Report under The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A

2019-2024

Conservation status assessment for the habitat:

H2120 - Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’)

Wales

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This report was produced by JNCC in collaboration with Natural Resources Wales.

This document should be cited as:

Natural Resources Wales and JNCC. (2026). Conservation status assessment for the habitat: H2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes').

Important note - Please read

- The information in this document represents Wales Report under The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A, for the period 2019-2024.
- It is based on supporting information provided by Natural Resources Wales, which is documented separately.
- The Habitats Regulations reporting 2019-2024 Approach Document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- Maps showing the distribution and range of the habitat are included.
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the assessments. Further underpinning explanatory notes are available in the related country reports.
- 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 not relevant to this habitat (section 11 National Site Network coverage for Annex I habitats).

Further details on the approach to the Habitats Regulations Reporting 2019-2024 are available on the JNCC website.

Assessment Summary: Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’)

Distribution Map

Range Map

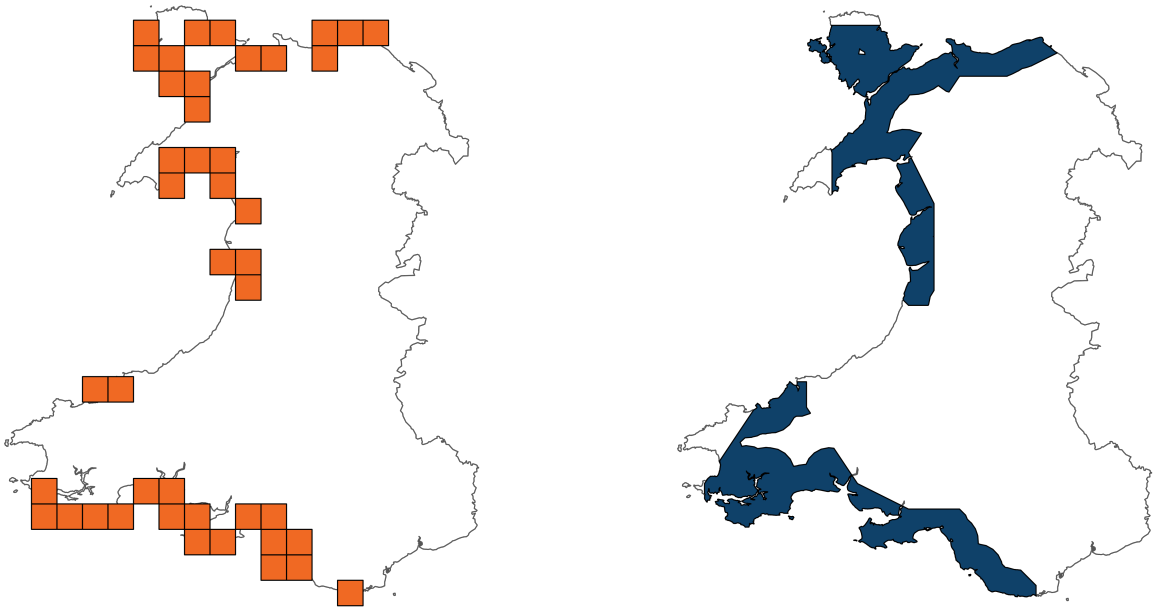

Figure 1: Wales distribution and range map for H2120 - Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’). Coastline boundary derived from the Oil and Gas Authority’s OGA and Lloyd’s Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority. The 10km grid square distribution map is based on available habitat records within the current reporting period.

Table 1: Table summarising the conservation status for H2120 - Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’). Overall conservation status for habitat is based on assessments of range, area covered by habitat, structure and functions, and future prospects.

Overall Conservation Status (see section 10)

Unfavourable-bad (U2)

Breakdown of Overall Conservation Status

Range (see section 4)	**Favourable (FV)**
Area covered by habitat (see section 5)	**Unfavourable-inadequate (U1)**
Structure and functions (see section 6)	**Unfavourable-bad (U2)**
Future prospects (see section 9)	**Unfavourable-bad (U2)**

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National Level

1. General information

1.1 Country	Wales
1.2 Habitat code	H2120 - Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’)

2. Maps

2.1 Year or period	1991-2022
2.2 Distribution map	Yes
2.3 Distribution map; Method used	Complete survey or a statistically robust estimate

2.4 Additional information

No additional information

Biogeographical Level

3. Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs ATL

3.2 Sources of information

See section 13 References

4. Range

4.1 Surface area (km²)	4,440.29
4.2 Short-term trend; Period	2013-2024
4.3 Short-term trend; Direction	Stable
4.4 Short-term trend; Magnitude	

a) Estimated minimum	
b) Estimated maximum	
c) Pre-defined range	
d) Unknown	
e) Type of estimate	
f) Rate of decrease	
4.5 Short-term trend; Method used	Complete survey or a statistically robust estimate
4.6 Long-term trend; Period	
4.7 Long-term trend; Direction	
4.8 Long-term trend; Magnitude	
a) Minimum	
b) Maximum	
c) Rate of decrease	
4.9 Long-term trend; Method used	

4.10 Favourable Reference Range (FRR)

a) Area (km²)	
b) Pre-defined increment	Current range is less than 2% smaller than the FRR
c) Unknown	No
d) Method used	Reference-based approach
e) Quality of information	moderate

4.11 Change and reason for change in surface area of range

a) Change	Yes
b) Genuine change	No

c) Improved knowledge or more accurate data	Yes
d) Different method	Yes
e) No information	No
f) Other reason	No
g) Main reason	Improved knowledge/more accurate data

4.12 Additional information

No additional information

5. Area covered by habitat

5.1 Year or period	1991-2022
5.2 Surface area (km²)	
a) Minimum	
b) Maximum	
c) Best single value	3.6777
5.3 Type of estimate	Best estimate
5.4 Surface area; Method used	Complete survey or a statistically robust estimate
5.5 Short-term trend; Period	
5.6 Short-term trend; Direction	Unknown
5.7 Short-term trend; Magnitude	
a) Estimated minimum	
b) Estimated maximum	
c) Pre-defined range	
d) Unknown	
e) Type of estimate	
f) Rate of decrease	
5.8 Short-term trend; Method used	Insufficient or no data available

5.9 Long-term trend; Period	1991-2022
5.10 Long-term trend; Direction	
5.11 Long-term trend; Magnitude	
a) Minimum	1.6
b) Maximum	1.6
c) Confidence interval	
d) Rate of decrease	
5.12 Long-term trend; Method used	Based mainly on extrapolation from a limited amount of data
5.13 Favourable Reference Area (FRA)	
a) Area (km²)	
b) Pre-defined increment	Current area is between 2% and 10% smaller than the FRA
c) Unknown	No
d) Method used	Reference-based approach
e) Quality of information	moderate

5.14 Change and reason for change in surface area of range

a) Change	Yes
b) Genuine change	Yes
c) Improved knowledge or more accurate data	Yes
d) Different method	Yes
e) No information	No
f) Other reason	No
g) Main reason	Improved knowledge/more accurate data

5.15 Additional information

No additional information

6. Structure and functions

6.1 Condition of habitat (km²)

Area in good condition	
ai) Minimum	1.0451
aii) Maximum	1.0451
Area not in good condition	
bi) Minimum	1.55
bii) Maximum	1.55
Area where condition is unknown	
ci) Minimum	1.0826
cii) Maximum	1.0826
6.2 Condition of habitat; Method used	Based mainly on extrapolation from a limited amount of data
6.3 Short-term trend of habitat area in good condition; Period	2013-2024
6.4 Short-term trend of habitat area in good condition; Direction	Stable
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

Typical species were not used directly in the assessment of conservation status for habitat structure and function as a comprehensive list of typical species for each habitat

was not available. However, the status of typical species was considered when the condition of individual sites was assessed using Common Standards Monitoring Guidance. Common Standards Monitoring (CSM) data was used to assess the area of habitat in ‘good’ and ‘not good’ condition (field 6.1). Species were a component of the attributes assessed under CSM. Therefore, an assessment of species is considered to have formed part of the reporting under field 6.1 which supported the Habitats Structure and Function assessment (field 10.3).

7. Main pressures

7.1 Characterisation of pressures

Table 2: Pressures affecting the habitat, including timing and importance/impact ranking. Pressures are defined as factors acting currently and/or during the reporting period (2019–2024). Rankings are: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

Pressure	Timing	Ranking
PA20: Live stock farming generating pollution	Ongoing and likely to be in the future	Medium (M)
PB02: Conversion from one type of forestry land use to another	Ongoing and likely to be in the future	Medium (M)
PD06: Transmission of electricity and communications (cables)	Only in future	Medium (M)
PE01: Roads, paths, railroads and related infrastructure	Ongoing and likely to be in the future	Medium (M)
PF03: Creation or development of sports, tourism and leisure infrastructure	Ongoing and likely to be in the future	Medium (M)
PF04: Development and maintenance of beach areas for tourism and recreation	Ongoing and likely to be in the future	High (H)
PF05: Sports, tourism and leisure activities	Ongoing and likely to be in the future	High (H)
PF15: Modification of coastline, estuary and coastal conditions for built-up areas	Ongoing and likely to be in the future	High (H)
PH01: Military, paramilitary or police exercises and operations on land and freshwater	Ongoing and likely to be in the future	Medium (M)
PI02: Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	High (H)

PI03: Problematic native species	Ongoing and likely to be in the future	Medium (M)
PJ01: Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Medium (M)
PJ03: Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	Medium (M)
PJ04: Sea-level rise due to climate change	Ongoing and likely to be in the future	Medium (M)
PJ06: Wave exposure changes due to climate change	Ongoing and likely to be in the future	High (H)
PJ07: Cyclones, storms, or tornados due to climate change	Ongoing and likely to be in the future	High (H)
PJ10: Change of habitat location, size, and / or quality due to climate change	Ongoing and likely to be in the future	High (H)
PK03: Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	High (H)
PK04: Atmospheric N-deposition	Ongoing and likely to be in the future	High (H)
PM07: Natural processes without direct or indirect influence from human activities or climate change	Ongoing and likely to be in the future	High (H)

7.2 Sources of information

See section 13 References

7.3 Additional information

No 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 structure and functions, including the status of typical species (related to 'Specific structure and functions')
8.3 Location of the measures taken	Both inside and outside National Site Network
8.4 Response to measures	Long-term results (after 2036)

8.5 List of main conservation measures

Table 3: Key conservation measures addressing current pressures and/or anticipated threats during the next two reporting periods (2025–2036). Measures are ranked by importance/impact: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

Conservation measure	Ranking
MB01: Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation	Medium (M)
MB05: Adapt/change forest management and exploitation practices	Medium (M)
MC06: Reduce impact of service corridors and networks	Medium (M)
MC07: Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure	Medium (M)
ME01: Reduce impact of transport operation and infrastructure	Medium (M)
MF02: Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities	High (H)
MF03: Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)	High (H)
MF08: Manage changes in hydrological and coastal systems and regimes for construction and development (incl. restoration of habitats).	High (H)
MH01: Reduce impact of military installations and activities	Medium (M)
MH04: Habitat restoration of areas related to military installations and activities and other specific human activities.	Medium (M)
MI03: Management, control or eradication of other invasive alien species	High (H)
MJ02: Implement climate change adaptation measures	High (H)

MI05: Management of problematic native species	Medium (M)
MK01: Reduce impact of mixed source pollution	High (H)
MM01: Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change	Medium (M)
MS03: Restoration of habitat of species from the directives	Medium (M)

8.6 Additional information

No additional information

9. Future prospects

9.1a Future trends of parameters

ai) Range	Overall stable
bi) Area	Negative - decreasing <=1% (one percent or less) per year on average
ci) Structure and functions	Negative - slight/moderate deterioration

9.1b Future prospects of parameters

aii) Range	Good
bii) Area	Poor
cii) Structure and functions	Bad

9.2 Additional information

No additional information

10. Conclusions

10.1 Range	Favourable (FV)
10.2 Area	Unfavourable-inadequate (U1)
10.3 Specific structure and functions (incl. typical species)	Unfavourable-bad (U2)

10.4 Future prospects	Unfavourable-bad (U2)
10.5 Overall assessment of Conservation Status	Unfavourable-bad (U2)
10.6 Overall trend in Conservation Status	Stable

10.7 Change and reason for change in conservation status

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

10.7 Change and reason for change in conservation status trend

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

10.8 Additional information

No additional information

11. UK National Site Network (pSCIs, SCIs, SACs) coverage for Annex I habitat types

11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (km^2)

a) Minimum	
b) Maximum	
c) Best single value	2.4814
11.2 Type of estimate	Best estimate
11.3 Habitat area inside the network; Method used	Complete survey or a statistically robust estimate

11.4 Short-term trend of habitat area within the network; Direction	Unknown
11.5 Short-term trend of habitat area within the network; Method used	Based mainly on extrapolation from a limited amount of data
11.6 Short-term trend of habitat area in good condition within the network; Direction	Unknown
11.7 Short-term trend of habitat area in good condition within the network; Method used	Insufficient or no data available

11.8 Additional information

No additional information

12. Complementary information

12.1 Justification of percentage thresholds for trends

No justification information

12.2 Other relevant information

No other relevant information

13. References

Biogeographical and marine regions

3.2 Sources of information

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Main pressures

7.2 Sources of information

No sources of information

14. Explanatory Notes

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 updated aggregated GIS layer has been created for this habitat across Wales (data source 1 below) joining together the maps and records from the other listed sources. Data source 1 (MAIN DATA SOURCE): Digital GIS Map Layer: Reg 9A H2120 Shifting Dunes with Ammophila arenaria ('white dunes') Extent Layer 2025 (NRW, 2025). This GIS layer (updated in 2025) supersedes the layer produced for the 2019 Article 17 submission. Data source 2 (MAIN DATA SOURCE): Sands of LIFE National Vegetation Classification (NVC) survey (Heathcote, Finch, Lamacraft, et al., 2022), is a vegetation survey of the Sands of LIFE sand dune sites using the UKs National Vegetation Classification (NVC) (Rodwell, 2000). Data source 3 (MAIN DATA SOURCE): Dynamic Dunescapes National Vegetation Classification (NVC) survey (Heathcote, Finch, Carter, et al., 2022), is a vegetation survey of the Dynamic Dunescapes Welsh sand dunes sites using the UKs National Vegetation Classification (NVC) (Rodwell, 2000). Data source 4 (MAIN DATA SOURCE): National Vegetation Classification Survey of coastal shingle sites in Wales 2022 (Heathcote, Finch, & Harrison, 2022), is a vegetation survey of the vegetated shingle structures around the coastline of Wales using the UKs National Vegetation Classification (NVC) (Rodwell, 2000) and Coastal Vegetated Shingle communities defined by Sneddon and Randall (Sneddon & Randall, 1993).

Data source 5 (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 (Ashall, Duckworth, & Holder, 1992a, 1992b, 1994, 1995; Ashall, Duckworth, Holder, et al., 1992a, 1992b, 1992c, 1994a, 1994b; Ashall, Duckworth, Holder, McConnell, et al., 1995a, 1995b; Ashall, Duckworth, Holder, & Smart, 1995a, 1995b; Ashall et al., 1994, 1994, 1994, 1994, 1995, 1995; Ashall, Holder, et al., 1992; Ashall & Holder, 1992a, 1992b, 1992c; Duckworth et al., 1992, 1995a, 1995b, 1995c; Duckworth & Holder, 1995a, 1995b; Holder, Duckworth, et al., 1994; Holder, Smart, et al., 1994; Huckbody et al., 1993) based on the UKs National Vegetation Classification (NVC) (Rodwell, 2000).

Data source 6 (MAIN DATA SOURCE): Ynyslas National Vegetation Classification (NVC) survey (Wallace, 2022), is a vegetation survey of Ynyslas sand dune site using the Uks National Vegetation Classification (NVC) (Rodwell, 2000).

The Sand Dune surveys (Dargie, 1995) were carried out over 20 years ago consequently several intra-site changes are likely to have occurred, but, no sites have been lost or irreversibly damaged.

H2120 vegetation equates to NVC communities;

SD5c Leymus arenarius mobile dune community Festuca rubra sub-community

SD6 Ammophila arenaria mobile dune

The H2120 habitat is found in 42, 10km grid squares, the distribution differs to that reported in 2013 (41 grid squares), however, this is due to the use of recent surveys (Heathcote, Finch, Carter, et al., 2022; Heathcote, Finch, & Harrison, 2022; Heathcote, Finch, Lamacraft, et al., 2022) rather than a genuine change in the distribution of the

	feature. The data presented in this report is considered to give good representation of the current distribution and extent of this habitat.
4.3: Short-term trend; Direction	Whilst losses and (more rarely) gains in the area of this habitat have undoubtedly occurred at individual sites over the last twelve years, changes to the 10km square distribution and linked range of H2120 are considered unlikely; there are no known examples of either the habitat being totally lost from a 10km square or being created or restored to a hectad where it was not present at the start of the period.
4.11: Change and reason for change in surface area of range	There is no evidence of actual change in the range of this habitat in Wales since the last report in 2018. However, more 10km2 grid squares have been recorded compared to 2018, this is due to the use of recent surveys (Heathcote, Finch, Carter, et al., 2022; Heathcote, Finch, & Harrison, 2022; Heathcote, Finch, Lamacraft, et al., 2022) confirming presence or absence of the habitat. rather than a genuine change in the distribution of the feature.
5.2: Surface area	[2013-2018: 3.6181 km2 (361.81 ha)] Surface area figure has been generated from recent National Vegetation Classification (NVC) survey data from the Sands of Life and Dynamic Dunescapes projects (Heathcote, Finch, Carter, et al., 2022; Heathcote, Finch, Lamacraft, et al., 2022). These datasets have been combined with an older dataset (1991 – 1995) covering the remainder of the sand dune sites in Wales (Sand Dune Vegetation Survey of Great Britain – Wales (SDSW) (Dargie, 1995)), The SDSW has been filtered to only include records containing SD5 and SD6 communities and sub-communities (corresponding NVC communities for the Annex I habitat type). Analysis of the 2022 data (Heathcote, Finch, Carter, et al., 2022; Heathcote, Finch, Lamacraft, et al., 2022) compared

	against the Sand Dune Vegetation Survey of Wales (Dargie, 1995) shows that the habitat has changed in extent on some sites due to vegetation succession and changes in management. Overall increase in recorded area of 5.96 ha (1.6%).
5.3: Type of estimate	The vegetation surveys undertaken by the Sands of Life and Dynamic Dunescapes projects (Heathcote, Finch, Carter, et al., 2022; Heathcote, Finch, Lamacraft, et al., 2022) have provided a comprehensive (but not complete) representation of the habitat in Wales. These datasets have been combined with an older dataset covering the remainder of the sand dune (sand dune survey of Wales (SDSW)) sites in Wales (Dargie, 1995).
5.6: Short-term trend; Direction	Based on studies from Welsh sand dunes (Rhind et al., 2001, 2006, 2013; Rhind & Jones, 2009), there has been a clear trend towards increasing stabilisation that has likely resulted in the loss of part of this habitat as dune systems become more stable. This has been exacerbated by the ongoing disruption of coastal processes caused by sea defence structures, leading to sediment starvation to some dune systems in some cases.
5.7: Short-term trend; Magnitude	f) Not applicable In recognition of JNCCs need to obtain a value for this metric, we have taken account of the JNCC recommended approach and can report that the decrease is assumed to be ≤1%. We must add this evaluation is to enable JNCC aggregated reporting. The Welsh data is inadequate to make a precise determination and as a consequence there is high degree of uncertainty over the assessment from Wales
5.8: Short-term trend; Method used	There is limited information on short term trends in extent of area for this habitat.
5.11: Long-term trend; Magnitude	Not applicable

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 shifting dunes identified through recent survey work undertaken by the Sands of LIFE and Dynamic Dunescapes projects (Heathcote, Finch, Carter, et al., 2022; Heathcote, Finch, Lamacraft, et al., 2022). Based on studies from Welsh sand dunes (Rhind et al., 2001, 2006, 2013; Rhind & Jones, 2009), there has been a clear trend towards increasing stabilisation that has likely resulted in the loss of part of this habitat as dune systems become more stable. This has been exacerbated by the ongoing disruption of coastal processes caused by sea defence structures, leading to sediment starvation to some dune systems in some cases. However, without a complete up-to-date survey of the feature across Wales, it is impossible to determine an accurate surface area figure or short term trends for this report.
6.1: Condition of habitat	Figures from habitat condition monitoring from the Sands of LIFE and Dynamic Dunescapes projects.
6.2: Condition of habitat; Method used	35% of the habitat resource in Wales is found in areas where the deposition of atmospheric nitrogen (2022 data) exceeds the Critical Load. The remainder of the habitat may be also be affected, to a lesser extent, by sub-critical load deposition.
6.4: Short-term trend of habitat area in good condition; Direction	104.51 ha (28%) of the feature is in good condition. The habitat has been monitored on at least two occasions between 2007 and 2018 and condition assessed in 2024. This monitoring showed no change in the overall condition of the Shifting dunes feature, which remained in favourable condition at Morfa Harlech a Morfa Dyffryn SAC and Kenfig SAC. The condition of the Shifting dunes at Y Twyni o Abermenai i Aberffraw SAC and Carmarthen Bay Dunes was unfavourable. The Dee Estuary SAC having no recent data since 2012 is tentatively concluded to be in unfavourable condition with low confidence.

	The condition of H2120 was additionally assessed at 10 dune sites as part of the Dynamic Dunescapes project with 3 out of 10 sites being in favourable condition (low to medium confidence).
7.1: Characterisation of pressures	Data held in SAFLE, NRW's statutory sites actions database (NRW, 2024), which provides information on 'issues' affecting habitats and species within the protected sites series in Wales, were used to provide a basis for quantifying pressures relating to the habitat (NRW, 2018). The special sites (SSSI and SAC) include 74% (273.88 ha) of the H2120 resource in Wales by area. Pressures: Ten pressures are ranked as High: PF04: Development and maintenance of beach areas for tourism and recreation – Beach cleaning is a significant pressure on the Shifting dune habitat, where the activity removes the precursors to the embryo dune habitat development and thereby affecting any natural expansion of the habitat. PF05: Sports, tourism and leisure activities – Shifting dunes are exposed to a high degree of pressure from sports, tourism and leisure activities, leading to damage of the habitat through trampling and general disturbance. Off road vehicle and motorcycle use is damaging the Shifting dunes on several sites in Wales. Damage is often limited to access points to beaches. PF15: Modification of coastline, estuary and coastal conditions for built-up areas – Shifting dunes are dependent on natural processes of sand movement and the habitat is being adversely affected by shoreline structures, especially where these are restricting sediment transport. Without an influx of new material, this habitat is likely to go

into decline. There are four Shoreline Management plans in Wales which set policies for the long term sustainable management of the coast (Atkins, 2010; Halcrow Group Limited, 2012b, 2012a; Royal Haskoning, 2012). The Habitats Regulations Assessments (HRAs) of these plans did not conclude that there would be adverse effects for SAC designated sand dunes because the policies applied to these sites were either managed realignment (to allow for active management) or no active intervention. In addition, the HRAs considered sediment supply from adjacent units, and where necessary, mitigation measures were included to ensure that coastal management updrift would not affect sediment supply to designated dune systems. Implementation of the SMPs and associated mitigation measures is required in order to help manage this pressure.

PI02: Other invasive alien species (other than species of Union concern) – The biodiversity and mobility of the Shifting dunes is being threatened by invasive non-native species such as Sea buckthorn (which in Wales in non-native). Sea buckthorn is a particular problem at a number of Welsh sand dunes sites, most notably at Pembrey, Laugharne & Pendine and at Tenby.PJ06: Wave exposure changes due to climate change &

PJ07: Cyclones, storms, or tornados due to climate change – Large waves and storm surges are predicted to become more frequent with climate change with the frontal dune habitats at greater risk of being overtopped or breached during these events. Storm event wave exposure causes erosion of the frontal dune habitats, reducing frontal dune height and increasing the chance of future overtopping and breaching during storm events.

PJ10: Change of habitat location, size, and / or quality due to climate change – Dune habitats naturally fluctuate in size and location in response to geomorphological processes, however, these fluctuations are expected to be more

pronounced and acute in response to climate change and the natural balance is likely to be disrupted affecting both structure and function of dune habitats.

PK03: Mixed source air pollution, air-borne pollutants – Sand dunes in close proximity to major roads in Wales are vulnerable to elevated levels of CO2 and other pollutants from road transport. Elevated levels of CO2 are linked to increased plant productivity which on sand dunes results in accelerated succession to rank grassland and scrub communities.

PK04: Atmospheric N-deposition – Atmospheric nitrogen deposition primarily in the form of nitrogen oxides (NOx) and ammonia (NH3), poses a significant threat to sand dune ecosystems. Excessive nitrogen inputs can accelerate ecological succession, leading to; nutrient imbalances, altered plant communities, and have negative impacts on sensitive sand dune habitats, leading to a loss of diversity in species-rich dune grasslands and hampering restoration goals (Aggenbach et al., 2017). There have been concerns over the levels of atmospheric nitrogen pollution and its links to soil enrichment and eutrophication. 35% of the Shifting dunes in Wales, is in areas which are currently subject to Nitrogen deposition rates which exceed the relevant Critical Load mapping value.

PM07: Natural processes without direct or indirect influence from human activities or climate change – Shifting dunes are dynamic and mobile and depend on the continued influx of sediment and development of the Embryonic shifting dunes habitat. Any disruption in coastal processes and the trend towards increasing stabilisation is likely to have the most damaging impact on the habitat.

The following pressures are considered to be important and are ranked as having a Medium impact:

PA20: Live stock farming generating pollution – Several

sand dune systems are in close proximity to, or downwind of farms where agricultural activities generate pollution. Air pollution generated by poultry farming is harmful to sand dune habitats which are naturally nutrient limited. Other agricultural pollution types include runoff and enrichment associated with livestock feeders which can enter the dune system.

PB02: Conversion from one type of forestry land use to another – Opportunities to restore areas of shifting dunes and dynamic conditions within conifer plantations on sand dunes are constrained or prevented by existing conifer plantations and future forest plans for re-stocking and changes from commercial conifer plantation to broadleaf forest.

PD06: Transmission of electricity and communications (cables) – The potential impacts of cabling on dune habitats are impacts relating to physical loss of extent and damage to the integrity of the dune habitats due to excavations, or the effects of cabling installation on underlying hydrology and geomorphology affecting the structure and function of the habitats.

PE01: Roads, paths, railroads and related infrastructure – Roads and paths criss-cross sand dune systems disrupting connectivity, geomorphological processes and acting as barriers to effective grazing. Pressure on sand dune systems also occurs when dune habitats are unable to rollback with natural geomorphological processes due to the presence of a road, railway or related infrastructure.

PF03: Creation or development of sports, tourism and leisure infrastructure – This pressure relates to the redesign of golf courses in response to coastal erosion, where dune habitats are modified into 'golf play areas'.

PH01: Military, paramilitary or police exercises and operations on land and freshwater – This relates to various

factors such as military use and inappropriate vehicle use. Several of the sand dune sites in Wales have been historically used by the military and some are currently used by the military. Historical pressures relate to abandoned and demolished buildings and structures within the dune habitats and the threat of Unexploded Ordnance (UXO) to management practices for habitat conservation. Where sand dune sites are currently used by the military the risk of UXO is great and military exercises can preclude the occurrence of conservation management due to safety issues.

PI03: Problematic native species – Lack of appropriate grazing combined with increasing levels of stabilisation, has led to native scrub encroachment on several Welsh sand dune systems. The Shifting dunes have been particularly affected by species such as Rosebay willowherb and Clematis.

PJ01: Temperature changes and extremes due to climate change – Sand dune habitats and species are adapted to drought conditions, however, premature desiccation and prolonged periods of drought associated with high temperatures can lead to community species change and an overall shift in species composition altering the overall structure and function of the habitat.

PJ03: Changes in precipitation regimes due to climate change – Increased rainfall during winter months can favour INNS such as Sea buckthorn, by facilitating growth (Burden et al., 2020) and exacerbating the effects of accelerated succession in sand dune vegetation communities.

PJ04: Sea-level rise due to climate change – Sea-level rise is likely to result in loss of the Shifting dune habitat and increased storminess may remove significant proportions of Shifting dune habitat.

	The pressures listed are considered to be current and applicable to future scenarios. Each of the pressures listed was regarded as being long term and there is no reason to suppose they will not continue to be applicable.
8.5: List of main conservation measures	In Wales 74% of H2120 by area is on SSSIs and 55% of H2120 total area is listed as a notified SAC feature. Conservation Measures identified and taken Conservation measures have been made on several sites to maintain the open nature of this habitat, which has become stabilised and often invaded by scrub and invasive native and non-native species. These conservation measures have included notching in the frontal dunes, dune re-profiling, sand dune rejuvenation including vegetation stripping, native scrub removal and the removal non-native invasive species such as Sea buckthorn (MB01, MB05, MF02, MF03, MH04, MI03, MI05, MM01, MS03). Restoration of H2120 has been implemented via externally funded projects under the EU LIFE programme and Heritage Lottery Fund where 10 frontal dune notches have been created, 43ha of dunes (including H2120) have been re-profiled or scraped and 132ha of invasive non-native species have been removed from dune habitat (including H2120) (MB01, MF02, MF03, MI03, MI05, MM01, MS03). Restoration and conservation measures will continue on these sites through AfterLIFE and legacy management plans. MH01: Reduce impact of military installations and activities Both the Sands of LIFE and the Dynamic Dunescapes projects undertook Unexploded Ordnance (UXO) surveys prior to undertaking ground-penetrating conservation interventions. The Sands of LIFE project developed an Unexploded Ordnance (UXO) Assessment and Mitigation Procedure in consultation with the MOD (Explosive Ordnance Clearance Officer Team and Porton Down) and

NRW's Health and Safety Team. The Procedure follows CIRIA (industry standard) guidance and aims to ensure that potentially lethal UXO risks to staff and contractors undertaking conservation works on sand dunes are adequately managed in line with legislation and to a consistent and appropriate standard. This procedure can be used on any sand dune site where there is a potential risk of UXO.

Other conservation measures include special projects, e.g. towards BAP targets for maintenance, improvement of condition, restoration and expansion of the resource (MF03, MI03, MI05, MM01).

Measure identified and not yet taken (ranked High)

MF08: Manage changes in hydrological and coastal systems and regimes for construction and development (incl. restoration of habitats).

Pressures relating to construction and development activities (coastal protection and sea defences) causing changes to hydrological conditions are continuing, restoration of shifting dunes impacted by these changes would be beneficial for the structure and function of this coastal habitat. Implementation of Shoreline Management policies (Atkins, 2010; Halcrow Group Limited, 2012b, 2012a) and associated mitigation measures is required in order to maintain sediment supply to sand dune systems.

MJ02: Implement climate change adaptation measures

The creation of buffer zones with appropriate conservation management to allow for the dynamic movement of dune habitats inland where there are no existing barriers would be beneficial. Where there are defences such as sea walls, targeted realignment to enable more connectivity of dune habitats with the hinterland is desirable. Implementation of Shoreline Management policies (Atkins, 2010; Halcrow

Group Limited, 2012b, 2012a) and associated mitigation measures is required in order to maintain sediment supply to sand dune systems.

MK01: Reduce impact of mixed source pollution

National regulations are in place, but have been insufficient to prevent continued high levels of N deposition nationally and locally increasing ammonia pollution from expansion of poultry units.

There are various air quality strategies and initiatives in place to protect and enhance biodiversity. Air quality limit values set out in the Air Quality Strategy (AQS) are transposed into national legislation by the Air Quality Standards Regulations 2010. Nitrogen deposition continues to impact semi-natural habitats in Wales. These regulations are not habitat-specific, however with introduction of The Environment (Air Quality and Soundscapes) (Wales) Act 2024 in Wales, this brings in new national targets for air quality pollutants, with the potential of directly influencing habitat protection.

This key legislative advancement requires mandatory targets for fine particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) to be established by February 2027, including new powers for Welsh Ministers to set pollutant-specific targets in future years (e.g., ammonia, nitrogen dioxide) linked to biodiversity outcomes, potentially enabling future habitat-sensitive thresholds.

Welsh Government have also introduced The Agriculture (Wales) Act in 2023. It aims to establish a framework of Sustainable Land Management (SLM) objectives to underpin agricultural support, including the Sustainable Farming Scheme (SFS). The Act provides Welsh Ministers with the power to provide support (financial or otherwise) for or in connection with 15 purposes, including 'Improving air quality'. Welsh Government published a consultation on

	the SFS which closed in March 2024. Welsh Ministers will not be making final scheme design decisions until further stakeholder work is undertaken. Measures identified and not yet taken (ranked Medium) MC06: Reduce impact of service corridors and networks & MC07: Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure Several pressures and their potential impacts of caballing on sand dunes have been identified including but not limited to damage and loss of habitat, disturbance to hydrology, introduction of INNS, loss of sediment and an increased risk of erosion. Conservation measures should take these impacts into consideration to minimise impacts of development on dune habitats from these types of installations. ME01: Reduce impact of transport operation and infrastructure Pressure on sand dune systems occurs when dune habitats are unable to rollback with natural geomorphological processes due to the presence of a road, railway or related infrastructure. Conservation measures to reduce the fragmentation impact from transport infrastructure is necessary as coastlines change in a response to sea-level rise and climate change. Regulations may often be inadequate to fully protect the habitat, e.g. in tackling under-management or neglect.
9.1:Future trends and prospects of parameters	Range: Despite several ongoing pressures on the habitat, significant change to the 10km square distribution and linked range is considered unlikely to occur within the short

to medium term, as it would require either the total loss of the habitat within a hectad or its creation/restoration within a square where it is not currently represented.

Area:

Based on recent studies (Rhind et al., 2001, 2006, 2013; Rhind & Jones, 2009), there has been a clear trend towards increasing stabilisation that has likely resulted in the loss of part of this habitat as dune systems become more stable. This has been exacerbated by the ongoing disruption of coastal processes caused by sea defence structures, leading to sediment starvation to some dune systems in some cases.

High visitor pressure and vehicle access, unless checked, will cause problems for the feature in the future.

Predicted sea-level rise will result in coastal squeeze of the habitat and increased storminess may remove significant proportions of the sediment and the vegetation, which if sustained consecutively over a number of years is likely to have a negative effect on the area of the habitat in the future.

Beach cleaning is known to occur at several locations which are outside of the protected sites series and may have a detrimental effect on the integrity of the habitat and thus affecting future area of the habitat.

Taking the above into account it is likely that the future trend for the area covered by the habitat is likely to be 'negative' if conservation measures are not implemented. Furthermore, without future monitoring of the area of the habitat in Wales the future prospects of the area will be 'unknown'.

Structure and function:

74% of the habitat is within the protected sites network.

Condition assessments (Gillis & Heathcote, 2024; Heathcote, 2024a, 2024b, 2024c; Heathcote, Gillis, Wallis, & Tomas, 2024a, 2024b; Heathcote, Gillis, Wallis, & Williams, 2024a, 2024b; Heathcote & Jones, 2024a, 2024b, 2024c; Williams & Heathcote, 2024) conclude that 7 sites (2 SACs and 3 SSSIs) are in favourable condition whilst 13 sites (2 SACs, 4 SSSIs and 3 non-designated sites) are in unfavourable condition (see section 6.2).

Several pressures currently ranked High are projected to intensify in the future e.g. PF04, PF05, PF15, PJ06, PJ07 and PJ10 as a result of climate change. Whilst several pressures currently ranked Medium are projected to be exacerbated by climate change and expected to be ranked as High within the next two reporting rounds (PJ01, PJ03, PJ04). Furthermore the combined impacts of several listed pressures are also expected to increase in the future adversely affecting the structure and function of H2120.

Based on Welsh studies (P. Rhind et al., 2006, 2013; P. Rhind & Jones, 2009; P. M. Rhind et al., 2001), there has been a clear trend towards increasing stabilisation that has likely resulted in the loss of part of this habitat as dune systems become more stable. This has been exacerbated by the ongoing disruption of coastal processes caused by sea defence structures, in some cases leading to sediment starvation to dune systems.

Predicted sea-level rise is likely to result in loss of the habitat and increased storminess may remove significant proportions of the vegetation, which if sustained consecutively over a number of years is likely to have a negative effect on the structure and function of the habitat in the future.

Beach cleaning is known to occur at a number of locations which are outside of the protected sites series and may

	have a detrimental effect on the integrity of the habitat and thus affecting future structure and function of the habitat. Taking the above into account it is likely that the future trend for the structure and function of the habitat is likely to be 'negative' if conservation measures are not implemented.
10.1: Range	Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is stable; and (ii) the current Range surface area is approximately equal to the Favourable Reference Range.
10.2: Area	Conclusion on Area reached because:(i) the short-term trend direction in Area is unknown; (ii) the current Area is not more than 10% below the Favourable Reference Area and iii) the change in distribution pattern is unknown.
10.3: Specific structure and functions	Conclusion on Structure and function reached because: i) habitat condition data indicates that more than 25% of the habitat is in unfavourable (not good) condition; ii) short-term trend in area of habitat in good condition is stable; and iii) expert opinion determines that there are significant issues for this habitat.
10.4: Future prospects	Conclusion on Future prospects reached because: (i) the Future prospects for Range are good; (ii) the Future prospects for Area covered by habitat are poor; and (iii) the Future prospects for Structure and function are bad.
10.5: Overall assessment of Conservation Status	Overall assessment of Conservation Status is Unfavourable-bad because two of the conclusions are Unfavourable-bad.
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).
5.13: Favourable Reference Area (FRA)	The UK-level FRV for surface area was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent reporting rounds. The audit may draw from any combination of the 2007, 2013, or 2019 Habitats Directive

	reports and reflects the full rationale used for the 2019 Article 17 reporting. This FRV was reviewed by Welsh experts and considered appropriate for use in Wales based on current habitat extent and trends.
4.10: Favourable Reference Range (FRR)	The UK-level FRV for range was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent reporting rounds. The audit may draw from any combination of the 2007, 2013, or 2019 Habitats Directive reports and reflects the full rationale used for the 2019 Article 17 reporting. This FRV was reviewed by Welsh experts and considered appropriate for use in Wales based on current distribution and trends.