

Strathy Coast SSSI – Site Condition Monitoring of coastal features 2016





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RESEARCH REPORT

Research Report No. 1067

Strathy Coast SSSI – Site Condition Monitoring of coastal features 2016

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SCM Reports

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The views expressed in the report are those of the contractor concerned and have been used by SNH staff to inform the condition assessment for the individual special features. Where the report recommends a particular condition for an individual feature, this is taken into account in the assessment process, but may not be the final condition assessment of the feature. Wider factors, which would not necessarily be known to the contractor at the time of the monitoring, are taken into consideration by SNH staff in making final condition assessments.



RESEARCH REPORT

Summary

Strathy Coast SSSI – Site Condition Monitoring of coastal features 2016

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Strathy Coast; SSSI; sand dune; coastal vegetation; Site Condition Monitoring

Background

Site Condition Monitoring (SCM) is a programme of assessment of the state of all notified features of interest on designated sites in Scotland. This report covers monitoring of the sand dune feature at Strathy Coast SSSI, carried out by Upland Ecology in 2016 as part of the 3rd cycle of SCM.

Strathy Coast SSSI is located on the north Sutherland coast centred around Strathy Point, 7 km to the east of Bettyhill. It comprises north, east and west facing cliffs, interrupted by beach and dune systems at Armadale, Strathy and Melvich Bays. The site is notified for the nationally important maritime cliff, sand dune and salt marsh habitats, the assemblage of rare plants, and geological interest.

The SSSI was originally notified for both machair and sand dune features. In 2016 SNH undertook a review of all machair vegetation in Scotland and concluded that true machair does not occur on the north coast of mainland Scotland, including this SSSI. The dune grassland previously classified as a machair has therefore been assessed in this report as part of the dune grassland feature.

Main findings

- The sand dune habitats and vegetation of Strathy Coast SSSI were monitored in September 2016 using a series of sample plots and transects as well as wider observations and photographs.
- The SSSI supports a wide range of dune vegetation types across the three bays, with notable representation of climbing dunes, and a rich dune flora including purple oxytropis *Oxytropis halleri*.
- The condition of the feature has been assessed against the standard SNH sand dune targets for three sub-features: Strand, embryo and mobile dunes; Fixed dunes; and Dune slacks.
- The ‘strand, embryo and mobile dunes’ and ‘dune slacks’ sub-features met all relevant targets but ‘fixed dunes’ failed to meet several targets and an overall condition assessment of ‘Unfavourable declining’ is recommended. Issues of concern included

- sward structure, frequency of negative indicators (rank grasses, non-native species) and loss/damage of fixed dune grassland through ploughing and stock feeding,
- A review of management is recommended to address the issues raised by SCM, in particular grazing levels and non-native species at Melvich Bay, and damage associated with stock feeding and cultivation at Strathy Bay.

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Acknowledgements

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1. BACKGROUND

Site Condition Monitoring (SCM) is a programme of assessment, against quality standards, of the state of notified feature of interest on designated sites. This report forms part of the third cycle of monitoring for coastal features, and covers the sand dune feature of Strathy Coast SSSI.

1.1 Feature description

Strathy Coast SSSI covers a section of the north Sutherland coast centred around Strathy Point, 7 km to the east of Bettyhill. It comprises north, east and west facing cliffs, interrupted by beach systems at Armadale, Strathy and Melvich. The site is notified for the nationally important maritime cliff, sand dune and salt marsh habitats found along the coast and for the assemblage of rare plants. It is also notified for the Moine rocks around Portskerra. This report covers the sand dune feature (including 'machair', see below), described in the SSSI citation as follows:

Machair

Areas of machair south of Armadale Bay, Strathy Bay and Melvich are found on the largely calcareous shell sand and support a rich variety of flowering plants. Birds-foot trefoil *Lotus corniculatus*, wild thyme *Thymus polytrichus*, common self-heal *Prunella vulgaris*, frog orchid *Coeloglossum viride* and cowslip *Primula veris* are all found within the machair habitat.

Sand dune (vegetation)

The sand dune habitats of this site are of exceptional quality. They typically show complete succession from pioneering strandline communities with sea sandwort *Honkenya peploides* and sea rocket *Cakile maritima*, through mobile dunes with colonising species such as marram grass *Ammophila arenaria* and sand couch grass *Elytrigia juncea*, to mature fixed dunes. Field gentian *Gentianella campestris*, frog orchid *Coeloglossum viride* and common twayblade *Listera ovata* are widespread. The nationally rare purple oxytropis and the eyebright *Euphrasia rotundifolia* also occur in this habitat.

The SSSI was originally notified for machair as well as sand dune features. In 2016 SNH undertook a review of all machair vegetation in Scotland as part of the Habitat Map of Scotland project, and concluded that true machair does not occur on the north coast of mainland Scotland, including this SSSI (Stewart Angus, pers. comm.). The dune grassland previously classified as a separate 'machair' feature for this SSSI has therefore been assessed in this report as part of the dune grassland feature.

1.2 Previous survey and monitoring

1.2.1 Vegetation survey

A survey of the SSSI using the NVC was carried out by Brookes (1996). Extracts from his maps showing the three bays at Armadale, Strathy and Melvich are given in Figure 1. As part of the Sand Dune Vegetation Survey of Scotland, Dargie (1998) 'harmonised' and digitised the maps of Brookes following a brief visit in 1997. His polygon maps are given in Figures 2-4. Table 1 summarises (at NVC community level) the vegetation types recorded and their extent.

The maps show a rather narrow zone of SD6 *Ammophila arenaria* mobile dune in all three bays with localised stands of SD2 *Honkenya-Cakile* strandline. SD4 *Elytrigia juncea* foredune was scarce and restricted to Armadale Bay. The most extensive dune vegetation was SD7 *Ammophila-Festuca rubra* semi-fixed dune and SD7/SD8 intermediates, with several sub-communities of SD8 *Festuca rubra-Galium verum* fixed dune grassland also widespread, including on climbing dunes, a feature of this site. Brooks also mapped SD9

Ammophila-Arrhenatherum dune at Melvich Bay and noted small amounts at Strathy Bay, but Dargie considered these to be an SD7-SD9 intermediate type. CG10 *Festuca-Agrostis-Galium verum* grassland was mapped on climbing dunes at Armadale and Strathy Bays. At Strathy Bay the only occurrences of dune slack in the SSSI were mapped as SD16 *Salix repens-Holcus lanatus* dune slack community.



Figure 1. NVC maps of Armadale Bay (top left), Strathy Bay (top right) and Melvich Bay (below) from Brookes (1996). For NVC codes see Table 1.

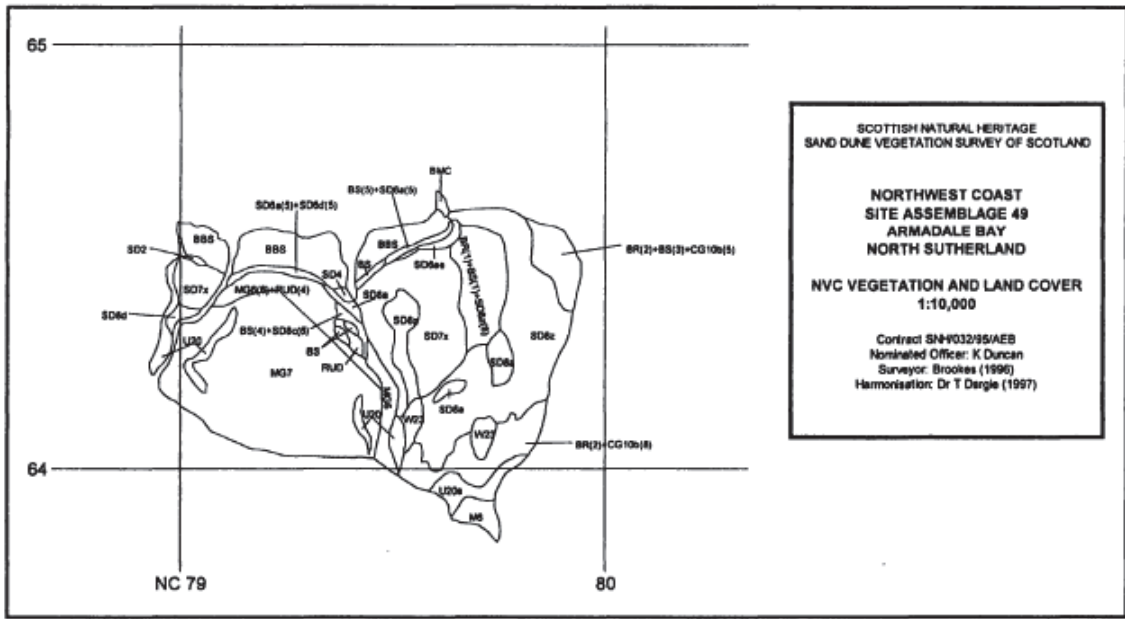


Figure 2. NVC map (blown sand only) for Armadale Bay, from Dargie (1998). For NVC codes see Table 1.

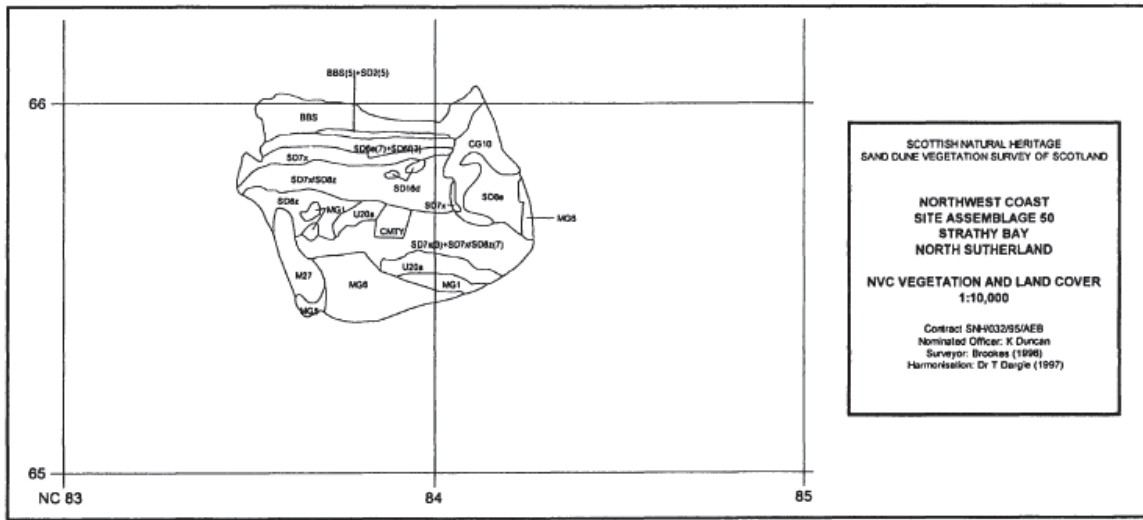
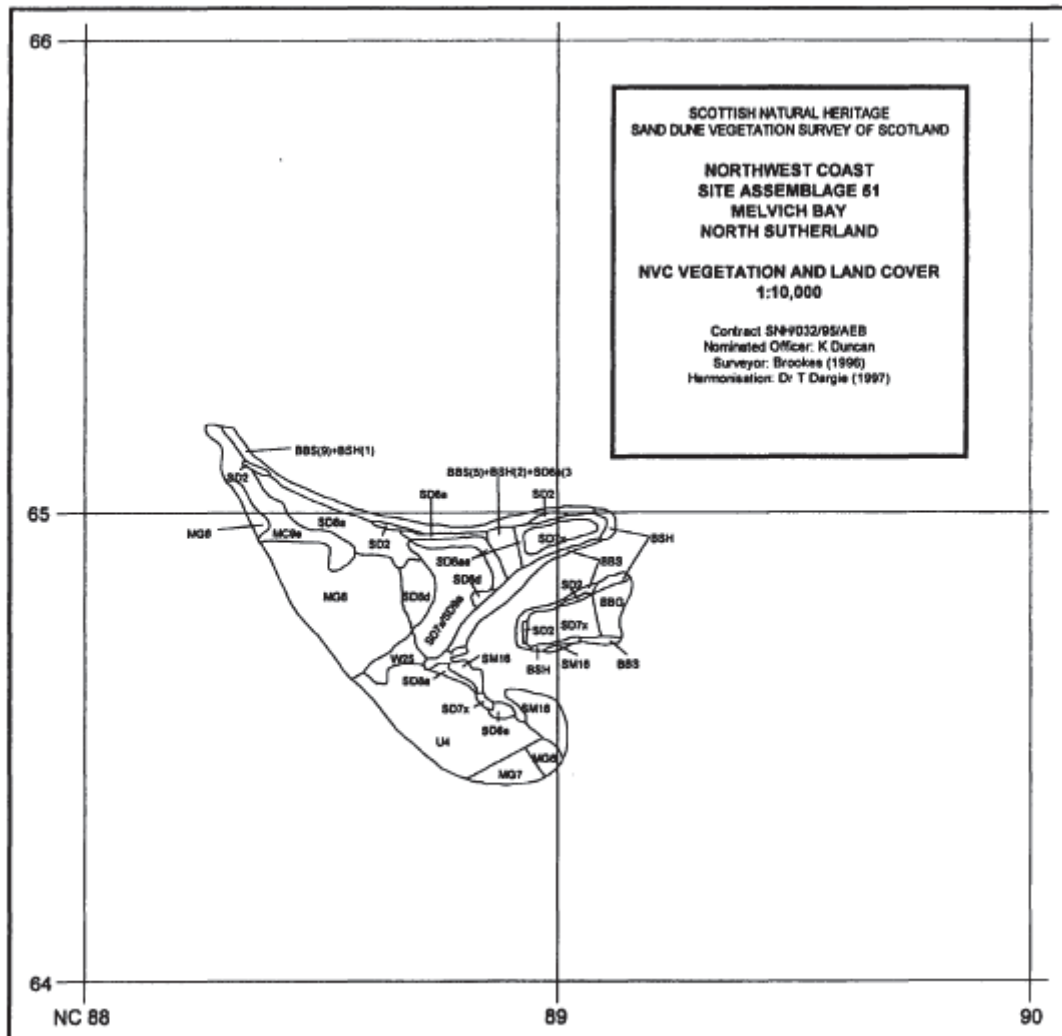


Figure 3. NVC map (blown sand only) for Strathy Bay, from Dargie (1998). For NVC codes see Table 1.



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Figure 4. NVC map (blown sand only) for Melvich Bay, from Dargie (1998). For NVC codes see Table 1.

Table 1. NVC sand dune types (Rodwell, 2000) in Strathy Coast SSSI, as mapped by Dargie (1998) based on Brookes (1996), with approximate extent of each community in ha. See also footnotes. Key: A = Armadale Bay, S = Strathy Bay, M = Melvich Bay. Intermediates are not listed separately (see Dargie, 1998, for full list). For estimating extent for this table, intermediates have been assigned to the first-named community e.g. SD7x/SD8x has been included in SD7.

code	NVC type	A	S	M	total
STRAND, EMBRYO AND MOBILE DUNE					5.0
SD2	<i>Honkenya peploides</i> - <i>Cakile maritima</i> strandline community	0.11	0.26	0.35	
SD4	<i>Elytrigia juncea</i> ssp. <i>boreoatlantica</i> foredune community	0.09			
SD6	<i>Ammophila arenaria</i> mobile dune community a. <i>Elytrigia juncea</i> s-c d. Typical s-c e. <i>Festuca rubra</i> s-c f. <i>Poa pratensis</i> s-c	0.77	1.79	1.63	
FIXED DUNE					49.8
SD7	<i>Ammophila arenaria</i> - <i>Festuca rubra</i> semi-fixed dune community x. <i>Galium verum</i> s-c	6.55	13.03	3.17*	
SD8	<i>Festuca rubra</i> - <i>Galium verum</i> fixed dune grassland a. Typical s-c c. <i>Syntrichia ruralis</i> s-c d. <i>Ranunculus acris</i> - <i>Bellis perennis</i> s-c e. <i>Prunella vulgaris</i> s-c x. <i>Centaurea nigra</i> - <i>Daucus carota</i> s-c z. <i>Thymus polytrichus</i> s-c	13.08	4.53	2.99	
SD9	<i>Ammophila arenaria</i> - <i>Arrhenatherum elatius</i> dune grassland**				
CG10	<i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Thymus polytrichus</i> grassland	2.93	2.51		
DUNE SLACK					0.2
SD16	<i>Salix repens</i> - <i>Holcus lanatus</i> dune slack community		0.18		
SCRUB					
W23	<i>Ulex europaeus</i> scrub	0.83			
W25	<i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> scrub			0.58	

* SD7 extent reduced by 1 ha (approx.) to exclude dunes omitted from SSSI boundary

** SD9 was mapped by Brookes at Melvich but changed to SD7-SD9 intermediate by Dargie

1.2.2 SCM

SCM of the SSSI sand dune habitats was undertaken in 2010 by Janine Morris, based on a series of walks and transects covering the three bays (Morris, 2010). For the sand dune feature, three sub-features were assessed: Strand, embryo and mobile dunes; Fixed dunes; and Dune slacks. Machair was assessed as a separate feature (see 1.1). Maps and details of the walks and transects (which also covered the Maritime cliff and Saltmarsh features) are available. The SCM targets were assessed across each transect or walk rather than from sample plots. The sand dune feature failed to meet several targets, relating to lack of strandline vegetation and *Elytrigia juncea* in embryo dunes, frequency of *Senecio jacobea* and other negative indicators, dune slack composition and visitor damage. The machair feature failed to meet targets for frequency of *S. jacobea* and the presence of fencing. However the overall condition of both features was determined by SNH as 'favourable' as despite some targets not being met in some places, the majority of the vegetation was in favourable condition (SNH, 2010).

2. METHODS

The site was visited on 4-6 September 2016 by Ian Strachan. The walking routes and transects followed to monitor the site are shown in Figs 5, 7 and 9. They were based on those followed in cycle 2 (Morris, 2010) and although the walk routes were not exactly the same they covered similar areas.

Sample plots (2 x 2 m) were recorded across the site for SCM purposes. In the absence of information about any plots in previous SCM visits, plot locations were selected to obtain a good representation of the vegetation types present. Full species lists with cover values were made for each plot, and other aspects such as flowering were recorded as required for SCM. Target notes were made to supplement the plot data (e.g. for strand species) and for points of concern. The vegetation was also compared on the walks/transects with that on the previous maps. Photographs were taken of all sample plots and to illustrate other target notes. The locations of sample plots and target notes/transect points are shown in Figs 6, 8 and 10. Details of all these points are given in Annex 1 and 2 and a full list of photographs taken is given in Annex 6. All photographs are copyright of the author.

OS grid references for the locations of sample plots, transects and other target notes were recorded using a Garmin eTrex GPS. These have been corrected to account for the discrepancy in conversion by the eTrex algorithm, which in this part of Scotland gives a GR c. 13 m due south of the correct value. Tracks were downloaded directly from the GPS as lat/long coordinates so are considered to be accurate.

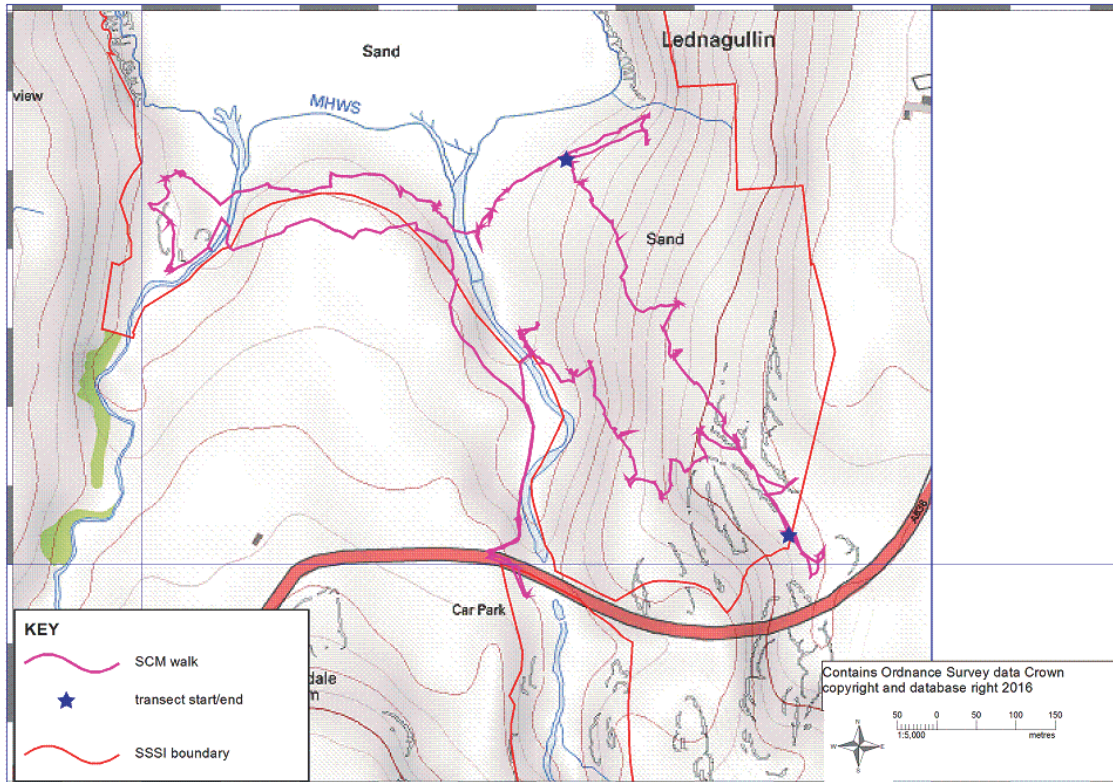


Figure 5. Strathy Coast SSSI - Armadale Bay SCM walk (NB the SSSI shown to the south of the road is a different site).

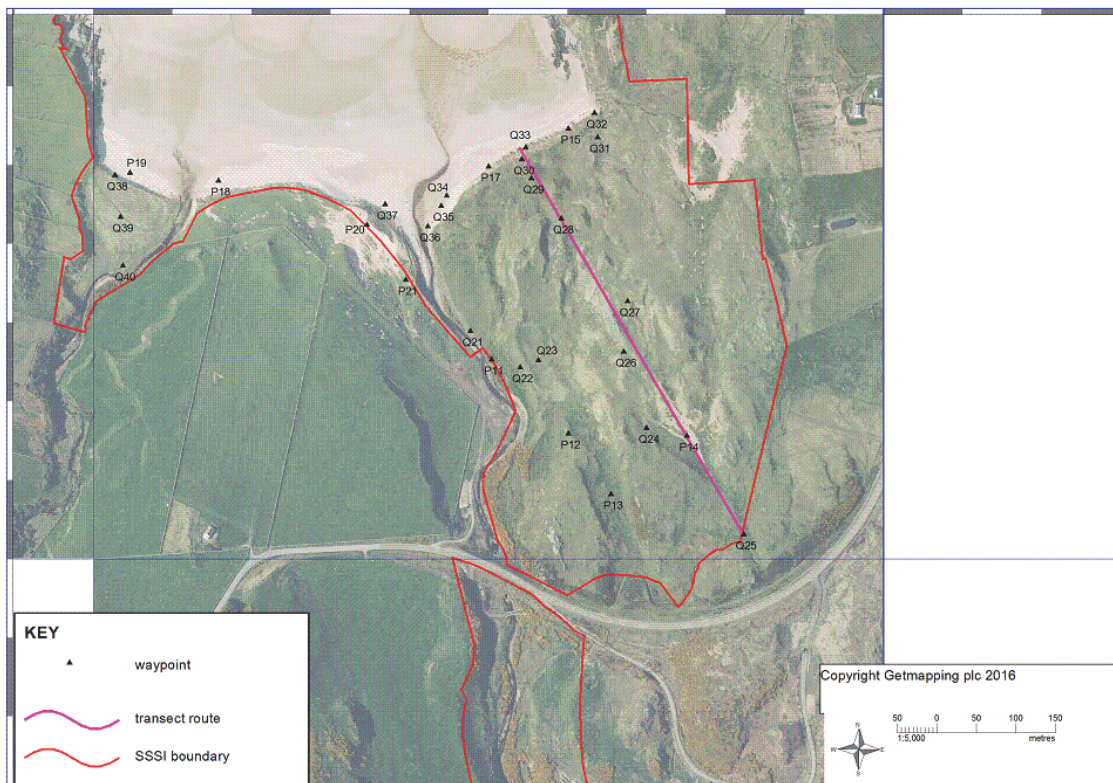


Figure 6. Strathy Coast SSSI - Armadale Bay: location of sample plots, target notes and transect, with air photo background.

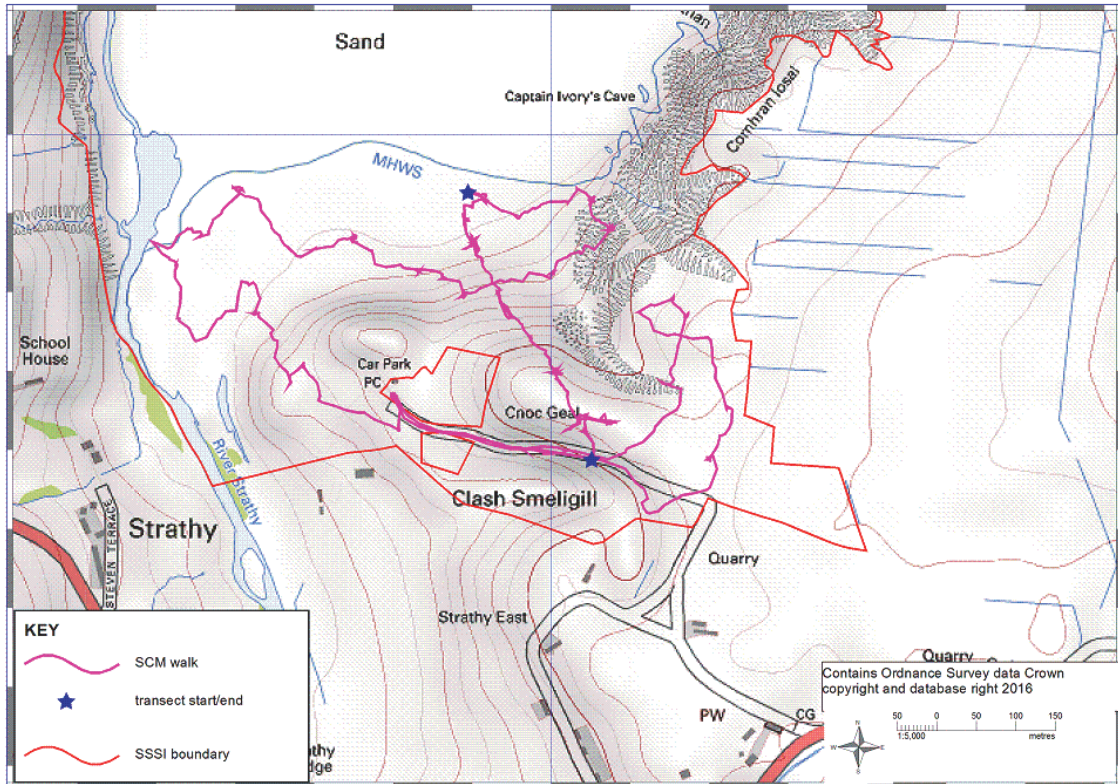


Figure 7. Strathay Coast SSSI - Strathay Bay SCM walk.

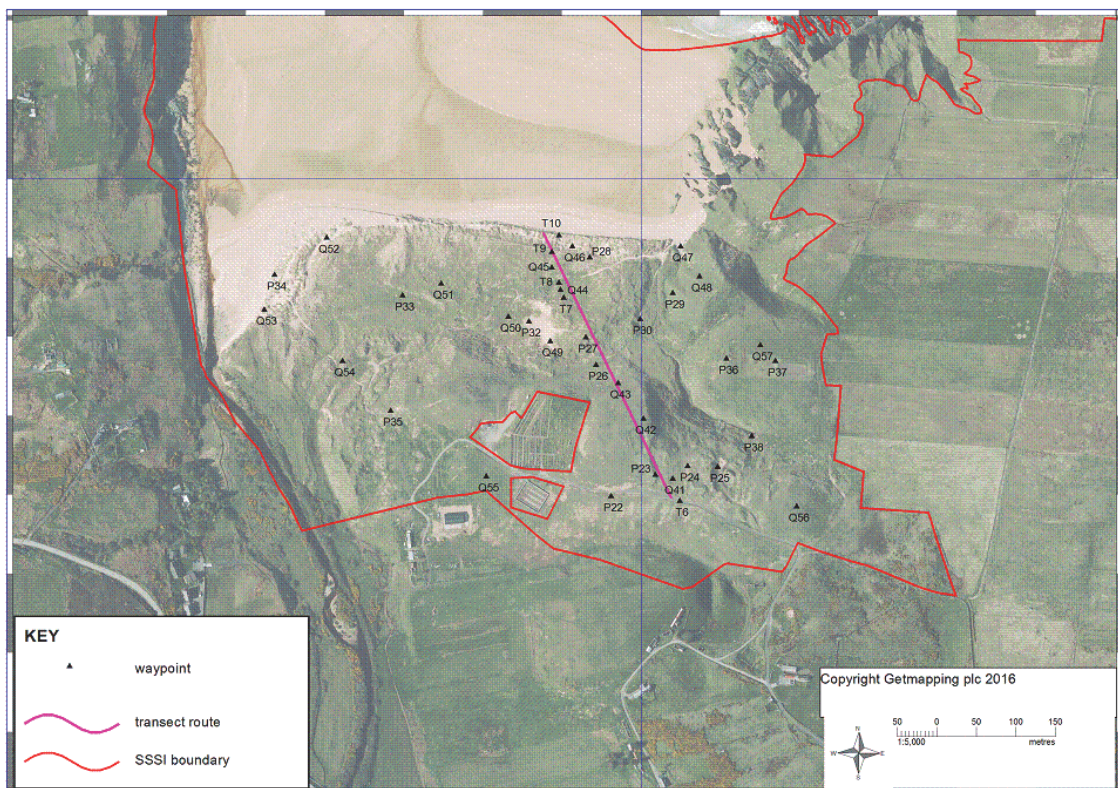


Figure 8. Strathay Coast SSSI - Strathay Bay: location of sample plots, target notes and transect, with air photo background.

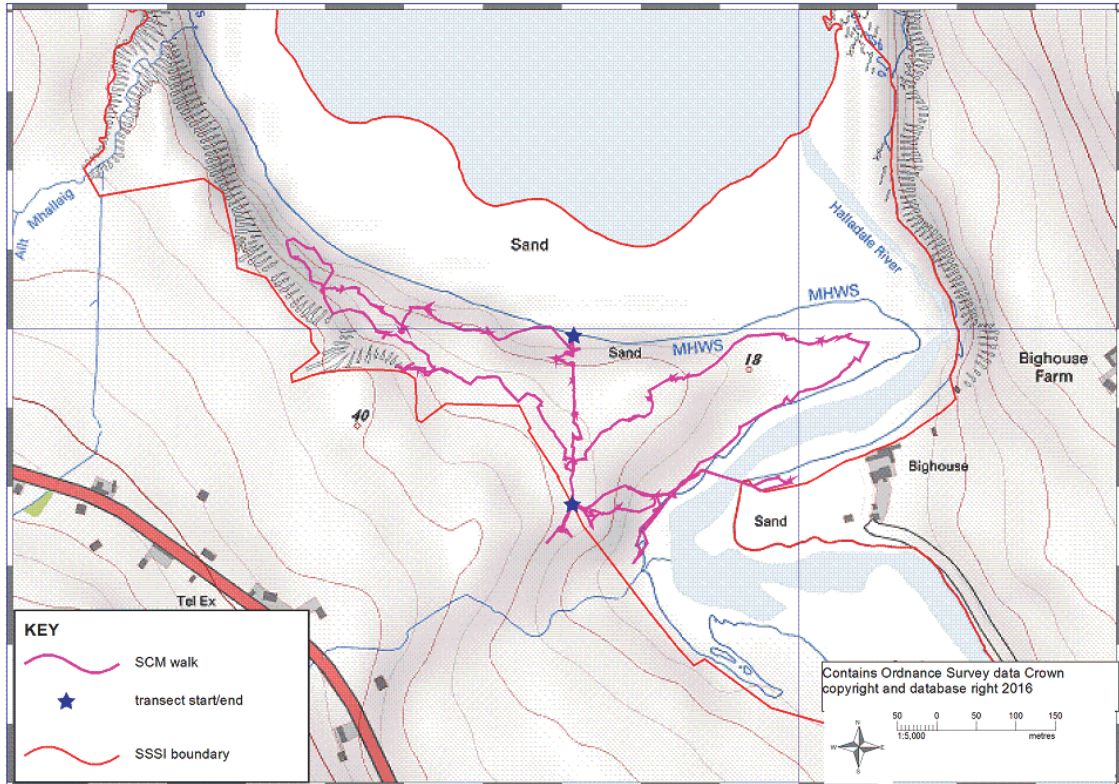


Figure 9. Strathy Coast SSSI: Melvich Bay SCM walk.

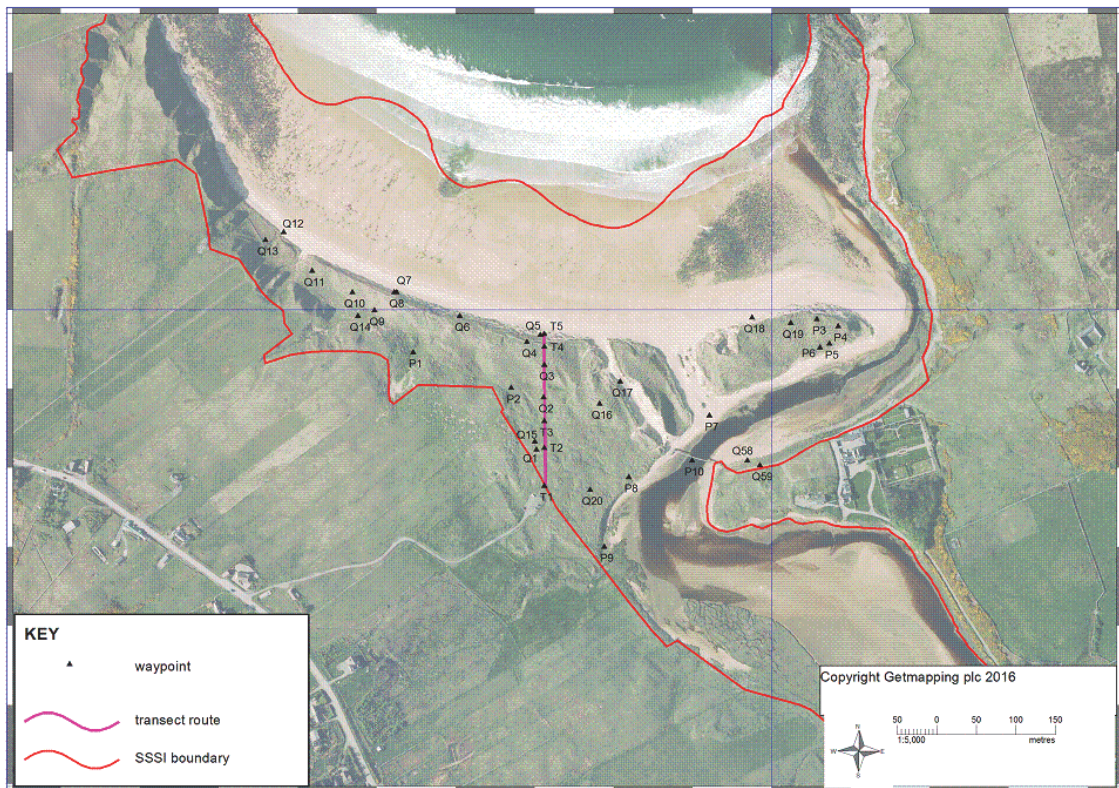


Figure 10. Strathy Coast SSSI - Melvich Bay: location of sample plots, target notes and transect, with air photo background.

3. VEGETATION AND TRANSECTS

Table 2 summarises the sample plots recorded in each bay by NVC type, and the full plot details are given in Annexes 3-5. The vegetation of the three bays is described briefly below, and compared with the findings of previous surveys. Details of the three transects are also given. Selected photographs are included but comprehensive images including all plots and transect points are listed in Annex 6.

Armadale Bay

The largest area of dunes lies to the east of the Armadale Burn (Figure 11), mainly comprising SD7x on the lower ground, turning to SD8z inland on climbing dunes (Figure 12), with H10 on the highest ground. The bay is fringed by SD6 mobile dune especially at the mouth of the Armadale Burn and further west where SD4 embryo dunes and SD2 strandline vegetation become prominent, widening to a 3 m zone in places. SD5 *Leymus arenarius* dune also occurs. There is a smaller 'triangle' of fixed dune on the western side of the bay.

A transect running north across the dunes was repeated (Figures 5 & 6). The transect was 570 m long and crossed fixed dune from the landward end at Q25 to the front dune crest at Q30. The outer 13 m was mobile dune from Q30 to the end of the transect (Q33), an eroded dune face.

Comparison with the map of Dargie (1998) reveals several differences:

- SD2 and SD4 were significantly more extensive than in 1996/7, and SD5 was newly recorded.
- East of the burn SD7 and SD8z form a more complex mosaic than originally mapped.
- Several ha of higher ground east of the river support dry heath (H10 with patches of H7) on rock/peat, rather than SD8 and CG10 on sand, suggesting that this area was wrongly mapped previously.

Strathy Bay

A wide area of dunes extends across the bay (Figure 13) fronted by a broad ridge of mobile dune (SD6), with strandline vegetation limited to scattered plants of *Cakile* near the eastern end of the bay and embryo dune to a single patch of SD4. Behind the mobile dunes, SD7x fixed dune occurs. This is mixed with climbing dune type SD8z further inland, rising a considerable height to the cemetery. SD8e occurs to the east, where some recent cultivation occurs. Behind the main dune ridge there are small areas of dune slack (SD16/SD17) (Figure 14) including patches with *Filipendula ulmaria* locally dominant.

A transect running north-west across the dunes was repeated (Figures 7 & 8). The transect was 370 m long and crossed fixed dune from the landward end at T6 to the front dune crest at T9, but with a 20 m section of dune slack from T7 to T8. The outer 30 m was mobile dune from the dune ridge at T9 to the end of the transect (T10), a 3 m high eroded dune face.

The dune vegetation is broadly similar to that mapped in Dargie (1998), but with these differences noted:

- SD2 was apparently much rarer than in 1996, but a patch of SD4 was newly recorded.
- An area of 0.1 ha of fixed dune on the east side of the bay has been ploughed/cultivated.

Melvich Bay

The dune grassland here (Figure 15) is predominantly rank (SD7x, SD7/9 and SD9) with only very localised areas of shorter turf (SD8d and SD8x). High dunes extend eastwards to the mouth of the river, cut across by two open gullies/blowouts (Figure 16) and with a

smaller blowout on the seaward side. A variable zone of mobile dune (SD6) occurs on the seaward face of the dunes, which appear to be predominantly eroding, but localised embryo dune (SD4) occurs near the western end with fragments of strandline vegetation. Above the footbridge there is a transition from dune to saltmarsh, with SD2 and SD4 present. There is also a narrow band of accreting dune (SD6 and SD7) below Bighouse on the south side of the river, which was included in the 2016 SCM walk (though not visited in 2010).

It was noted that the SSSI boundary cuts across and excludes several areas of dunes to the north and south of the carpark and to the west of Bighouse. Boundary realignment would be required to include them.

A transect running north across the dunes was repeated (Figures 9 & 10). The transect was 190 m long and crossed fixed dune from the landward end at T1 to the front dune crest at T4. The outer 15 m was mobile dune from the dune ridge at T4 to the end of the transect (T5), a bare, sloping dune face.

Comparison with Dargie's map shows that the distribution and types of vegetation are broadly similar, with the following differences noted:

- The north-western section of dunes mapped as SD8a is now largely tall SD7x-SD9 (c. 2 ha) with only small patches of SD8x.
- Strandline SD2 vegetation, shown in several places on the seaward side of the dunes in 1996, was largely 'missing' in 2016.
- A second 'gully' of bare sand now cuts across the eastern dune section.

Table 2. List of sample plots recorded by NVC type. For NVC codes see Table 1. For locations see Annex 1 and Figures 5, 7, and 9. For plot data see Annexes 2-4.

NVC type	No. of samples	Armadale Bay	Strathy Bay	Melvich Bay
STRANDBLINE, EMBRYO AND MOBILE DUNE				
SD2	1	Q34		
SD4	5	Q32 Q35	Q47	Q6 Q7
SD6	14	Q33 Q36 Q37 Q38	Q46 Q52 Q53	Q4 Q5 Q8 Q12 Q17 Q18 Q58
FIXED DUNE				
SD7a	1	Q24		
SD7x	9	Q23 Q27 Q29 Q31	Q43 Q45 Q54	Q16 Q19
SD7x-SD9	6			Q2 Q3 Q9 Q10 Q11 Q59
SD8a	1	Q28		
SD8c	2	Q30	Q49	
SD8d	2			Q1 Q15
SD8e	2	Q21	Q57	
SD8x	4	Q40	Q51	Q14 Q20
SD8z	7	Q22 Q25	Q41 Q42 Q48 Q55 Q56	
SD8z-CG10	1	Q26		
SD9	2	Q39		Q13
DUNE SLACK				
SD16	1		Q50	
SD17	1		Q44	
total	59	20	17	22



Figure 11. View east across main area of dunes at Armadale Bay, with accreting dunes in the foreground (P20),



Figure 12. Climbing dunes with species-rich turf of SD8z at Armadale Bay (Q22).



Figure 13. View west across main dunes at Strathy Bay showing transition from mobile dunes on right to fixed/climbing dunes on left, and eroded paths to beach (Q48).



Figure 14. Dune slack at Strathy Bay with Filipendula ulmaria in foreground (T7).



Figure 15. View west across front dune ridge at Melvich Bay with SD6 mobile dune to seaward and rank SD7x-SD9 fixed dune behind (T4).



Figure 16. View south across gully through dunes at Melvich Bay (Q17)

4. SCM RESULTS

The Standard SNH Site Condition Monitoring form for sand dunes has been completed and is appended as Annex 7. Three sub-features have been assessed: Strand, embryo and mobile dune; Fixed dune; and Dune slack. Notes on targets which were not met, or otherwise require explanation, are given below in sections 4.1 (strand, embryo and mobile dune), 4.2 (fixed dune) and 4.3 (Dune slack) with overall conclusions in section 4.4. Selected photographs are included but see Annex 6 for full list. Targets are indicated by bullet points under the relevant attribute. Relevant plots/target notes are indicated by codes (see Figures 6, 8 and 10 and Appendices 1 and 2 for details).

4.1 Strand, embryo and mobile dune

The strand, embryo and mobile dune sub-feature failed to meet certain targets for individual sections but was judged to 'pass' overall, as explained below.

Attribute: Extent

- Area maintained (i.e. no net decrease). The only acceptable form of loss is that due to natural coastal erosion.

Although the scale of the earlier maps makes it hard to compare accurately with 2016, some differences are apparent. There was markedly more strand (SD2) and embryo dune (SD4) in 2016 at Armadale Bay (Figure 11) but less strandline vegetation at Strathy and Melvich Bays. These are likely to be part of a cycle of natural fluctuations (Sally Ward *pers. obs.* over last 40 years) and the target is judged to be met overall. SD2 was noted as absent from Strathy Bay in 2010.

Attribute: Vegetation composition: typical species

- At least one of the following [listed] species at least frequent and another occasional on strand. [See SCM form in Annex 7 for species list.]

Strand vegetation was well represented at Armadale Bay, with one listed species frequent and three occasional, but it was very scarce at Melvich and Strathy Bays, with three and one of the listed species present respectively, all of which were rare. Again, this probably reflects natural fluctuations and the target is judged to be met overall.

- *Elytrigia juncea* present on embryo dunes or mixed with *Ammophila arenaria* and/or *Leymus arenarius* in mobile dune zone.

The target is met since *Elytrigia juncea* is locally abundant at Armadale Bay and present at both Melvich and Strathy Bays. It was not found at Strathy Bay in 2010.

Attribute: Indicators of local distinctiveness

- List specific to site (note that rare vascular plants must be monitored separately, but mention where found if noted during coastal SCM)

The locally rare strand species *Polygonum oxyspermum ssp raii* was newly recorded as frequent at Armadale Bay (P15, P17, P18).

4.2 Fixed dune

The fixed dunes sub-feature failed to meet several targets, as explained below.

Attribute: Extent

- No net loss in extent except as part of change to other dune habitats as part of natural processes (e.g. losses to bare sand, mobile dune, slack or dune heath are all acceptable forms of loss).

No loss was apparent at Melvich and Armadale Bays. However, two instances of 'loss' that was not due to natural processes were encountered at Strathy Bay. An area of c. 0.1 ha of SD8 dune has been ploughed/cultivated (P37; Figure 17) although this area has been under similar periodic cultivation since before the site was designated (Sally Ward *pers. obs.* over last 40 years), so continuation of the same land use is not regarded as a loss of designated habitat. Several areas (P23-25; c. 0.2 ha in total) have been enriched by stock feeding near Strathy graveyard causing loss of SD8 vegetation (Figure 18). This target is therefore judged as not being met due to the areas that have been altered by stock feeding.

Attribute: Vegetation structure: range of zones

- Transition to terrestrial habitat(s) intact

Intact transitions to terrestrial habitats including maritime cliff, mesotrophic grassland, bracken, scrub, dry heath and fen are all represented. Transitions from fixed dune to improved grassland occur at Melvich and Armadale Bays but lie beyond the SSSI boundary.

Attribute: Vegetation structure: bare ground

- Bare ground or sand present but no more than 10% of total area.

Patches of bare ground, mostly from rabbit activity, are widespread in fixed dune at Strathy Bay (Figure 19), local at Armadale Bay, and rare at Melvich Bay, covering much less than 10% overall.

Attribute: Vegetation structure: sward height

- 30-70% of sward comprises species-rich short turf, 2-10cm tall.

This attribute has been assessed from the sample plots, field observations and the air photographs. The target is met at Strathy Bay with about 30% short turf. At Armadale Bay the proportion is somewhat lower, perhaps 20% and at Melvich Bay the fixed dune vegetation is predominantly tall and rank (Figure 15) because of insufficient grazing, with more limited areas of short turf, less than 15%. Taking account of the relative extents of fixed dune in the three bays (Table 1) the average is significantly lower than the target value, thus the SSSI is judged not to meet the target overall.

Attribute: Vegetation composition: typical species

- If calcareous dune grasslands (SD7, SD8, SD9, SD19) are recorded in NVC survey, at least eight of the following present at more than occasional level. [See SCM form in Annex 7 for species list].

All the fixed dunes here fall into this category. Based on the sample plots, Strathy and Armadale Bays exceed this target, whereas Melvich Bay has only seven listed species frequent or abundant (but five occasional), probably reflecting the lack of grazing there. However the target was met across the three bays as a whole.



Figure 17. Cultivated dune area at Strathy Bay (P37).



Figure 18. Stock-feeding area with enriched vegetation at Strathy Bay (P24)



Figure 19. Fixed dunes at Strathy Bay (SD7x) with rabbit burrows and abundant rayless *Senecio jacobea* (P33).

Attribute: Vegetation composition: negative indicator species

- *Arrhenatherum elatius* and/or *Dactylis glomerata* no more than occasional.

Arrhenatherum and/or *Dactylis* are at least frequent in fixed dune plots across all three bays, therefore this target is not met. Cover is generally low, but is notably higher (10-25%, locally 50%) in the western half of the Melvich Bay dunes, where it comes close to SD9 (Figure 13). This was also reported at Melvich Bay by Morris (2010) but the frequency at the other bays has not previously been noted. These species typically increase in response to lack of grazing and/or nitrogen deposition (JNCC, 2004).

- *Senecio jacobaea* no more than frequent in sward.

This species is frequent overall in fixed dune at Strathy Bay and occasional at Armadale and Melvich Bays. It is locally abundant at Strathy Bay in association with rabbit activity e.g. P33 (Figure 19). The unusual rayless form (ssp *dunensis*?) occurs at Strathy Bay (e.g. T8) and Armadale (e.g. Q29). Morris (2010) considered this species to be a threat to the species composition at this site, but SNH concluded that the target was met whilst recognising that control may be needed if further spread occurred. In the absence of previous plot data it is difficult to know whether expansion has occurred, but the target is judged to be met overall.

- Other invasive species absent (includes *Cirsium arvense*, *Cirsium vulgare*, *Urtica dioica*, *Lolium perenne*) (List and use DAFOR, target notes if present).

The target for 'other invasive species' to be **absent** seems very strict, and unrealistic, compared to the target for this group of species in the JNCC guidance (JNCC, 2004), i.e. that any one species should be no more than frequent, and negative indicators combine should have no more than 5% cover. This is taken into account below. The SNH target also makes no mention of various other species covered by the JNCC guidance, including bracken *Pteridium aquilinum* and invasive non-natives, which are also considered here.

In fixed dune, based on the sample plots, *Urtica dioica* is rare, at Armadale Bay only. *Lolium perenne* was not recorded. The combined cover is <5%. However *Cirsium* spp, sometimes with *U. dioica*, are locally abundant at Strathy Bay with high cover in places e.g. areas associated with stock feeding (P23-25), and at Armadale Bay (P21) (Figure 20).

Pteridium aquilinum occurs locally in the dunes at Armadale Bay, with apparent encroachment into fixed dune vegetation observed in two locations (see Q39-Q40 and P12) (Figure 21) but with relatively small areas affected. At Strathy Bay there is a large area of bracken on sand to the south of the access road (photo RIMG0981) but this has not changed since the mapping in 1996.

The tall, non-native, Shasta daisy *Leucanthemum x superbum* is well-established in the easternmost fixed dunes at Melvich Bay (P3-P5), over an area of approximately 30 x 20 m (Figure 22). Although not mentioned in previous SCM (Morris, 2010) or survey (Brookes, 1996) it was recorded at this location in 2008 (BSBI database). This widespread garden escape appears to be spreading in Scotland, mainly in disturbed habitats.



Figure 20. SD8d fixed dune with abundant *Cirsium arvense* at Armadale Bay (P11).



Figure 21. SD8d fixed dune with bracken encroachment at Armadale Bay (P12).



Figure 22. Fixed dune at Melvich Bay with abundant Shasta daisy *Leucanthemum x superbum* and sycamore saplings (P4).

- Scrub (except *Juniperus communis*) never more than occasional as an invading component.

Native rose scrub (*Rosa mollis agg*) is locally frequent in the fixed dunes at Melvich Bay (e.g. Q9, P2) but rare overall. Several saplings of sycamore *Acer pseudoplatanus* and a redcurrant *Ribes rubrum* bush are also present in the dunes at Melvich Bay (P3, P6) (Figure 22).

Attribute: other negative indicators

- Agricultural ploughing of fixed dunes absent.

An area of c. 0.1 ha has been ploughed/cultivated on the eastern side of Strathy Bay (P37) (Figure 17). About half has been recently ploughed, the other half has potatoes and dense arable weeds including *Anchusa arvensis*, *Potentilla anserina* and *Rumex crispus*. This area was previously mapped as SD8 dune with no mention of cultivation in previous survey or SCM, so this is assumed to be recent. The target is therefore not met.

- Visitor damage (trampling, digging, jumping, fires, litter) absent.

As noted in 2010 by Morris, a substantial area of bare sand (c. 30 m across) is present at Strathy Bay in the middle of the dunes below the cemetery (P32, Q49) where several paths converge (Figure 23). Evidence of a campfire is also present, though no fire damage was seen. The extent to which this bare sand is caused by trampling is uncertain. Vehicle damage has occurred on the dunes here in the past (SNH, 2010) though there was no evidence of vehicle use in 2016. At Melvich Bay the path from the public car park to the Halladale River above the footbridge has recently been damaged by cutting of turf (P8) with c. 10 x 5 m of fixed dune affected (Figure 24). The reason for this action was not obvious.

- Continuous lengths of bare sand paths >0.5 m wide absent.

At Strathy Bay there are various paths to the beach, with very localised bare sand sections (Figure 17), but no evidence of erosion increasing was seen.

- Winter feeding impacts (poaching, patches of nitrophiles, spreads of straw and hay) never more than rare.

Several fixed dune areas at Strathy Bay, to the east of the cemetery (P23-25; c. 0.2 ha in total), have been damaged by stock feeding and associated trampling, causing enrichment and loss of SD8 vegetation (Figure 18). This was also noted by SNH (2010) although the previous extent is uncertain. Although impacts are 'rare' in the sense of being present at <20% of stops, such a high threshold seems inappropriate for impacts of this nature. The scale of damage at Strathy Bay is considered sufficient to fail this target.

Attribute: Indicators of local distinctiveness

- List specific to site (note that rare vascular plants must be monitored separately, but mention where found if noted during coastal SCM)

The Nationally Scarce species *Oxytropis halleri*, which forms part of the vascular plant assemblage of the SSSI, was recorded in several places at Armadale Bay (Q21, Q22) and Strathy Bay (P25, P35). The Nationally Scarce hair sedge *Carex capillaris* was also recorded at Armadale Bay in SD8z vegetation (P13).



Figure 23. Eroded area with dune slack beyond in centre of dunes at Strathy Bay (Q49).



Figure 24. Cut turves along path to footbridge at Melvich Bay (P8).

4.3 Dune slack

Physical structure: functionality (optional)

- Natural conditions for initiating new slacks (blowout deflation to level of watertable, progradation) still occurring.

Erosion beside the western slack area (P32, Figure 23) may be creating such conditions. More detailed survey, preferably when the watertable is high, would be needed to confirm this.

Vegetation structure: range of zones

- All dune slack communities should be present – from embryonic dune slacks with a high percentage of bare ground to those with more closed vegetation. Early dune slack successional stages at least occasional.

Dune slack is a minor sub-feature of this site of limited extent. Even so the vegetation is varied, from short turf with bryophytes dominant and some bare ground to taller swards of *Filipendula ulmaria* or *Salix repens* (Figure 14). The target is therefore considered to be met.

Vegetation structure: composition

- Cover of *Salix repens* no greater than 33%

Salix repens is locally dense (>50% cover in Q50) though not tall (20 cm) and is <33% cover overall, so the target is judged to be met.

Attribute: Indicators of local distinctiveness

- List specific to site (note that rare vascular plants must be monitored separately, but mention where found if noted during coastal SCM).

The Nationally Scarce sub-species *Gentianella amarella* ssp. *septentrionalis* is locally abundant in one area of dune slack at Strathy Bay (T7).

4.4 Conclusion

The results of monitoring the feature are summarised in Table 5. The Strand, embryo and mobile dunes and Dune slack sub-features passed all relevant targets whereas the Fixed dunes sub-feature was judged to have failed six targets. Thus a conclusion of **unfavourable declining** is recommended.

Table 5. Summary table for SCM at Strathy Coast SSSI

Feature	Sub-Types	Targets	Pass	Fail
Sand dunes	Strand, embryo and mobile dunes	21	21	0
	Fixed dunes	25	19	6
	Dune slack	24	24	0

5. SITE CHECK

Site Check involves the 'incidental' recording of information during SCM visits to a site which is relevant to other notified features on that site and their condition.

Part of the saltmarsh feature was observed at Melvich Bay where it adjoins the sand dunes (photo RIMG0876). The 'Maritime cliff and slope' feature was also observed where it adjoined the dunes round all three bays (e.g. RIMG0957). No issues of concern were noted for either habitat. Of the vascular plant assemblage, the species *Oxytropis halleri* was recorded in several locations (see 3.3).

6. PRESSURES AND MANAGEMENT

6.1 Pressures likely to affect condition

	Standard pressure	Relevant at this site
1.	Agricultural operations	Yes – cultivation, stock feeding (Strathy Bay)
2.	Burning	
3.	Development with planning permission	
4.	Dumping/spreading/storage of materials	
5.	Extraction - dredging (capital, maintenance)	
6.	Extraction - quarrying	
7.	Extraction - sand & gravel	
8.	Extraction - water (freshwater catchment; industrial, e.g. power station)	
9.	Fishing - recreational	
10.	Flood defence/coastal defence works	
11.	Forestry operations	
12.	Game or fisheries management	
13.	Grazing - appropriate level	Yes
14.	Grazing - over	
15.	Grazing - under	Yes
16.	Inter-specific competition	
17.	Maintenance activities carried out on site by an organisation	
18.	Mineral extraction	
19.	Natural event	Yes – tidal/wind erosion and accretion
20.	No on-site activities related to feature condition noted	
21.	Non intervention	
22.	Pollution - air-based sources (inc. greenhouse gases)	
23.	Pollution - land-based sources	
24.	Pollution - sewerage	
25.	Presence/changing extent invasive species - NATIVE	Yes – thistles, ragwort, bracken
26.	Presence/changing extent invasive species - NON NATIVE	Yes – Shasta daisy
27.	Pressure to be identified	
28.	Proactive on-site management	
29.	Recreation/disturbance	Yes – see 6.2
30.	Statutory undertaker	
31.	Tourism & recreation	
32.	Trampling	
33.	Waste disposal - quarrying (geological material)	
34.	Plant pests and diseases: <i>Phytophthora ramorum/kernoviae</i> on Blaeberry of heathland and woodland habitats	
35.	Plant pests and diseases: <i>Phytophthora austrocedrae</i> on	

	Juniper (Juniper dieback)	
36.	Plant pests and diseases: <i>Dothistroma septosporum</i> on conifers (Dothistroma needle blight, or Red-band needle blight)	
37.	Plant pests and diseases: <i>Phytophthora ramorum/kernoviae</i> on Rhododendron, Larch, other hosts	
38.	Plant pests and diseases: Alder dieback (Including <i>Phytophthora alni</i> and other causes)	
39.	Plant pests and diseases: Heather beetle	
40.	Plant pests and diseases: Other/unidentified suspected pest/pathogen	

6.2 Management note

Cattle grazing was observed on the dunes at Strathy Bay and there was also evidence of sheep grazing at Armadale Bay and Melvich Bay. Grazing and burrowing by rabbits is also especially prominent at Strathy Bay. Grazing at current levels is likely to be beneficial to species diversity of the dunes, although at Melvich Bay grazing pressure seems low; a stock fence has recently been erected or renewed along the western section of dunes and there was no evidence of grazing to the north of this fence, where the vegetation has apparently become tall and rank compared to the survey in 1996, with some scrub development evident. It is recommended that grazing management is reviewed.

At Strathy Bay, winter stock feeding near the cemetery has caused significant damage to fixed dune vegetation. It is recommended that this activity is reviewed.

Recreational use was observed at Strathy Bay and Melvich Bay, including picnickers/bathers and surfers crossing the dunes to the beach. This creates slightly eroded paths but may also help to maintain a more open turf locally.

The non-native Shasta daisy *Leucanthemum x superbum* is well-established over a large area of fixed dunes at Melvich Bay (P3-P5). It seems likely to expand and control should be considered.

7. REFERENCES

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ANNEX 1: SAMPLE PLOT LOCATIONS

Key to bays: A = Armadale, M = Melvich, S = Strathy

Sub-features: FD = fixed dune, MD = mobile dune, E = embryo dune, S = strandline

plot no	Bay	Date	X	Y	Sub-feature	NVC	Notes
Q1	M	04/09/2016	288705	964826	FD	SD8d	
Q2	M	04/09/2016	288714	964892	FD	SD7x/9	<i>Cirsium arvense</i> small patch to east otherwise rare?
Q3	M	04/09/2016	288715	964933	FD	SD7x/9	
Q4	M	04/09/2016	288693	964962	MD	SD6e	
Q5	M	04/09/2016	288710	964971	MD	SD6a	
Q6	M	04/09/2016	288608	964995	E	SD4	<i>Cirsium arvense</i> and <i>Senecio jacobea</i> both abundant across outer dune face with low cover
Q7	M	04/09/2016	288528	965025	E	SD4	<i>Honkenya peploides</i> scattered (O) below
Q8	M	04/09/2016	288525	965025	MD	SD6d	
Q9	M	04/09/2016	288500	965002	FD	SD7x/9	<i>Rosa mollis</i> scrub local nearby
Q10	M	04/09/2016	288472	965025	FD	SD7x/9	
Q11	M	04/09/2016	288421	965052	FD	SD7x/9	
Q12	M	04/09/2016	288385	965101	MD	SD6b	<i>Honkenya peploides</i> , <i>Atriplex glabriuscula</i> and <i>Cakile maritima</i> very sparse on beach below mobile dune
Q13	M	04/09/2016	288362	965091	FD	SD9	
Q14	M	04/09/2016	288479	964995	FD	SD8x	within a grazed patch c 30x30m surrounded by SD7x
Q15	M	04/09/2016	288703	964836	FD	SD8d	
Q16	M	04/09/2016	288785	964884	FD	SD7x	
Q17	M	04/09/2016	288811	964912	MD	SD6d	
Q18	M	04/09/2016	288978	964993	MD	SD6d	sand 'gully' across dune spit with SD6 each side. <i>Cirsium arvense</i> freq in SD6 above quadrat
Q19	M	04/09/2016	289027	964986	FD	SD7x	
Q20	M	04/09/2016	288773	964775	FD	SD8x	SD8x but surrounded by SD9
Q21	A	05/09/2016	279480	964292	FD	SD8e	
Q22	A	05/09/2016	279543	964246	FD	SD8z	
Q23	A	05/09/2016	279566	964255	FD	SD7x	
Q24	A	05/09/2016	279703	964169	FD	SD7a	<i>Cirsium arvense</i> abundant
Q25	A	05/09/2016	279826	964034	FD	SD8z	Transect - start
Q26	A	05/09/2016	279674	964266	FD	SD8z/ CG10	
Q27	A	05/09/2016	279679	964330	FD	SD7x	
Q28	A	05/09/2016	279595	964435	FD	SD8a	
Q29	A	05/09/2016	279557	964486	FD	SD7x	
Q30	A	05/09/2016	279545	964510	FD	SD8c	Edge of fixed dune>mobile dune
Q31	A	05/09/2016	279641	964538	FD	SD7x	
Q32	A	05/09/2016	279637	964569	E	SD4	
Q33	A	05/09/2016	279550	964525	MD	SD6a	Transect - end (<i>Cakile</i>). V open SD6a with 10%

plot no	Bay	Date	X	Y	Sub-feature	NVC	Notes
							<i>Ammophila</i> , also slumped SD7 on dune face
Q34	A	05/09/2016	279450	964464	S	SD2	
Q35	A	05/09/2016	279443	964451	E	SD4	
Q36	A	05/09/2016	279426	964425	MD	SD6a	
Q37	A	05/09/2016	279372	964453	MD	SD6a	To seaward, Honkenya A and Cakile LF. SD5 patchy. 20m wide zone of SD2,4,5,6
Q38	A	05/09/2016	279030	964490	MD	SD6d	
Q39	A	05/09/2016	279037	964437	FD	SD9	<i>Cirsium arvense</i> R/O over wider stand. Bracken encroaching slightly to west
Q40	A	05/09/2016	279040	964375	FD	SD8x	bracken encroaching
Q41	S	06/09/2016	284043	965623	FD	SD8z	
Q42	S	06/09/2016	284006	965699	FD	SD8z	
Q43	S	06/09/2016	283974	965744	FD	SD7x	<i>Arrhenatherum</i> increasing down slope. <i>S jacobea</i> R on these slopes
Q44	S	06/09/2016	283901	965862	DS	SD17	
Q45	S	06/09/2016	283890	965890	FD	SD7x	<i>Cirsium arvense</i> LA over 30 x 20 m
Q46	S	06/09/2016	283916	965917	MD	SD6	
Q47	S	06/09/2016	284053	965917	E	SD4	SD2 beyond (scattered <i>Cakile</i> only)
Q48	S	06/09/2016	284077	965879	FD	SD8z	steep terraced slope with <i>S jacobea</i> F but low cover
Q49	S	06/09/2016	283888	965797	FD	SD7	steep dune slope with rabbit burrows/erosion
Q50	S	06/09/2016	283835	965828	DS	SD16	
Q51	S	06/09/2016	283750	965870	FD	SD8x	
Q52	S	06/09/2016	283605	965928	MD	SD6	<i>S jacobea</i> and <i>R crispus</i> R in SD6, <i>Tussilago</i> LF, <i>Bryum pallens</i> LA
Q53	S	06/09/2016	283526	965837	MD	SD6	tiny patch of <i>Chamerion</i> adjacent
Q54	S	06/09/2016	283625	965772	FD	SD7x	
Q55	S	06/09/2016	283807	965626	FD	SD8z	
Q56	S	06/09/2016	284200	965588	FD	SD8z	
Q57	S	06/09/2016	284154	965792	FD	SD8e	
Q58	M	06/09/2016	288972	964812	MD	SD6a	
Q59	M	06/09/2016	288988	964806	FD	SD7x/9	

ANNEX 2: TARGET NOTE AND TRANSECT DETAILS

Key to bays: A = Armadale, M = Melvich, S = Strathy

Code	Bay	Date	X	Y	Notes
P1	M	04/09/2016	288549	964949	open gully with vegetation resembling MG1b with much <i>Urtica</i> , <i>Cirsium arvense</i> , <i>Anthriscus</i> , <i>Senecio jacobea</i> and <i>Dactylis</i> but also scattered <i>Ammophila</i> . Possibly enriched by dumping?
P2	M	04/09/2016	288673	964904	SD7x/9 with frequent <i>Rosa mollis</i> scrub
P3	M	04/09/2016	289060	964991	NW edge of <i>Leucanthemum x superbum</i> abundant/dominant over c 30x30m of SD7x, also a few scattered <i>Acer pseudoplatanus</i> saplings (1m)
P4	M	04/09/2016	289087	964982	E edge of <i>Leucanthemum x superbum</i> area
P5	M	04/09/2016	289076	964960	S edge of <i>Leucanthemum x superbum</i> area
P6	M	04/09/2016	289064	964955	<i>Ribes rubrum</i> bush
P7	M	04/09/2016	288924	964869	Large blowout, bare
P8	M	04/09/2016	288822	964791	edges of path turves dug out and left on dune (for vehicle access?) c10 x 5 m of SD7x damaged
P9	M	06/09/2016	288791	964703	view of transition from dune to saltmarsh, <i>E farctus</i> and <i>Honckenya</i> present
P10	M	06/09/2016	288902	964812	Dunes with blowout viewed from footbridge
P11	A	05/09/2016	279507	964256	SD8d with <i>S jacobea</i> F and >5% cover, <i>Cirsium arvense/vulgare</i> O-F
P12	A	05/09/2016	279604	964162	Bracken encroachment into SD8e c 30x30m
P13	A	05/09/2016	279658	964085	SD8z with <i>Carex capillaris</i>
P14	A	05/09/2016	279754	964159	Eroded dune hollow with SD8z/c and scattered <i>Cirsium arvense</i>
P15	A	05/09/2016	279604	964549	<i>Polygonum oxyspermum</i> , <i>Honckenya</i> , <i>Cakile</i> all R
P17	A	05/09/2016	279503	964501	<i>E juncea</i> along base of dune face with <i>Cakile</i> , <i>P oxyspermum</i> , <i>Honckenya</i> , <i>R crispus</i> , <i>Atriplex glabriuscula</i>
P18	A	05/09/2016	279161	964483	Large area SD2 <i>P oxyspermum</i> O, <i>Honckenya</i> A, <i>Cakile</i> O, <i>R crispus</i> R
P19	A	05/09/2016	279049	964493	30m wide zone of SD2 with <i>Honckenya</i> D, also SD4 <i>E juncea</i> / <i>Honckenya</i>
P20	A	05/09/2016	279349	964427	Large blowout partly within SSSI
P21	A	05/09/2016	279398	964357	large patch of <i>Urtica</i> and <i>C arvense</i>
P22	S	06/09/2016	283965	965601	Erosion around rabbit burrows c.50 x 5 m
P23	S	06/09/2016	284021	965628	Cattle feeding area with <i>C arvense</i> F over 10 x 30 m
P24	S	06/09/2016	284062	965639	Cattle feeding area, 50 x 30 m trampled/enriched, spp poor with <i>Holcus</i> & <i>Cirsium spp</i>
P25	S	06/09/2016	284100	965638	Dense <i>Cirsium arvense</i> / <i>Urticac.</i> 20x10 m
P26	S	06/09/2016	283946	965767	main path from CP to beach, short turf (SD8d) but little erosion. SD9 locally above
P27	S	06/09/2016	283933	965802	views across front dunes

Code	Bay	Date	X	Y	Notes
P28	S	06/09/2016	283938	965903	Large blowout with SD6 developing
P29	S	06/09/2016	284043	965858	<i>Oxytropis halleri</i>
P30	S	06/09/2016	284002	965825	2m wide path with local erosion from rabbits
P32	S	06/09/2016	283861	965822	campfire on edge of slack
P33	S	06/09/2016	283701	965855	<i>S jacobea</i> R on flat but F on adjacent slopes where rabbit burrows occur
P34	S	06/09/2016	283539	965881	very open <i>Ammophila</i> (SD6d) beyond main dune
P35	S	06/09/2016	283686	965709	Abundant <i>Oxytropis</i> in SD8z. 3 cm tall turf
P36	S	06/09/2016	284111	965775	View across site
P37	S	06/09/2016	284173	965772	ploughed/cultivated area 50x20 m, half with potatoes and dense arable weeds - <i>Anchusa</i> , <i>Stellaria media</i> , <i>Rumex</i> spp, <i>Persicaria</i> , <i>P anserina</i> etc
P38	S	06/09/2016	284143	965677	Gully with dense <i>Urtica</i> , <i>Cirsium arvense</i> and dumped material
T1	M	04/09/2016	288715	964780	Transect - start - FD (SD7x)
T2	M	04/09/2016	288715	964828	Transect - FD (SD8d)
T3	M	04/09/2016	288715	964862	Transect - FD (SD7x/9)
T4	M	04/09/2016	288715	964956	Transect - MD (SD6)
T5	M	04/09/2016	288715	964972	Transect - end
T6	S	06/09/2016	284052	965595	Transect - start - FD (SD7x)
T7	S	06/09/2016	283905	965852	transect - DS (SD16). <i>Gentianella amarella</i> ssp <i>septentrionalis</i> LA
T8	S	06/09/2016	283899	965871	transect - FD (SD7x)
T9	S	06/09/2016	283890	965910	Transect - MD (SD6)
T10	S	06/09/2016	283899	965931	Transect - end - 3m eroded face with open <i>Ammophila</i>

ANNEX 3: SAMPLE PLOT DATA – STRAND, EMBRYO & MOBILE DUNES

Species cover given as %, or x = present (cover not recorded). + = in stand but not in plot.

a. Embryo and mobile dunes: Melvich Bay

Plot No	Q6	Q7	Q5	Q58	Q12	Q17	Q18	Q8	Q4
NVC	SD4	SD4	SD6 a	SD6 a	SD6 b	SD6 d	SD6 d	SD6 d	SD6 e
bare sand %	90	90	80	40	80	40	50	20	50
Ammophila flowering			y	y	y	y	y	y	n
GRASSES									
Ammophila arenaria	10	5	50	30	50	70	50	80	70
Arrhenatherum elatius								5	5
Elymus farctus	30	30	5	20	10				2
Festuca rubra									10
Leymus arenarius					3				
Poa pratensis								5	10
HERBS									
Achillea millefolium									x
Angelica sylvestris									x
Cerastium fontanum									x
Centaurea nigra									x
Cirsium arvense	1					x		2	5
Equisetum arvense								x	
Heracleum sphondylium									x
Honkenya peploides				15					
Rumex crispus					x				
Senecio jacobea						x		1	
Sonchus arvensis				3		x			
Thalictrum minus						x			
Tussilage farfara					x				
Vicia sepium									x
BRYOPHYTES total	0	0	0	0	0	0	0	0	20
Bryum pallens									x

b. Strand, embryo and mobile dunes: Armadale Bay

* cover uses DOMIN

plot no	Q34*	Q32	Q35*	Q33	Q36	Q37	Q38
NVC	SD2	SD4	SD4	SD6a	SD6a	SD6a	SD6d
bare sand %		60		90	20	60	50
Ammophila flowering				y	y	y	y
GRASSES SEDGES RUSHES							
Agrostis stolonifera					x		
Ammophila arenaria	1	2	3	10	x	50	60
Arrhenatherum elatius	1				x		
Elymus farctus	4	30	8		x	30	
Festuca rubra					x		
Holcus lanatus					x		
Leymus arenarius	1					x	
Lolium perenne			1				
Poa pratensis					x		
HERBS							
Atriplex glabriuscula	5		2		x		
Cakile maritima	4		2				
Cerastium fontanum							1
Honkenya peploides	1					x	
Ligusticum scoticum					x		
Plantago lanceolata					x		
Polygonum oxyspermum	4		1				2
Rumex crispus	2						1
Senecio jacobea							2
Senecio vulgaris	1	1				x	
Sonchus arvensis					x		1
Tussilage farfara		3					
Vicia sepium							1
BRYOPHYTES total	0	0	0	0	15	0	5
Bryum pallens					x		

c. Embryo and mobile dunes: Strathy Bay

plot no	Q47	Q46	Q52	Q53
NVC	SD4	SD6	SD6	SD6
bare sand %	60	60	70	40
<i>Ammophila</i> flowering		y	y	y
GRASSES SEDGES RUSHES				
<i>Ammophila arenaria</i>	5	60	70	50
<i>Elymus farctus</i>	40			
<i>Festuca rubra</i>		x		5
<i>Holcus lanatus</i>	x			x
HERBS				
<i>Atriplex glabriuscula</i>	+			
<i>Centaurea nigra</i>		x		
<i>Cerastium fontanum</i>		x		
<i>Cerastium glomeratum</i>		x		
<i>Chamerion angustifolium</i>				+
<i>Cirsium vulgare</i>				+
<i>Gentianella amarella</i>				x
<i>Senecio jacobea</i>		1		+
<i>Sonchus arvensis</i>				10
<i>Tussilago farfara</i>				+
BRYOPHYTES total	0	30	0	0
<i>Rhytidiadelphus triquetrus</i>		x		

ANNEX 4: SAMPLE PLOT DATA – FIXED DUNES

Species cover given as % or x = present (cover not recorded). * = Positive indicator species.

Key to frequency in final column: A abundant (>60% of samples), F frequent (41-60%), O occasional (21-40%), R rare (1-20%).

a. Fixed dunes: Melvich Bay

plot no	Q16	Q19	Q2	Q3	Q9	Q10	Q11	Q59	Q13	Q15	Q1	Q14	Q20	count	freq
NVC	SD7x	SD7x	SD7x/9	SD7x/9	SD7x/9	SD7x/9	SD7x/9	SD7x/9	SD9	SD8d	SD8d	SD8x	SD8x		
sward ht (cm)		40-100	40-80	40-100	100	50-100	80	30-80	100	5	10-40	30-70	20		
bare sand %	0	0	0	0	0	0	0	0	0	0	0	0	0		
herbs flowering/seeding	y	y	y	y	y	y	y	y	y	y	y	y	y		
GRASSES SEDGES RUSHES															
<i>Agrostis capillaris</i>									x					1	R
<i>Agrostis stolonifera</i>										x				1	R
<i>Ammophila arenaria</i>	50	60	50	50	70	70	50	60	20	0	20	10		11	A
<i>Anthoxanthum odoratum</i>													x	1	R
<i>Arrhenatherum elatius</i>	5	2	20	10	10	5	5	20	50		x	1	x	12	A
<i>Carex flacca</i> *										x			x	2	R
<i>Carex pulicaris</i>										x				1	R
<i>Cynosurus cristatus</i>													x	1	R
<i>Dactylis glomerata</i>					10	10	5	5				1	x	6	F
<i>Festuca rubra</i> *	50	40	30	40	10	50				x	x	70	x	10	A
<i>Holcus lanatus</i>	x	x	x						5	x	x	x	x	8	A
<i>Koeleria micrantha</i>										x				1	R
<i>Luzula multiflora</i>												x		1	R
<i>Poa pratensis</i>					x			x			x	5		4	O
<i>Schedonorus arundinaceus</i>						5								1	R
HERBS															
<i>Achillea millefolium</i>	x	x	x	x	x		x	x			x	x		9	A
<i>Angelica sylvestris</i>	x	x	x	x		x	x		x					7	F
<i>Anthyllis vulneraria</i>										x				1	R
<i>Bellis perennis</i>	x	x								x	x			4	O
<i>Campanula rotundifolia</i>	x							x					x	3	O
<i>Centaurea nigra</i>	x	x	x	x	x	x	x		x	x		x	x	11	A
<i>Cirsium arvense</i>	x	x		3		3		3	x					6	F
<i>Coeloglossum viride</i>										x				1	R

plot no	Q16	Q19	Q2	Q3	Q9	Q10	Q11	Q59	Q13	Q15	Q1	Q14	Q20	count	freq
<i>Equisetum arvense</i>							x							1	R
<i>Euphrasia</i> sp*										x	x			2	R
<i>Filipendula ulmaria</i>									x					1	R
<i>Galium verum</i> *		x	x	x		x	x	x	x	x	x	x	x	11	A
<i>Heracleum sphondylium</i>	x			x	x	x	x							5	O
<i>Hieracium</i> spp					x									1	R
<i>Lathyrus pratensis</i>									x					1	R
<i>Linum catharticum</i> *										x	x		x	3	O
<i>Lotus corniculatus</i> *			x				x				x	x	x	5	O
<i>Oxytropis halleri</i>										x				1	R
<i>Pilosella officinarum</i> *										x	x		x	3	O
<i>Plantago lanceolata</i> *	x	x	x	x	x	x		x		x	x	x	x	11	A
<i>Plantago maritima</i>										x				1	R
<i>Primula veris</i>										x	x		x	3	O
<i>Prunella vulgaris</i> *									x	x	x	x	x	5	O
<i>Ranunculus acris</i>					x					x	x	x	x	5	O
<i>Rhinanthus minor</i> *	x													1	R
<i>Rumex acetosa</i>							x						x	2	R
<i>Scorzoneroides autumnalis</i>										x		x	x	3	O
<i>Senecio jacobea</i>						1	2				x	x		4	O
<i>Sonchus arvensis</i>				x										1	R
<i>Taraxacum officinale</i>	x											x		2	R
<i>Thalictrum minus</i>		x												1	R
<i>Thymus polytrichus</i> *										x	x		x	3	O
<i>Trifolium pratense</i>										x	x	x	x	4	O
<i>Trifolium repens</i> *	x					x				x	x	x	x	6	F
<i>Trollius europaeus</i>										x				1	R
<i>Valeriana officinalis</i>		x						x						2	R
<i>Veronica chamaedrys</i> *	x		x	x	x	x	x			x	x	x	x	10	A
<i>Vicia cracca</i>						x								1	R
<i>Vicia sepium</i>	x		x	x		x	x				x	x		7	F
<i>Viola riviniana</i> *	x	x					x				x		x	5	F
SHRUBS															
<i>Rosa mollis</i>							20							1	R
BRYOPHYTES total	5		80	40	5	10	5	50	3	30	80	70	50		
<i>Brachythecium albicans</i>	x													1	R
<i>Calliergonella cuspidata</i>			x										x	2	R

plot no	Q16	Q19	Q2	Q3	Q9	Q10	Q11	Q59	Q13	Q15	Q1	Q14	Q20	count	freq
Campylopus sp										x	x			2	R
Ditrichum sp										x				1	R
Hylocomium splendens								x			x			2	R
Plagiomnium undulatum	x			x	x		x							4	O
Rhytidiadelphus squarrosus*	x		x	x		x	x	x		x	x	x	x	10	A
Scleropodium purum					x	x		x	x		x	x	x	7	F

b. Fixed dunes: Armadale Bay

plot no	Q24	Q23	Q27	Q29	Q31	Q28	Q21	Q40	Q22	Q25	Q26	Q39	Q30	count	freq
NVC	SD7a	SD7x	SD7x	SD7x	SD7x	SD8a	SD8e	SD8x	SD8z	SD8z	SD8z/ CG10	SD9	SD19		
sward ht	100	40-90	10-50		100	20-70	5	20-50	5	15	7	70	10-80		
bare sand	0	0	0	0	0	0	0	0	0	0	20	0	20		
herbs flowering/seeding	y	y	y	y	y	y	y	y	y	y	y	y	y		
GRASSES, SEDGES & RUSHES															
<i>Agrostis stolonifera</i>									x		x			2	R
<i>Aira caryophyllea</i>										x				1	R
<i>Ammophila arenaria</i>	60	40	40	x	90	20					x	10	30	9	A
<i>Anthoxanthum odoratum</i>									x	x				2	R
<i>Arrhenatherum elatius</i>		5			x			5				40		4	O
<i>Carex capillaris</i>							x		x	x				3	O
<i>Carex flacca</i> *		x	x				x		x		x			5	O
<i>Cynosurus cristatus</i>										x				1	R
<i>Dactylis glomerata</i>		20						15	x	x		20		5	O
<i>Danthonia decumbens</i>							x			x				2	R
<i>Festuca rubra</i> *	40	10	30	x	30	50	x	80	x	x	x	15	20	13	A
<i>Holcus lanatus</i>					x			x		x			x	4	O
<i>Koeleria micrantha</i>			x				x		x	x	x			5	O
<i>Luzula multiflora</i>										x				1	R
<i>Poa pratensis</i>	10	x	x	x	x	x			x	x				8	A
HERBS															
<i>Achillea millefolium</i>				x	x		x					x	x	5	O
<i>Bellis perennis</i>			x				x		x		x			4	O
<i>Campanula rotundifolia</i>		x	x			x	x	x		x				6	F
<i>Centaurea nigra</i>		x			x		x	x	x					5	O
<i>Centaurea scabiosa</i>								x						1	R
<i>Cerastium fontanum</i>						x			x	x	x			4	O
<i>Cirsium arvense</i>	10	5		1	10									4	O
<i>Cirsium vulgare</i>						x						1	1	3	O
<i>Coeloglossum viride</i>							x							1	R
<i>Crepis capillaris</i>				x		x			x				x	4	O
<i>Euphrasia sp</i> *							x							1	R
<i>Galium saxatile</i>		x												1	R

plot no	Q24	Q23	Q27	Q29	Q31	Q28	Q21	Q40	Q22	Q25	Q26	Q39	Q30	count	freq
Galium verum*		x	x	x	x	x	x	x	x	x	x	x		11	A
Gentianella amarella			x			x	x		x					4	O
Heracleum sphondylium								x				x	x	3	O
Hypochaeris radicata*				x									x	2	R
Linum catharticum*			x			x	x		x	x	x		x	7	F
Lotus corniculatus*				x	x	x	x	x	x	x	x			8	A
Oxytropis halleri							x		x					2	R
Pedicularis sylvatica							x							1	R
Pilosella officinarum*									x	x	x		x	4	O
Pimpinella saxifraga									x					1	R
Pinguicula vulgaris						x			x					2	R
Plantago lanceolata*	x	x	x	x		x	x	x	x	x	x	x		11	A
Plantago maritima							x		x		x			3	O
Polygala vulgaris							x							1	R
Primula veris							x							1	R
Prunella vulgaris*		x	x		x		x			x				5	O
Pteridium aquilinum								2						1	R
Ranunculus acris					x		x	x	x	x				5	O
Scorzoneroides autumnalis						x				x				2	R
Selaginella selaginoides							x							1	R
Senecio jacobea					3	x							2	3	O
Succisa pratensis							x							1	R
Taraxacum officinale			x			x							x	3	O
Thalictrum minus								x						1	R
Thymus polytrichus*			x			x	x		x	x	x			6	F
Trifolium pratense							x							1	R
Trifolium repens*			x	x	x	x	x	x					x	7	F
Urtica dioica												1		1	R
Veronica chamaedrys*		x			x	x		x		x		x		6	F
Vicia sepium						x		x				x		3	O
Viola riviniana*	x	x	x							x	x			5	O
BRYOPHYTES total	10	10	25	2	5	60	30	5	5		5	5	50		
Brachythecium albicans								x						1	R
Brachythecium rutabulum												x		1	R
Bryum pallens													x	1	R
Calliergonella cuspidata			x		x									2	R
Campylopus sp							x							1	R

plot no	Q24	Q23	Q27	Q29	Q31	Q28	Q21	Q40	Q22	Q25	Q26	Q39	Q30	count	freq
fissidens sp									x					1	R
Homalothecium lutescens													x	1	R
Hylocomium splendens	x					x				x				3	O
Hypnum sp*			x				x							2	R
Kindbergia praelonga					x							x		2	R
Plagiochila sp			x											1	R
Plagiomnium undulatum												x		1	R
Rhizomnium sp				x										1	R
Rhytidiadelphus squarrosus*	x	x	x			x			x	x				6	F
Rhytidiadelphus triquetrus*						x								1	R
Scleropodium purum	x									x				2	R
Syntrichia ruralis*													x	1	R
LICHENS															
Peltigera canina*									x		x			2	R
Cladonia portentosa*			x						x					2	R
Cladonia spp*															

c. Fixed dunes: Strathy Bay

plot no	Q49	Q43	Q45	Q54	Q51	Q57	Q55	Q56	Q41	Q42	Q48	count	freq
NVC	SD8c	SD7x	SD7x	SD7x	SD8x	SD8e	SD8z	SD8z	SD8z	SD8z	SD8z		
sward ht (cm)		50	30-70	10-50	70	25	10	3	3	15-60	5-15		
bare sand	10	0	0	0	0	0	0	1	5	0	0		
herbs flowering/seeding	y	y	y	y	y	y	y	y	y	y	y		
GRASSES SEDGES RUSHES													
Agrostis stolonifera						x		x			x	3	O
Ammophila arenaria	40	20	50	40	5				1	5		7	A
Anthoxanthum odoratum						x						1	R
Arrhenatherum elatius		10		x	1							3	O
Carex flacca*						x	x	x			x	4	O
Dactylis glomerata		10					1				x	3	O
Festuca rubra*	10	50	50	40	10	x	x	x	x	x		10	A
Holcus lanatus	x	x		x	x	x	x		x	x		8	A
Koeleria micrantha							x			x	x	3	O
Luzula campestris*									x			1	R
Poa pratensis				x	2			x	x			4	O
HERBS													
Achillea millefolium					x				x	x	x	4	O
Angelica sylvestris		x	x		x	x						4	O
Bellis perennis	x					x		x				3	O
Centaurea nigra		x	x	x	x	x	x			x	x	8	A
Cerastium fontanum									x			1	R
Cirsium arvense			5									1	R
Cirsium vulgare	1											1	R
Crepis capillaris	x			x								2	R
Euphrasia sp*							x		x		x	3	O
Filipendula ulmaria				+								1	R
Galium saxatile						x						1	R
Galium verum*		x	x	x	x		x	x	x	x	x	9	A
Gentianella amarella	x						x	x	x			4	O
Heracleum sphondylium	x	x	x	x	x							5	F
Linum catharticum*	x							x			x	3	O
Lotus corniculatus *			x	x	x	x	x	x	x	x	x	9	A
Myosotis arvensis	x		x									2	R

plot no	Q49	Q43	Q45	Q54	Q51	Q57	Q55	Q56	Q41	Q42	Q48	count	freq
<i>Parnassia palustris</i>		x								x		2	R
<i>Persicaria vivipara</i>								x				1	R
<i>Pilosella officinarum</i> *									x			1	R
<i>Plantago lanceolata</i> *		x	x	x	x	x	x	x	x	x	x	10	A
<i>Plantago maritima</i>								x			x	2	R
<i>Potentilla erecta</i>						x						1	R
<i>Primula veris</i>				x			x	x	x	x	x	6	F
<i>Prunella vulgaris</i> *	x	x				x	x	x	x	x	x	8	A
<i>Ranunculus acris</i>		x			x		x	x	x	x	x	7	A
<i>Scilla verna</i>								x				1	R
<i>Scorzoneroides autumnalis</i>							x					1	R
<i>Senecio jacobea</i>	5		1				1	<1	1		1	6	F
<i>Sonchus arvensis</i>			x									1	R
<i>Succisa pratensis</i>					x	x		x	x	x	x	6	F
<i>Taraxacum officinale</i>	x		x	x					x			4	O
<i>Thymus polytrichus</i> *	x					x	x	x	x	x	x	7	A
<i>Trifolium pratense</i>						x				x	x	3	O
<i>Trifolium repens</i> *	x	x	x			x			x	x	x	7	A
<i>Trollius europaeus</i>										x		1	R
<i>Veronica chamaedrys</i> *	x	x	x		x		x			x		5	F
<i>Vicia cracca</i>		x										1	R
<i>Vicia sepium</i>				x	x							2	R
<i>Viola riviniana</i> *		x				x	x		x	x		5	F
SHRUBS													
<i>Salix repens</i>								x				1	R
BRYOPHYTES total	75	50	80	90	90	15		1	20	20			
<i>Brachythecium albicans</i>	x											1	R
<i>Calliergonella cuspidata</i>			x							x	x	3	O
<i>Homalothecium lutescens</i>									x			1	R
<i>Hylocomium splendens</i>				x								1	R
<i>Hypnum spp</i> *	x					x					x	3	O
<i>Plagiomnium undulatum</i>		x										1	R
<i>Rhytidiadelphus squarrosus</i> *	x	x			x	x		x	x		x	7	A
<i>Rhytidiadelphus triquetrus</i> *	x		x	x	x							4	O
<i>Scleropodium purum</i>	x	x	x			x		x	x	x		7	A
<i>Syntrichia ruralis</i> *	x											1	R
LICHENS													

plot no	Q49	Q43	Q45	Q54	Q51	Q57	Q55	Q56	Q41	Q42	Q48	count	freq
Peltigera canina*									x			1	R
Cladonia portentosa*									15			1	R

ANNEX 5: SAMPLE PLOT DATA – DUNE SLACK

Strathy Bay. Species cover using DOMIN. X = present

plot no	Q50	Q44
NVC	SD16	SD17
sward ht (cm)	20	3-12
bare sand %	0	0
GRASSES SEDGES RUSHES		
Agrostis stolonifera	5	
Carex arenaria	5	3
Carex flacca	3	3
Festuca rubra	4	3
Holcus lanatus		4
Poa pratensis	x	
HERBS		
Bellis perennis		4
Campanula rotundifolia		2
Centaurea nigra	1	
Cerastium fontanum		1
Cirsium vulgare	1	
Euphrasia sp		2
Filipendula ulmaria	1	5
Galium palustre	3	
Galium verum		1
Gentianella amarella		1
Lotus corniculatus		3
Myosotis sp	1	
Parnassia palustris	3	3
Plantago lanceolata		3
Potentilla anserina		8
Prunella vulgaris	3	5
Rumex acetosa	3	
Rumex crispus		2
Senecio jacobea		1
Sonchus arvensis	3	2
Trifolium repens	3	3
Veronica chamaedrys	2	
Viola riviniana	2	
SHRUBS		
Salix repens	8	
BRYOPHYTES total %	60	80
Bryum sp		6
Calliergonella cuspidata	x	6
Rhytidiadelphus squarrosus	x	5
Rhytidiadelphus triquetrus	x	
Scleropodium purum	x	

ANNEX 6: LIST OF PHOTOGRAPHS

The photographs listed in this Annex can be provided on request in electronic format. Dates: Armadale Bay 5/9/16, Strathy Bay 6/9/16, Melvich Bay 4/9/16 (0840-0877) and 6/9/16 (0982-0987).

photo no	Section	Location	Direction	Description
RIMG0840	Melvich Bay	T1	N	view along transect
RIMG0841	Melvich Bay	Q1	SE	plot
RIMG0842	Melvich Bay	T2	W	localised area of short turf SD8
RIMG0843	Melvich Bay	Q2	W	SD7/9
RIMG0844	Melvich Bay	Q2	x	plot
RIMG0845	Melvich Bay	Q3	NW	plot
RIMG0846	Melvich Bay	T4	W	dune ridge
RIMG0847	Melvich Bay	T4	E	dune ridge
RIMG0848	Melvich Bay	Q4	SW	plot
RIMG0849	Melvich Bay	Q4	W	dune face
RIMG0850	Melvich Bay	T5	W	bare dune face
RIMG0851	Melvich Bay	Q5	x	plot
RIMG0852	Melvich Bay	Q6	E	plot
RIMG0853	Melvich Bay	Q7	W	plots Q7 and Q8
RIMG0854	Melvich Bay	Q9	x	plot
RIMG0855	Melvich Bay	Q9	N	SD7/9 stand
RIMG0856	Melvich Bay	Q10	N	plot
RIMG0857	Melvich Bay	Q11	N	plot
RIMG0858	Melvich Bay	Q12	NW	Cakile on strand
RIMG0859	Melvich Bay	Q12	SE	plot
RIMG0860	Melvich Bay	Q13	NW	plot
RIMG0861	Melvich Bay	Q14	NE	plot
RIMG0862	Melvich Bay	P1	S	gully with <i>Urtica</i> etc
RIMG0863	Melvich Bay	Q15	SE	plot
RIMG0864	Melvich Bay	Q16	x	plot
RIMG0865	Melvich Bay	Q17	NE	plot
RIMG0866	Melvich Bay	Q17	S	trampled blow-out across dunes
RIMG0867	Melvich Bay	Q18	SE	plot
RIMG0868	Melvich Bay	Q18	E	dune face
RIMG0869	Melvich Bay	Q19	x	plot
RIMG0870	Melvich Bay	Q19	x	plot detail
RIMG0871	Melvich Bay	P4	SW	Large stand of Shasta daisy
RIMG0872	Melvich Bay	P4	x	sycamore sapling in dunes
RIMG0873	Melvich Bay	P7	NW	large blowout across dunes
RIMG0874	Melvich Bay	P8	E	recently cut turf
RIMG0875	Melvich Bay	P8	x	recently cut turf
RIMG0876	Melvich Bay	P8	SW	saltmarsh-dune transition
RIMG0877	Melvich Bay	Q20	NW	plot
RIMG0877	Armadale Bay	Q21	N	Plot
RIMG0878	Armadale Bay	Q21	x	<i>Oxytropis</i> leaves
RIMG0879	Armadale Bay	P11	SSE	<i>Senecio</i> and <i>Cirsium</i> spp in SD8d
RIMG0880	Armadale Bay	P11	S	<i>Cirsium</i> spp frequent in SD8d
RIMG0881	Armadale Bay	Q22	N	plot
RIMG0882	Armadale Bay	Q23	S	plot
RIMG0883	Armadale Bay	P12	E	fenceline through SD8 with bracken
RIMG0884	Armadale Bay	P12	N	transition from SD8 to SD7
RIMG0885	Armadale Bay	P13	SE	<i>Ulex</i> scrub on steep face with SD8z
RIMG0886	Armadale Bay	Q24	SE	plot
RIMG0887	Armadale Bay	P14	NW	Eroded dune hollow with SD8z/c and scattered <i>Cirsium arvense</i>
RIMG0888	Armadale Bay	Q25	NW	View along transect from outside SSSI

photo no	Section	Location	Direction	Description
RIMG0889	Armadale Bay	Q25	NW	plot
RIMG0890	Armadale Bay	Q26	NE	plot
RIMG0891	Armadale Bay	Q27	N	plot
RIMG0892	Armadale Bay	Q28	NW	
RIMG0893	Armadale Bay	Q29	x	rayless form of <i>Senecio jacobea</i>
RIMG0894	Armadale Bay	Q29	x	rayless form of <i>Senecio jacobea</i>
RIMG0895	Armadale Bay	Q29	x	SD7x with frequent <i>C arvensis</i> and <i>S jacobea</i> (rayless)
RIMG0896	Armadale Bay	Q29	x	plot
RIMG0897	Armadale Bay	Q30	NW	plot
RIMG0898	Armadale Bay	Q31	x	plot
RIMG0899	Armadale Bay	Q32	W	plot
RIMG0900	Armadale Bay	P15	x	<i>Polygonum oxyspermum</i>
RIMG0901	Armadale Bay	Q33	S	Transect end - eroded dune face
RIMG0902	Armadale Bay	P17	SW	<i>E juncea</i> along base of dune
RIMG0903	Armadale Bay	P17	SW	SD4 embryo dune
RIMG0904	Armadale Bay	Q34	x	plot
RIMG0905	Armadale Bay	Q34	x	SD2 with <i>Cakile</i>
RIMG0906	Armadale Bay	Q35	x	plot
RIMG0907	Armadale Bay	Q36	E	strandline vegetation
RIMG0908	Armadale Bay	Q36	W	accreting dunes west of river
RIMG0909	Armadale Bay	Q36	x	plot
RIMG0910	Armadale Bay	Q37	SW	plot
RIMG0911	Armadale Bay	Q37	NW	wide area of embryo dunes
RIMG0912	Armadale Bay	P18	E	<i>Polygonum oxyspermum</i>
RIMG0913	Armadale Bay	P18	E	SD2 and SD4
RIMG0914	Armadale Bay	P19	W	SD2 & SD4
RIMG0915	Armadale Bay	P19	SE	SD2 & SD4
RIMG0916	Armadale Bay	Q38	S	plot
RIMG0917	Armadale Bay	Q38	W	SD6
RIMG0918	Armadale Bay	Q39	N	Bracken encroaching into SD7x/9
RIMG0919	Armadale Bay	Q39	W	SD7x
RIMG0920	Armadale Bay	Q40	W	plot with bracken encroaching
RIMG0921	Armadale Bay	Q40	NW	plot with bracken encroaching
RIMG0922	Armadale Bay	P20	SE	Blowout on edge of SSSI with SD8 to crest
RIMG0923	Armadale Bay	P20	NW	Blowout on edge of SSSI
RIMG0924	Armadale Bay	P20	E	View across river to main dunes
RIMG0925	Armadale Bay	P21	N	Dense <i>Urtica</i> and <i>C arvensis</i> patch
RIMG0926	Strathy Bay	P22	NE	Rabbit erosion beside road
RIMG0927	Strathy Bay	P22	NW	Rabbit erosion beside road
RIMG0928	Strathy Bay	T6	N	Start of transect
RIMG0929	Strathy Bay	Q41	NW	Cattle feeding area
RIMG0930	Strathy Bay	Q41	S	plot
RIMG0931	Strathy Bay	P24	E	Large cattle feeding area
RIMG0932	Strathy Bay	P23	SW	Dense <i>Cirsium vulgare</i> patch
RIMG0933	Strathy Bay	P25	E	Dense <i>Urtica</i> and <i>Cirsium</i> spp in cattle feeding area
RIMG0934	Strathy Bay	Q42	NE	plot
RIMG0935	Strathy Bay	Q42	NW	Strathy Bay
RIMG0936	Strathy Bay	Q42	N	Strathy Bay
RIMG0937	Strathy Bay	Q43	x	plot
RIMG0938	Strathy Bay	P26	WSW	main path from carpark to beach
RIMG0939	Strathy Bay	P26	ENE	main path from carpark to beach
RIMG0940	Strathy Bay	P27	WNW	central hollow with slacks and bare area
RIMG0941	Strathy Bay	P27	NNW	central hollow with slack and front ridge
RIMG0942	Strathy Bay	T7	NNW	Dune slack with <i>Filipendula</i>
RIMG0943	Strathy Bay	T7	E	Dune slack with <i>Filipendula</i> D

photo no	Section	Location	Direction	Description
RIMG0944	Strathy Bay	T7	x	Abundant <i>Gentianella amarella</i> in slack
RIMG0945	Strathy Bay	T8	x	Rabbit burrows with rayless <i>Senecio jacobea</i> LA
RIMG0946	Strathy Bay	Q44	x	plot
RIMG0947	Strathy Bay	Q45	N	plot
RIMG0948	Strathy Bay	T9	ENE	front dunes with SD6
RIMG0949	Strathy Bay	T9	WNW	front dunes with SD6
RIMG0950	Strathy Bay	T10	W	Eroded front face of dune
RIMG0951	Strathy Bay	Q46	W	plot
RIMG0952	Strathy Bay	P28	NE	blowout with SD6
RIMG0953	Strathy Bay	Q47	N	plot
RIMG0954	Strathy Bay	Q48	N	plot
RIMG0955	Strathy Bay	Q48	W	view across front dunes
RIMG0956	Strathy Bay	Q48	NW	Strathy Bay
RIMG0957	Strathy Bay	P30	NNE	steep terraced slopes with SD8z
RIMG0958	Strathy Bay	P30	N	path with rabbit erosion
RIMG0959	Strathy Bay	Q49	NW	bare sand hollow with rabbit burrows to right and dune slack far left
RIMG0960	Strathy Bay	Q49	SW	steep dune slope with rabbit burrows/erosion
RIMG0961	Strathy Bay	Q49	x	plot
RIMG0962	Strathy Bay	P32	W	campfire site on edge of slack
RIMG0963	Strathy Bay	P32	E	eroded area with rabbit burrows behind
RIMG0964	Strathy Bay	Q50	E	plot
RIMG0965	Strathy Bay	Q51	E	plot
RIMG0966	Strathy Bay	P33	W	Rabbit burrows with <i>Senecio jacobea</i> F
RIMG0967	Strathy Bay	Q52	NE	SD6 ridge
RIMG0968	Strathy Bay	Q52	SW	plot
RIMG0969	Strathy Bay	P34	SW	scattered <i>Ammophila</i> below main dune
RIMG0970	Strathy Bay	Q53	SW	plot
RIMG0971	Strathy Bay	Q54	NE	plot
RIMG0972	Strathy Bay	Q54	SE	eroded paths on slope
RIMG0973	Strathy Bay	Q55	E	plot
RIMG0974	Strathy Bay	Q56	NW	plot
RIMG0975	Strathy Bay	P36	W	view across main dunes
RIMG0976	Strathy Bay	Q57	SE	plot
RIMG0977	Strathy Bay	P37	SE	ploughed area with potatoes
RIMG0978	Strathy Bay	P37	x	<i>Anchusa arvensis</i>
RIMG0979	Strathy Bay	P37	E	ploughed area with ruderal spp <i>Anchusa</i> , <i>Stellaria media</i> , <i>Rumex</i> etc
RIMG0980	Strathy Bay	P38	SE	Gully with <i>Urtica</i> & <i>Cirsium arvense</i> dominant
RIMG0981	Strathy Bay	P22	SE	U20 bracken stand below road
RIMG0982	Melvich Bay	P9	S	dune-saltmarsh transition
RIMG0983	Melvich Bay	P9	N	dune-saltmarsh transition
RIMG0984	Melvich Bay	Q58	E	plot
RIMG0985	Melvich Bay	Q58	W	embro dune and footbridge
RIMG0986	Melvich Bay	Q59	W	plot
RIMG0987	Melvich Bay	P10	NW	dunes with blowout view from bridge

ANNEX 7: SITE CONDITION MONITORING FORM

This Annex can be downloaded as a separate document.

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