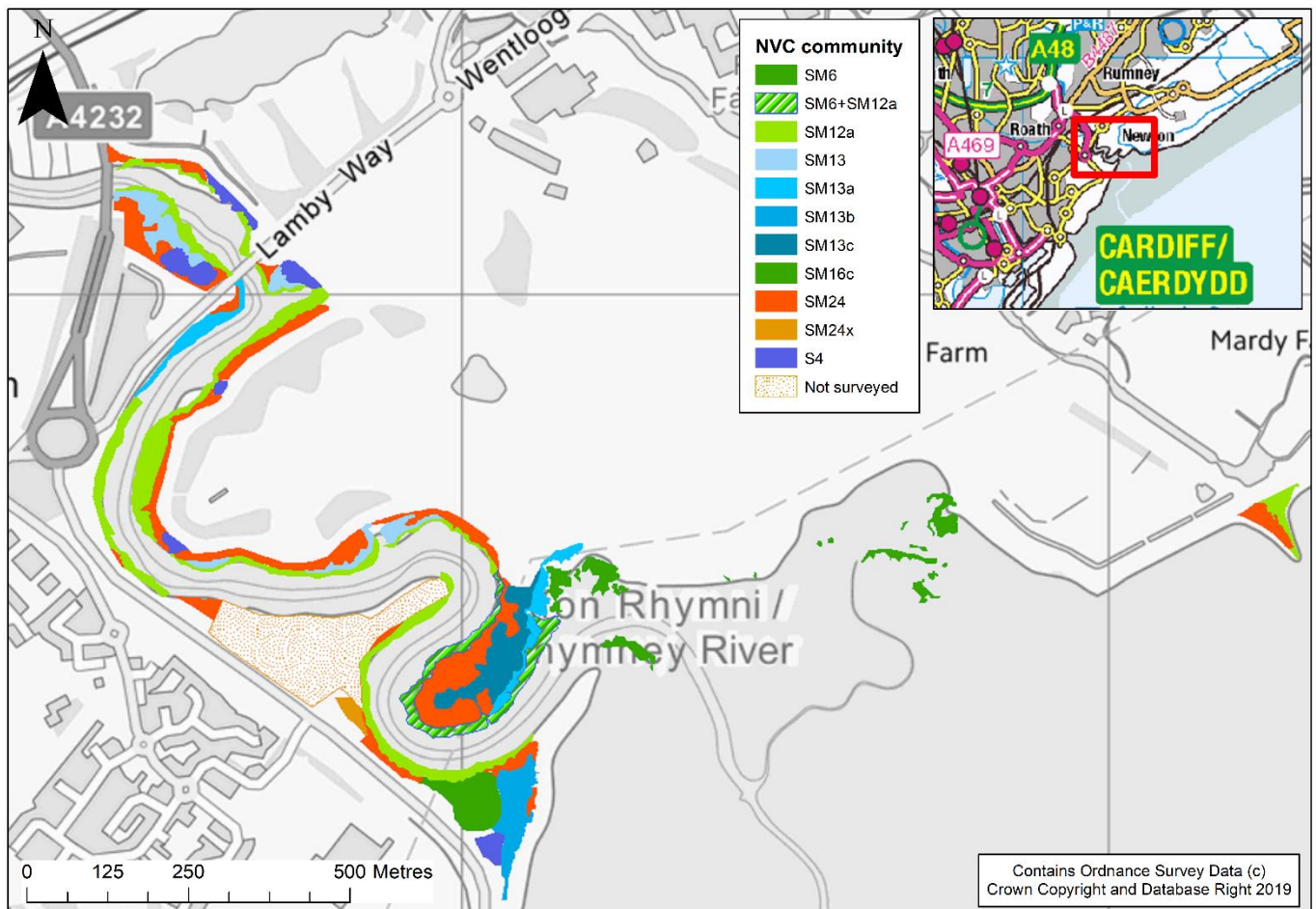


Figure 3—1. Layout of NVC communities

3.1.2 Saltmarsh Vegetation Communities (NVC)

SM6 *Spartina anglica* salt-marsh community: This is a pioneer community consisting of only Common Cord-grass *Spartina anglica* located as isolated stands around the margins of the

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mudflats. In some the Common Cord-grass is also invading the SM12a vegetation, but only in one place is it extensive enough to be mapped as a mosaic of the two communities.



Figure 3—2. SM6 vegetation with yellow flowers of Common Cord-grass visible

SM12a Rayed Aster *tripolium* on salt-marshes: This is a very open vegetation which forms a fringe on the upper banks of the river channel, below the level of the plateaus supporting stable saltmarsh vegetation. Sea Aster *Aster tripolium* is the most obvious component at this time of year, but associated species include Greater Sea-spurrey *Spergularia media* and Glasswort *Salicornia* sp..

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Figure 3—3. Fringe of SM12a (dark green) on upper bank of river

SM13a *Puccinellia maritima* salt-marsh community, sub-community with *Puccinellia maritima* dominant and SM13b *Puccinellia maritima* salt-marsh community, *Glaux maritima* sub-community: There was a narrow band of vegetation located around the seaward edges of the two main saltmarsh plateaus which consisted of stands dominated by Common Saltmarsh-grass *Puccinellia maritima*. On the left bank this vegetation had no other species constant so is assigned to SM13a, but on the right bank Sea-milkwort *Glaux maritima* was present in a more species-rich sward so is assigned to SM13b.

SM13c *Puccinellia maritima* salt-marsh community, *Limonium vulgare*-*Armeria maritima* sub-community: There was a large stand of this vegetation on the largest peninsula on the left bank which forms the colourful and attractive community with a very open sward of Common Saltmarsh-grass and frequent Sea Lavender *Limonium vulgare*, Sea Aster and Glassworts. This vegetation forms a mosaic with SM24, with the SM13c occupying the lower (and hence wetter) areas of the plateau.

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Figure 3—4. A typical view of SM13c vegetation

SM16c *Festuca rubra* salt-marsh community, *Festuca rubra*-*Glaux maritima* sub-community: The plateau on the right bank supports a slightly raised area of ground which is heavily-grazed by ponies. Here the vegetation has a grassy sward dominated by Creeping Bent *Agrostis stolonifera* with Red Fescue *Festuca rubra* constant at low abundance. The associated species are primarily saltmarsh rather than mesotrophic so the vegetation is referred to SM16c, although the fit in not great.

SM24 *Elymus pycnanthus* salt-marsh community: This vegetation was dominant over large stretches of *Festuca rubra*-*Glaux maritima* sub-community on ungrazed ground low enough to be occasionally inundated ground throughout the study area. The vegetation is typically species-poor, dominated by the coarse grass Sea Couch *Elytrigia atherica*. The only constant associate was Spear-leaved Orache *Atriplex prostrata*.

SM24x *Elymus pycnanthus* salt-marsh community: There was one area of grassland which appears to derive from typical SM24 but grazing by ponies has opened the sward allowing other species to colonise and diversify the sward. The vegetation is clearly distinct from the species-poor SM24, but can't be easily assigned elsewhere so it mapped as SM24x.

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Figure 3—5. Species-poor swards of Sea Couch are common in ungrazed areas

3.1.3 Other Communities

S4 *Phragmites australis* swamp and reed-beds: There are several places where Common Reed *Phragmites australis* forms dense stands with few associates.



Figure 3—6. Reedbeds are a conspicuous part of the vegetation in several places

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3.2 Annex 1 habitats

The NVC communities described above were referred to the corresponding EU Annex 1 habitats. Table 1 shows how communities are assigned based on European Commission (2013). This gives a total of 8.2ha of Atlantic salt meadows in the study area.

Table 1. NVC communities referred to Annex 1 habitat

Annex 1 habitat	NVC communities
No equivalent	SM6
1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	SM12a, SM13a, SM13b, SM13c, SM16c
No equivalent	SM24, SM24x, S4

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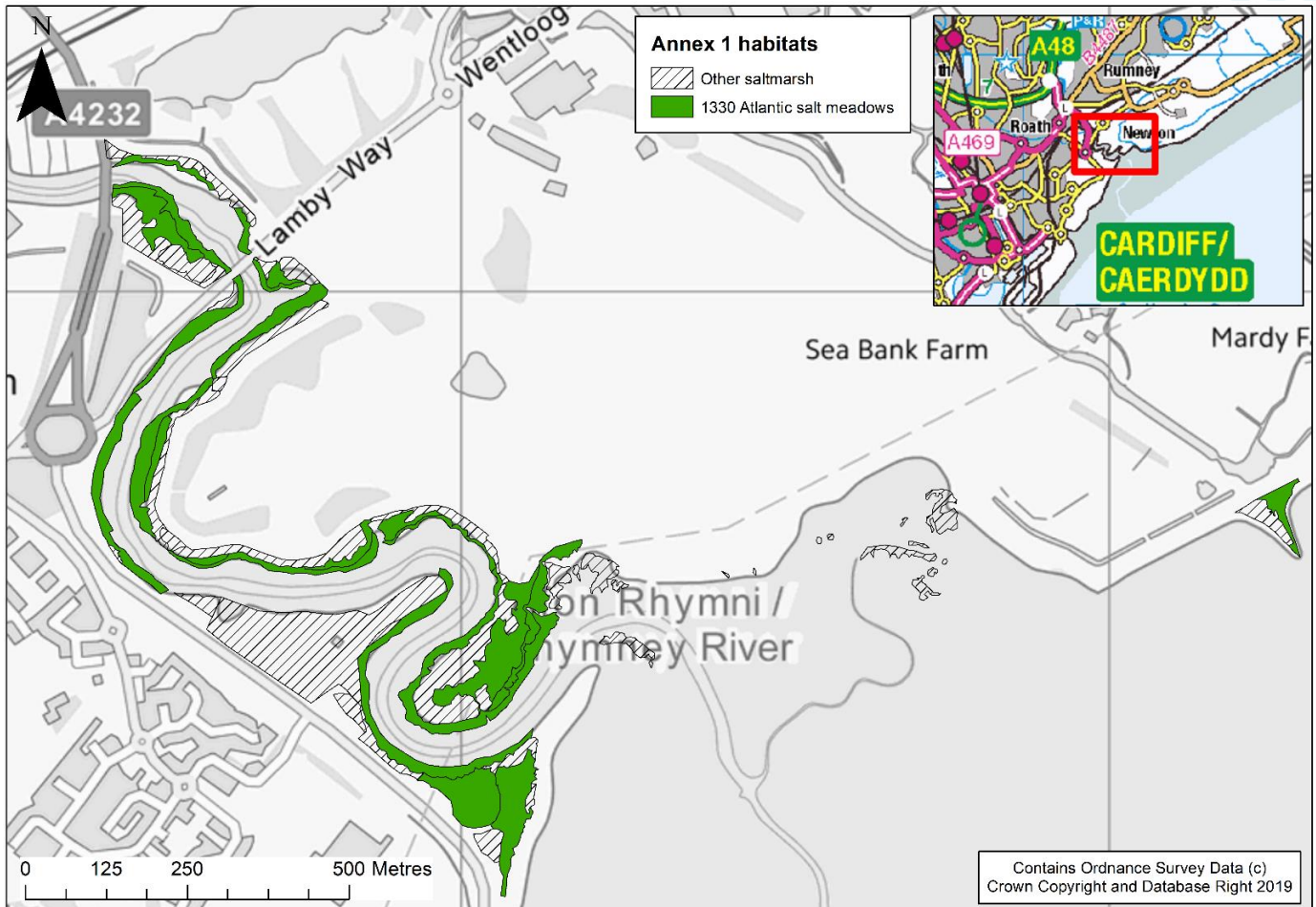


Figure 3—7. Location of Annex 1 saltmarsh

4 Conclusion and Recommendations

4.1 Conclusion

The vegetation on site represents typical saltmarsh habitat occurring in western British saltmarshes. A total of 8.2ha of the vegetation qualify as EU Annex 1 habitat 'H1330 Atlantic salt meadows *Glauco-Puccinellietalia maritimae*'), a designated feature of the Severn Estuary SAC in which at least part of the study area is located. These NVC communities are also notifiable features of the Severn Estuary SSSI, and Habitats of Principal Importance under Section 41 of the NERC Act 2006 (formerly UK BAP priority habitats).

4.2 Recommendations

Impacts to the Annex 1 saltmarsh habitat should be considered as part of the design and the scheme should firstly seek to avoid impacts. However, should an impact to this habitat be identified mitigation or compensation measures may be required.

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5 References

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Appendix A**Plant species present on site**

The table below lists the species recorded on the saltmarsh, with a DAFOR code (D = dominant; A = abundant; F = frequent; O = occasional; R = rare) showing their abundance in each NVC vegetation type found on site.

Taxon	Common Name	SM6	SM12a	NVC SM13a,b,c	SM16	SM24	S4
Vascular Plants							
<i>Agrostis stolonifera</i>	Creeping Bent	-	-	R	A	R	-
<i>Apium graveolens</i>	Wild Celery	-	-	-	R	R	-
<i>Aster tripolium</i>	Sea Aster	-	A	O	R	R	-
<i>Atriplex prostrata</i>	Spear-leaved Orache	-	-	R	R	O	-
<i>Beta vulgaris subsp. maritima</i>	Sea Beet	-	R	-	-	-	-
<i>Bolboschoenus maritimus</i>	Sea Club-rush	-	R	-	-	-	-
<i>Carex extensa</i>	Long-bracted Sedge	-	R	-	-	-	-
<i>Elytrigia atherica</i>	Sea Couch	-	-	-	-	D	R
<i>Festuca rubra agg.</i>	Red Fescue	-	-	-	F	-	-
<i>Glaux maritima</i>	Sea-milkwort	-	R	O	R	-	-
<i>Juncus gerardii</i>	Saltmarsh Rush	-	R	O	F	-	-
<i>Phragmites australis</i>	Common Reed	-	-	-	-	R	D
<i>Plantago maritima</i>	Sea Plantain	-	O	O	R	-	-
<i>Puccinellia maritima</i>	Common Saltmarsh-grass	-	R	A	R	-	-
<i>Schedonorus arundinacea</i>	Tall Fescue	-	-	-	O	-	-
<i>Spartina anglica</i>	Common Cord-grass	D	R	-	-	-	-
<i>Spergularia media</i>	Greater Sea-spurrey	-	O	R	-	-	-
Bryophytes							
<i>Henediella heimii</i>	Heim's Pottia	-	-	-	R	-	-
<i>Amblystegium serpens</i>	Creeping Feather-moss	-	-	-	-	O	-

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Figure 0—1. Inflorescences of Long-bracted Sedge.



Figure 0—2. Heim's Pottia in SM16 saltmarsh.

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Figure 0—3. Wild Celery in SM24 vegetation



Figure 0—4. Spear-leaved Orache fruits in SM24 vegetation