European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC)

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the
conservation status assessment for the habitat:

H2190 - Humid dune slacks

WALES

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this habitat, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this habitat is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; and/or (iii) the field was only relevant at UK-level (sections 10 Future prospects and 11 Conclusions).
- For technical reasons, the country-level future trends for Range, Area covered by habitat and Structure and functions are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 17 for Annex I habitat types (Annex D)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (Wales information only)**
1.2 Habitat code	**2190 - Humid dune slacks**

2. Maps

2.1 Year or period	1991-2017
2.3 Distribution map	Yes
2.3 Distribution map Method used	Complete survey or a statistically robust estimate
2.4 Additional maps	No

BIOGEOGRAPHICAL LEVEL

3. Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	**Atlantic (ATL)**
3.2 Sources of information	Ashall, J., Duckworth, J., Holder, C. (1992). Sand dune survey of Great Britain. Site report no. 120 Tai Morfa, Dwyfor Wales 1991 (DRAFT VERSION). Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 86). Ashall, J., Duckworth, J., Holder, C. (1992). Sand dune survey of Great Britain. Site report no. 129 Kinmel Bay, Colwyn, Wales 1991 (DRAFT VERSION). Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 98). Ashall, J., Duckworth, J., Holder, C. (1994). Sand dune survey of Great Britain. Site report no. 113 Dunes between Tywyn & Aberdovey, Meirionydd, Wales 1991. Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 81). Ashall, J., Duckworth, J., Holder, C. (1995). Sand dune survey of Great Britain. Site report no. 125 Tywyn Gwyn, Anglesey, Ynys Mon, Wales 1991. Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 94). Ashall, J., Duckworth, J., Holder, C., McConnell, A., Smart, S. (1995). Sand dune survey of Great Britain. Site report no. 108 Whitesands Bay, Preseli, Wales 1991. Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 71). Ashall, J., Duckworth, J., Holder, C., McConnell, A., Smart, S. (1995). Sand dune survey of Great Britain. Site report no. 110 Poppit Sands, Preseli, Wales 1991. Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 73). Ashall, J., Duckworth, J., Holder, C., Smart, S. (1992). Sand dune survey of Great Britain. Site report no. 111 Towyn Warren, Ceredigion, Wales 1991 (DRAFT VERSION). Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 79). Ashall, J., Duckworth, J., Holder, C., Smart, S. (1992). Sand dune survey of Great Britain. Site report no. 112 Ynyslas, Ceredigion, Wales 1991 (DRAFT VERSION). Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 80). Ashall, J., Duckworth, J., Holder, C., Smart, S. (1992). Sand dune survey of Great Britain. Site report no. 115 Morfa Dyffryn Meirionydd (DRAFT VERSION). Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 90). Ashall, J., Duckworth, J., Holder, C., Smart, S. (1994). Sand dune survey of Great Britain. Site report no. 100 Pendine Burrows, Carmarthen, Wales 1991. Joint Nature Conservation Committee (JNCC) Peterborough. (JNCC Report 78). Ashall, J., Duckworth, J., Holder, C., Smart, S. (1994). Sand dune survey of Great Britain. Site report no. 105 Stackpole Warren, Barafundle Bay and Broad Haven South Pembrokeshire, Wales 1991. Joint Nature Conservation Committee (JNCC)

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Wilkinson, K. (2018). Humid Dune Slacks Carmarthen Bay Dunes SAC Monitoring Report. NRW Evidence Report (draft in prep).

4. Range

4.1 Surface area (in km²)			
4.2 Short-term trend Period			
4.3 Short-term trend Direction	Stable (0)		
4.4 Short-term trend Magnitude	a) Minimum	b) Maximum	
4.5 Short-term trend Method used			
4.6 Long-term trend Period			
4.7 Long-term trend Direction			
4.8 Long-term trend Magnitude	a) Minimum	b) Maximum	
4.9 Long-term trend Method used			
4.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown d) Method	No	
4.11 Change and reason for change in surface area of range	No change The change is mainly due to:		
4.12 Additional information			

5. Area covered by habitat

5.1 Year or period	1991-2017			
5.2 Surface area (in km²)	a) Minimum	b) Maximum	c) Best single value	3.2295
5.3 Type of estimate	Best estimate			
5.4 Surface area Method used	Complete survey or a statistically robust estimate			

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5.5 Short-term trend Period	2007-2018		
5.6 Short-term trend Direction	Uncertain (u)		
5.7 Short-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.8 Short-term trend Method used	Insufficient or no data available		
5.9 Long-term trend Period	1991-2018		
5.10 Long-term trend Direction	Uncertain (u)		
5.11 Long-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.12 Long-term trend Method used	Insufficient or no data available		
5.13 Favourable reference area	a) Area (km²) b) Operator c) Unknown No d) Method		
5.14 Change and reason for change in surface area of range	No change The change is mainly due to:		
5.15 Additional information			

6. Structure and functions

6.1 Condition of habitat	a) Area in good condition (km²)	Minimum	0	Maximum	0
	b) Area in not-good condition (km²)	Minimum	2.3639	Maximum	2.3639
	c) Area where condition is not known (km²)	Minimum	0.8656	Maximum	0.8656
6.2 Condition of habitat Method used	Complete survey or a statistically robust estimate				
6.3 Short-term trend of habitat area in good condition Period	2007-2018				
6.4 Short-term trend of habitat area in good condition Direction	Stable (0)				
6.5 Short-term trend of habitat area in good condition Method used	Based mainly on extrapolation from a limited amount of data				
6.6 Typical species	Has the list of typical species changed in comparison to the previous reporting period?		No		
6.7 Typical species Method used					
6.8 Additional information					

7. Main pressures and threats

7.1 Characterisation of pressures/threats

Pressure	Ranking
Extensive grazing or undergrazing by livestock (A10)	H
Application of natural fertilisers on agricultural land (A19)	H
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	H
Sports, tourism and leisure activities (F07)	H

Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	H
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	M
Other invasive alien species (other then species of Union concern) (I02)	M
Problematic native species (I04)	M
Mixed source air pollution, air-borne pollutants (J03)	M
Drainage (K02)	M

Threat	Ranking
Extensive grazing or undergrazing by livestock (A10)	H
Application of natural fertilisers on agricultural land (A19)	H
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	H
Sports, tourism and leisure activities (F07)	H
Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	H
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	M
Other invasive alien species (other then species of Union concern) (I02)	M
Problematic native species (I04)	M
Mixed source air pollution, air-borne pollutants (J03)	M
Drainage (K02)	M

7.2 Sources of information

7.3 Additional information

8. Conservation measures

8.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified and taken
8.2 Main purpose of the measures taken		Restore the habitat of the species (related to 'Habitat for the species')
8.3 Location of the measures taken		Both inside and outside Natura 2000
8.4 Response to the measures		Long-term results (after 2030)
8.5 List of main conservation measures		

Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures (CA04)
Reduce diffuse pollution to surface or ground waters from agricultural activities (CA11)
Reduce impact of outdoor sports, leisure and recreational activities (CF03)

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Reduce/eliminate air pollution from industrial, commercial, residential and recreational areas and activities (CF06)

Manage changes in hydrological and coastal systems and regimes for construction and development (CF10)

Manage water abstraction for public supply and for industrial and commercial use (CF11)

Reduce impact of military installations and activities (CH01)

Management, control or eradication of other invasive alien species (CI03)

Management of problematic native species (CI05)

Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes (CL01)

8.6 Additional information

9. Future prospects

9.1 Future prospects of parameters

a) Range
b) Area
c) Structure and functions

9.2 Additional information

10. Conclusions

10.1. Range

10.2. Area

10.3. Specific structure and functions (incl. typical species)

10.4. Future prospects

10.5 Overall assessment of Conservation Status

10.6 Overall trend in Conservation Status

10.7 Change and reasons for change in conservation status and conservation status trend

a) Overall assessment of conservation status

No change

The change is mainly due to:

b) Overall trend in conservation status

No change

The change is mainly due to:

10.8 Additional information

11. Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types

11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (in km² in biogeographical/ marine region)

a) Minimum
b) Maximum
c) Best single value 2.7456

11.2 Type of estimate

Best estimate

11.3 Surface area of the habitat type inside the network Method used

Complete survey or a statistically robust estimate

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11.4 Short-term trend of habitat area in good condition within the network Direction	Stable (0)
11.5 Short-term trend of habitat area in good condition within network Method used	Based mainly on extrapolation from a limited amount of data
11.6 Additional information	

12. Complementary information

12.1 Justification of % thresholds for trends	
12.2 Other relevant information	

Distribution Map

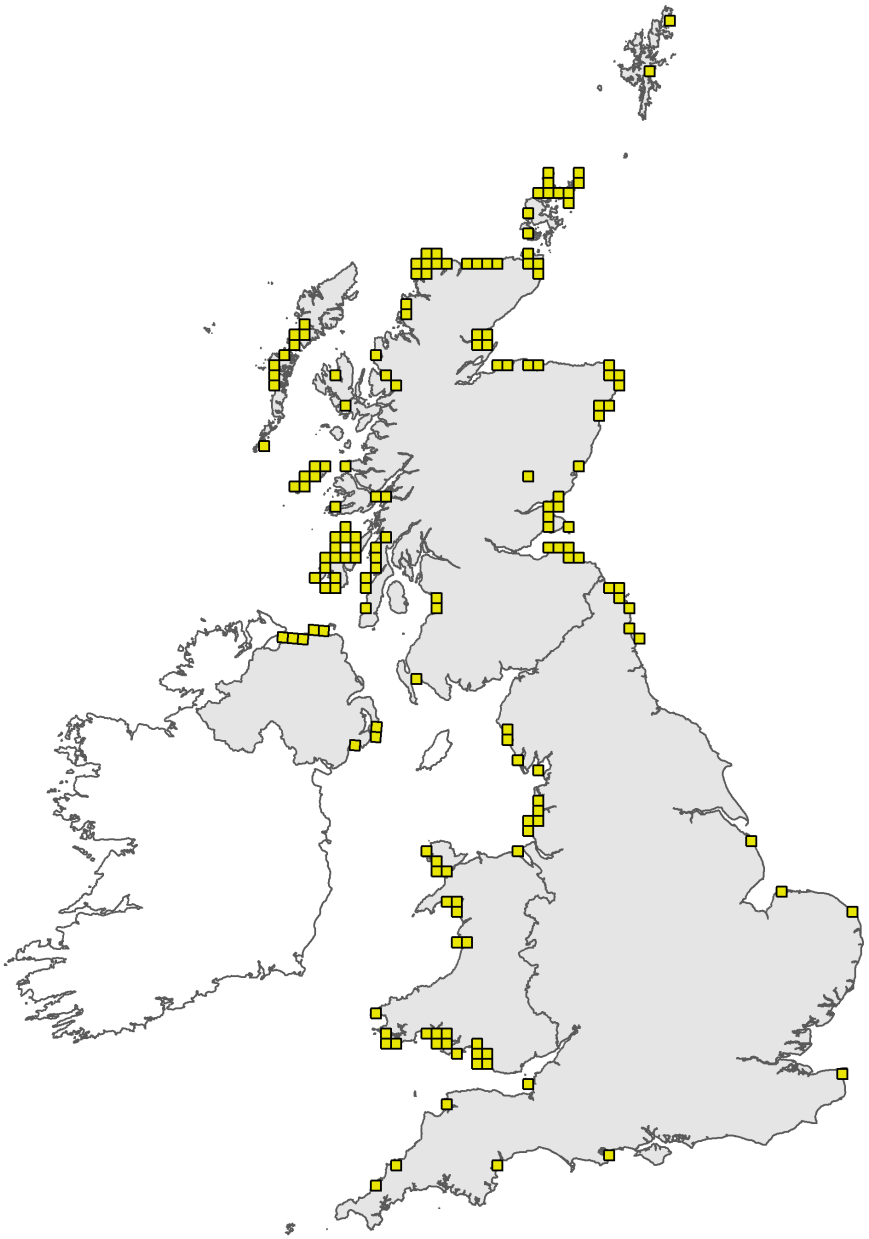

Figure 1: UK distribution map for H2190 - Humid dune slacks. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available habitat records which are considered to be representative of the distribution within the current reporting period. For further details see the 2019 Article17 UK Approach document.

Range Map

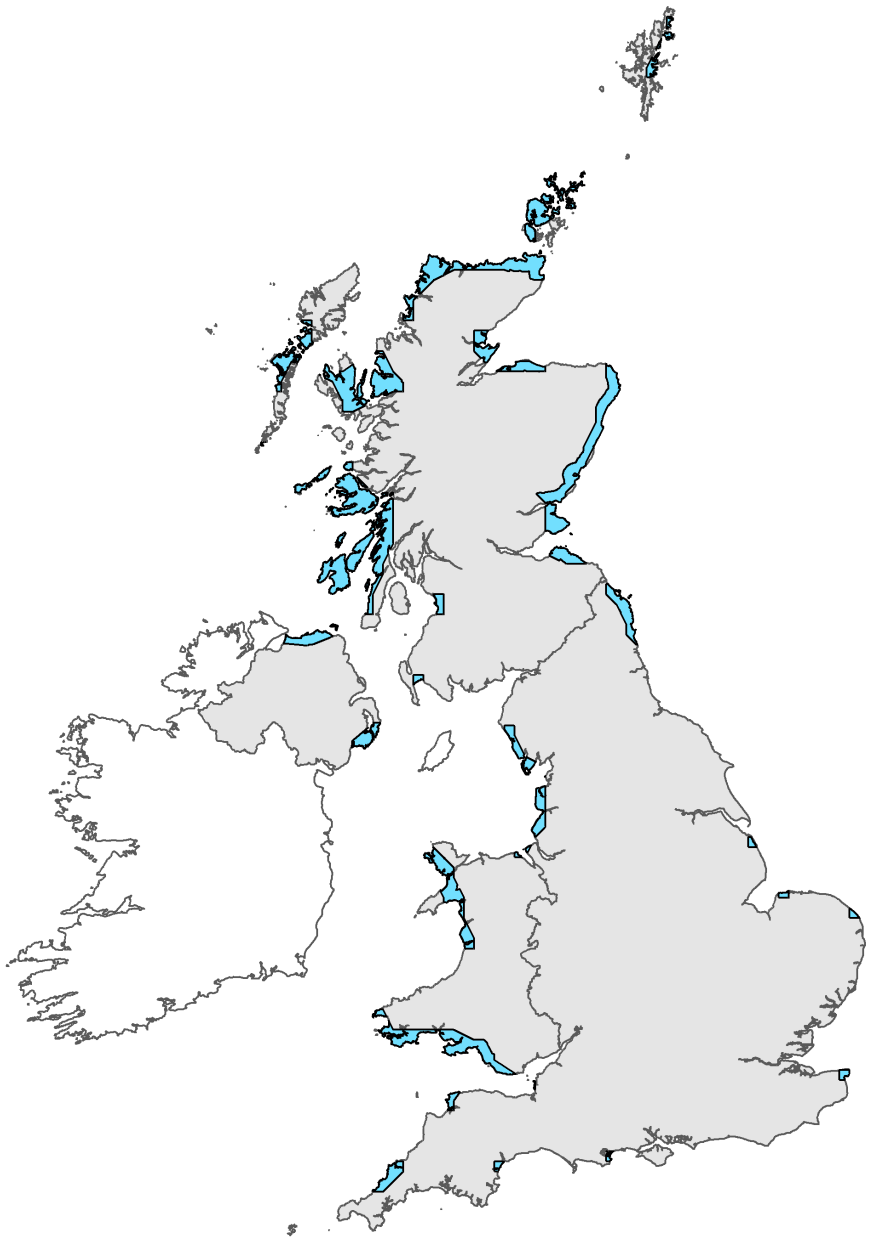

Figure 2: UK range map for H2190 - Humid dune slacks. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by applying a bespoke range mapping tool for Article 17 reporting (produced by JNCC) to the 10km grid square distribution map presented in Figure 1. The alpha value for this habitat was 25km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Habitat code: 2190

Field label	Note
2.3 Distribution map; Method used	The 10km square distribution and habitat area estimates are derived from a combination of different original sources, summarised below. A single aggregated GIS layer has been created for this habitat across Wales (data source 1 below) pulling together the maps and records from the other listed sources. Detailed processing notes for the 2018 Article 17 extent layer have been produced (Kay, 2018). Data source 1 (MAIN DATA SOURCE): Digital GIS Map Layer: Article 17 H2170 Dunes with Salix repens ssp. argentea (Salicion arenariae) Extent Layer 2018 (Kay, 2018). Data source 2 (MAIN DATA SOURCE): Sand Dune Vegetation Survey of Great Britain Part 3 - Wales (Dargie, 1995). This was a comprehensive survey of all sand dunes in Wales (see published sources) based on the UKs National Vegetation Classification (NVC) (Rodwell, 2000). Data source 3 (SECONDARY DATA SOURCE): Coastal habitat mapping and monitoring utilising remote sensing PhD Thesis (Jones, 2017). The study focused on the use of Very High Resolution (VHR) optical imagery for retrieving parameters to identify associations that can separate habitat boundaries for extent mapping down to species level for indicators of condition, with a focus on operational use. The Earth Observation Data for Habitat Monitoring (EODHaM) system was implemented using Worldview-2 data from two periods (July and September 2016), in situ data and local ecological knowledge for two sites in Wales, Kenfig Burrows SAC and Castlemartin SSSI. The Sand Dune surveys (Dargie, 1995) were carried out over 20 years ago and so several intra-site changes are likely to have occurred, but, no sites have been lost or irreversibly damaged. H2190 vegetation equates to NVC communities SD13, SD14, SD15, SD16 (part) and SD17, occurrences of these NVC communities in the above data sources were used to compile the habitat map for Wales. SD16 was included in the assessment but only when the cover of that community was not more than 33%. The linking of SD16 to both H2170 and H2190 is an ongoing issue in the UK. Separating the habitat on the ground for mapping and monitoring purposes and for reporting on each individual habitat has proved problematic. The range has not changed since the 2012 report. The 2018 data is considered to give good representation of the current distribution and extent of this habitat.

Habitat code: 2190 Region code: ATL

Field label	Note
4.3 Short term trend; Direction	Any recent losses and gains of this habitat do not appear to have affected range at least since the Phase II baseline data was created in the early 1990s. No instances have been identified where, since 2001, the habitat has either been totally lost from a 10km square or created or restored within a 10km square where it was not present at the start of the period.
5.1 Year or period	The data used to produce the total area figure are predominantly from 1991 - 1995. Post 1995 information includes remote sensing habitat data for Kenfig from 2017 (Jones, 2017). This new dataset is considered to provide good coverage for Kenfig, however, the data from the Sand Dune Vegetation Survey Wales (Dargie, 1995) is rather old and may not be an accurate representation of the area of the feature.

5.3 Type of estimate	Estimate is mostly based upon an old data set (Sand Dune Vegetation Survey of Great Britain - Wales (Dargie, 1995)), which has been filtered to only include records containing NVC communities SD13, SD14, SD15, SD16 (part) and SD17. The Annex I habitat also encompasses a range of marshy grassland and swamp vegetation types. These have not been included in this analysis as it has not been possible to confirm where they occur within a dune slack setting. However, SD13 - SD17 are the dominant vegetation types within Welsh dune slacks and the exclusion of the marshy grassland and swamp vegetation types is unlikely to have a very significant impact on the total habitat area. The only contemporary data is for Kenfig where remote sensing data has been used to derive the extent of the H2190 habitat (Jones, 2017). It is very likely that the habitat has changed in extent on some sites due to vegetation succession and changes in management.
5.4 Surface area; Method used	The total area is derived largely from the Phase 2 Sand Dune Survey of Great Britain (Dargie, 1995) with surveys carried out in Wales in the early 1990s (see published sources). The survey used the UKs National Vegetation Classification (NVC) (Rodwell, 2000) and provided a near complete survey of sand dune systems in Wales. A more recent remote sensing data set was used to determine the extent of the H2190 habitat at Kenfig (Jones, 2017).
5.6 Short term trend; Direction	The short-term trend for this habitat in Wales is \uncertain\ as some data is available, but not enough to accurately determine direction.
5.8 Short term trend; Method used	There is limited information on short term trends in extent for this habitat. However, three SACs have been subject to repeat monitoring during the short-term trend period of 2007 - 2018 and results show there is a continued trend of 'unfavourable condition' but extent was not formally assessed. Within the current reporting round SAC monitoring has covered one site in Wales (Kenfig) - no changes in extent were noted during SAC monitoring (Wilkinson, 2018), but extent was not formally assessed. Based on recent studies (Rhind et al., 2008, Rhind & Jones, 2009) there has been a clear trend towards increasing stabilisation that is likely to have been detrimental to this habitat, since it is classed at the younger end of dune slack succession. There is some indication that dune slacks in Wales have been getting more mature, favouring the development of the Dunes with Salix repens H2170 habitat. On-going management to improve the condition of the Humid dune slacks has been occurring at some sites in Wales, where the habitat has been scraped, mowed and scrub removed. These management actions have largely focused on restarting the successional processes within Humid dune slacks but will also have promoted the local expansion of the community at the expense of H2170 and dense scrub.
5.14 Change and reason for change in surface area	The change in the estimated area of this habitat is the result of the re-analysis of existing survey data (see section 5.2) in addition to the more accurate data for the areas of Humid dune slacks identified through remote sensing at Kenfig (Jones, 2017). The reasons for the change in surface area have been outlined above and without a complete up-to-date survey of the feature across Wales it is impossible to determine an accurate surface area figure for this report.
6.1 Condition of habitat	Only partially assessed in this reporting round.
6.2 Condition of habitat; Method used	There is little information available about the condition of H2190 on SAC sites where the feature is not notified as A-C grade (38.17 ha 2261 11.8%) and SSSI sites which are not part of the N2K series (29.80 ha 2261 9.2%). Together these sites represent 21% of the total habitat in Wales. There is very little information about habitat condition on non-statutory sites. Together these sites represent only 17.59 ha 2261 5.4% of the total habitat in Wales. The SAC monitoring (which is based on Common Standards Monitoring (JNCC, 2004)) results give an almost complete (if somewhat out of date - 4 out of 5 assessments from the last reporting round) picture of the condition of the habitat in Wales covering 73% of the total resource.

6.4 Short term trend of habitat area in good condition; Direction	0% of the feature is in good condition. The habitat has been the subject of repeat condition monitoring on all five SACs in the last reporting round on which it is a recognised feature and one of the five SACs in this reporting round. This monitoring showed no change in the overall condition of the Humid dune slacks feature, which remained in unfavourable condition on all occasions.

7.1 Characterisation of pressures/ threats	Data held in NRWs Special Sites Actions Database (NRW, 2018), which provides information on \issues\ affecting habitat and species within the protected sites series in Wales, were used to provide a basis for identifying and quantifying pressures / threats relating to the habitat. The special sites (SSSI and SAC) include 94% of the H2190 resource in Wales by area. Pressures: Five pressures are ranked as High A10 - Extensive grazing or under-grazing by livestock A19 - Application of natural fertilisers on agricultural land A26 - Agricultural activities generating diffuse pollution to surface or ground waters F07 - Sports, tourism and leisure activities L02 - Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) A10 - Maintaining / Establishing appropriate stock grazing has been an ongoing problem for a number of sites and several sites are now showing evidence of scrub encroachment. Efforts are being made to reverse this trend. A19 - This has been a problem on at least one site (Aberffraw) where abattoir slurry was being used on adjacent fields to the dunes and nutrient drift as a direct result of the application of natural fertilisers are having a negative impact on the Annex I habitats. A26 - Contamination of ground and/or surface waters as a result of agricultural activities has been a problem on at least one major site (Merthyr Mawr) but several other sites are susceptible. F07 - Problems here include vehicle access, camping and making fires within dune slacks. L02 - Because of the lack of mobility and dynamism most dune systems in Wales are undergoing succession towards more stable \rank vegetation\ and undesirable scrub communities, probably exacerbated by increasing levels of eutrophication due in part to atmospheric pollution and possibly ground water contamination in places. A further four pressures, I02, I04, J03 & K02 were also ranked as High but were down-graded to Medium for the purposes of UK reporting. I02 - Other invasive alien species (other than species of Union concern) I04 - Problematic native species J03 - Mixed source air pollution, air-borne pollutants K02 - Drainage I02 - This mainly relates to Sea buckthorn (which is not native to Wales). Sea buckthorn has caused problems on several sites especially in south Wales and will readily establish itself in dryer dune slacks. major efforts have been made to control this species at Merthyr Mawr (part of Kenfig SAC). Other species of concern include conifer species, Japanese rose, Montbretia, Black cherry and Cotoneaster. I04 - Lack of appropriate grazing combined with increasing levels of stabilisation has led to scrub encroachment on several sites. This is an ongoing management issue and has been reversed on some sites. J03 - Elevated deposition of atmospheric nitrogen is linked to soil enrichment, eutrophication, accelerated habitat succession and other adverse impacts. 46% of the habitat in Wales is found in areas where deposition rates exceeds the Critical Load of 10 kg/ha/yr. K02 - Many dune slacks in Wales have been affected by local drainage schemes reducing water table levels. Quarry de-watering at one site is a potential concern. Water abstraction has also proved to be a problem on one site. An additional four pressures, A06, B01, H01 & K01 were categorised as Medium in Wales but only the single most significant of these A06 is included in the final report to JNCC for UK reporting. A06 - Abandonment of grassland management (e.g. cessation of grazing or of mowing) A06 - Establishing appropriate grazing has been an ongoing problem for several sites and some sites are now showing evidence of insufficient grazing. In some cases, there is insufficient grazing to maintain good species diversity and prevent scrub encroachment. There are some examples in Wales where dune slacks have turned into wet woodland, although efforts are being made to reverse this trend. The following pressures are important and ranked as having a Medium impact but have not been included for UK reporting purposes. B01 - Conversion to forest from other land uses, or afforestation (excluding drainage). H01 - Military, paramilitary or police exercises and operations on land. K01 - Abstractions from groundwater, surface water or mixed water. B01 - Several dune sites in Wales have been partly afforested and humid dune slacks have been impacted by this operation through a lowering of the water table by surface drainage and transpiration of the plantation (on or adjacent to the dunes). H01 - Several Welsh sand dune sites are actively used by the Ministry of Defence (MoD)

	for training and weapons testing purposes. Due to these MoD activities, traditional sand dune management techniques (such as grazing) are not possible. Consequently, many dune habitats including the Humid dune slacks have been negatively impacted from this lack of management. K01 - Many dune slacks in Wales have been affected by local drainage schemes reducing water table levels. Quarry de-watering at one site is a potential concern. Water abstraction has also proved to be a problem on one site. Threats: Five threats (ranked High) were identified and assessed in a similar way to the pressures outlined above (Guest, 2012a). Climate change is likely to represent a significant and long-term risk to this habitat because of sea level rise, and changes in precipitation and storminess etc. However, the extent and severity of the likely impacts over the next 12 years is unclear, with the main impacts anticipated over longer timescales. So, while climate change impacts cannot be dismissed they have not been identified as a significant threat(s) for this current report. Predicted sea-level rise is likely to result in overall loss of sand dune habitat and may affect this feature in the future. All the main pressures affecting the habitat in Wales are considered to be ongoing and are expected to continue to impact the habitat over the next two reporting cycles.
8.5 List of main conservation measures	In Wales the vast bulk of the habitat by area falls within the protected sites series (94% is on SSSI's and 73% is listed as a SAC feature). 29% of the total on SSSI is covered by management agreement. 26% of the habitat by area is covered by Glastir Advanced agreements. 0.3% is covered by \grazed pasture - no inputs\ 24.6% is covered by \management of sand dunes\ 0.5% is covered by \management of sand dunes with mixed grazing\. 10.1% of the habitat by area is covered by Glastir Entry agreements. 0.1% is covered by \grazed pasture - no inputs and mixed grazing\ 9.9% is covered by \management of sand dunes\ 0.1% is covered by \management of sand dunes with mixed grazing\. 7.7% of the habitat by area is covered by Glastir Entry Commons. Efforts have been made on several sites to maintain the open nature of this habitat, which can become invaded by scrub and wetland trees. On overly mature sites, turf stripping is also often a necessary requirement to re-establish links with the water table. These measures are creating areas of both H2170 Dunes with Salix repens ssp. argentea (Salicion arenariae) and H2190 Humid dune slacks but part of this strategy is to create embryonic dune slacks and kick-start the geomorphological processes within the dunes. Specific management measures are required and include increased or reintroduced grazing management (CA04) and invasive species (CI03) and native scrub control (CI05). Efforts are in place to implement restoration of H2190 via externally funded projects (CA04, CA11, CF03, CF06, CF10, CH03, CI03, CI05, CL01). Other conservation measures include special projects, e.g. towards BAP targets for maintenance, improvement of condition, restoration and expansion of the resource (CA04, CF03, CH03, CI03, CI05, CL01). Regulations may often be inadequate to fully protect the habitat, e.g. in tackling under-management or neglect. Measures which are already being implemented are shown in italics in 8.5.

9.1 Future prospects of parameters	The lack of dynamic processes and dune stabilisation across the wider Welsh sand dune systems has had a negative impact on humid dune slack vegetation. Afforestation, scrub encroachment and increased biomass through reduced grazing levels, have led to the lowering of groundwater levels resulting in shrubs and rank grass species invading humid dune slacks and important pioneer dune slack communities being lost from the successional sequence (Houston, 2008. Davy et al., 2006). Unless, management measures are implemented to address these issues it is likely that this habitat will decrease in area as humid dune slacks develop in later successional habitats and humid dune slack vegetation types are no longer maintained by natural processes as other dune slack types mature. The habitat is being adversely affected by several factors which are negatively affecting the structure and function of the habitat, such as, - over and under-grazing (under-grazing is related to increased grassiness and scrub encroachment), - nutrient enrichment (from a variety of different sources) leading to loss of characteristic species, - recreational activities such as vehicle use, motorcycles and golf courses, where the vegetation is severely modified by excessive management (mowing, fertilizing and re-seeding) and drainage leading to drying out of the H2190, - scrub and invasive alien species encroachment which is exacerbated by a lack of grazing, - changes in hydrology and atmospheric N deposition. Changes to the local hydrology of the sand dune such as forestry plantations, drainage of adjacent land and abstraction. Climate change could pose a significant threat to the series of dune slacks in Europe. Most have been formed by natural sand movement but now lie within more stable dune systems. If water tables fall, as predicted in some areas, the habitat could be left 'high and dry' (Houston 2008). The lack of mobility and dynamism most dune systems in Wales are undergoing results in succession moving towards more stable \rank vegetation\ and undesirable scrub communities, probably exacerbated by increasing levels of eutrophication due in part to atmospheric pollution and possibly ground water contamination in places. SAC monitoring has revealed that many areas of the habitat are in poor condition (see 6.2), mostly due to successional development linked to increasing levels of stabilisation. Planned interventions outlined in active bids for funding sand dune restoration in Wales under the EU LIFE programme and Heritage Lottery Fund, have the potential to mitigate or reverse some of these effects over significant areas, and if successful, should provide a more optimistic outlook for the habitat in the medium term.
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	This is the total surface area of the feature within SACs (irrespective of whether the feature has been notified).
11.3 Surface area of the habitat type inside the network; Method used	Estimate is mostly based upon an old data set (Sand Dune Vegetation Survey of Great Britain - Wales (Dargie, 1995)), which has been filtered to only include records containing NVC communities SD13, SD14, SD15, SD16 (part) and SD17. The only contemporary data is for Kenfig where remote sensing data has been used to derive the extent of the H2190 habitat (Jones, 2017). It is very likely that the habitat has changed in extent on some sites due to vegetation succession and changes in management.
11.4 Short term trend of habitat area in good condition within the network; Direction	One of the four SACs supporting this feature has been concluded to be in 'unfavourable condition' for this reporting cycle, this SAC was concluded to be in unfavourable condition in the 2007 - 2012 reporting round. The other four SACs supporting this feature have not been assessed during this reporting cycle and are concluded to be in 'unfavourable condition' based on the 2007-2012 reporting round information. It should however be noted that these assessments of overall condition are relatively coarse-grained and will incorporate areas of higher and lower quality and functionality. On this basis the short-term trend of the habitat in good condition is reported as \stable\.