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

2019-2024

Conservation status assessment for the habitat:

H1330 - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Wales

Cyfoeth Naturiol Cymru
Natural Resources Wales

JNCC

For further information please contact:

Natural Resources Wales, Welsh Government Offices, Cathays Park, King Edward VII Avenue, Cardiff, CF10 3NQ. https://naturalresources.wales

JNCC, Quay House, 2 East Station Road, Fletton Quays, Peterborough, PE2 8YY. https://jncc.gov.uk

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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: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Distribution Map

Range Map

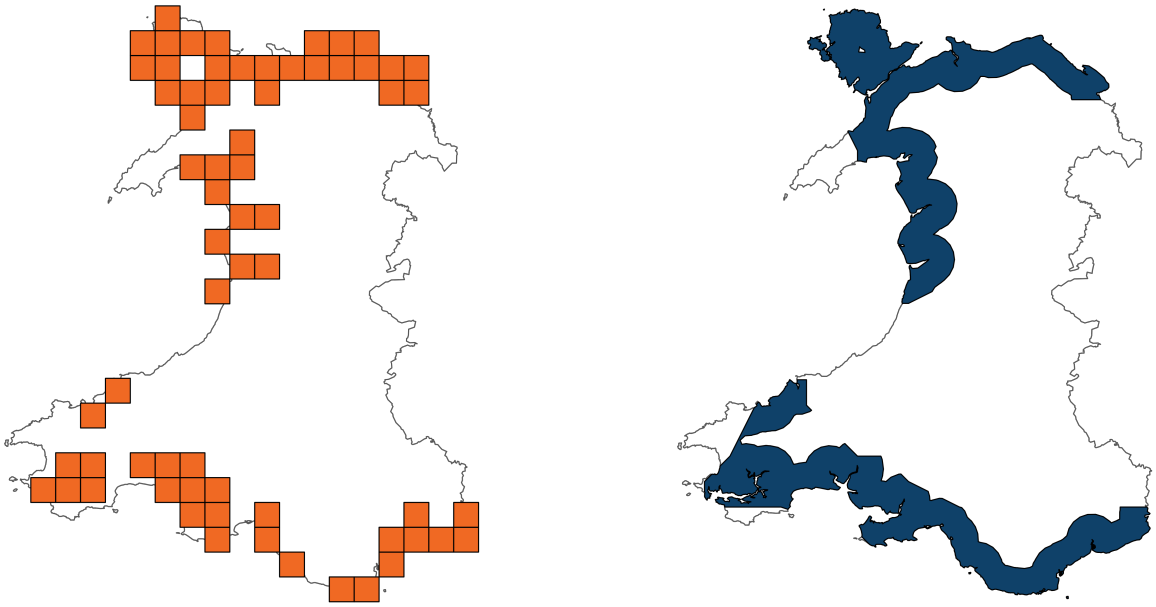

Figure 1: Wales distribution and range map for H1330 - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil 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 H1330 - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*). 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)**

List of Sections

National Level

1. General information

1.1 Country	Wales
1.2 Habitat code	H1330 - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

2. Maps

2.1 Year or period	1987-2024
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)	6,330.84
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	Stable
4.8 Long-term trend; Magnitude	
a) Minimum	
b) Maximum	
c) Rate of decrease	
4.9 Long-term trend; Method used	Complete survey or a statistically robust estimate

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	No
b) Genuine change	

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

4.12 Additional information

No additional information

5. Area covered by habitat

5.1 Year or period	2019-2024
5.2 Surface area (km²)	
a) Minimum	
b) Maximum	
c) Best single value	74.82
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	
5.10 Long-term trend; Direction	
5.11 Long-term trend; Magnitude	
a) Minimum	
b) Maximum	
c) Confidence interval	
d) Rate of decrease	
5.12 Long-term trend; Method used	
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	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

5.15 Additional information

No additional information

6. Structure and functions

6.1 Condition of habitat (km²)	
Area in good condition	
ai) Minimum	10.46
aii) Maximum	10.46
Area not in good condition	
bi) Minimum	47.27
bii) Maximum	47.27
Area where condition is unknown	
ci) Minimum	17.09
cii) Maximum	17.09
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	Decreasing
6.5 Short-term trend of habitat area in good condition; Method used	Based mainly on expert opinion with very limited 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
PA05: Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Medium (M)
PA07: Intensive grazing or overgrazing by livestock	Ongoing and likely to be in the future	High (H)
PF06: Deposition and treatment of waste/ rubbish from built-up areas	Ongoing and likely to be in the future	High (H)
PF10: Residential, commercial and industrial activities and structures generating marine pollution	Ongoing and likely to be in the future	Medium (M)
PF15: Modification of coastline, estuary and coastal conditions for built-up areas	Only in future	Medium (M)
PI03: Problematic native species	Ongoing and likely to be in the future	Medium (M)
PJ01: Temperature changes and extremes due to climate change	Only in future	High (H)
PJ04: Sea-level rise due to climate change	Only in future	High (H)
PJ06: Wave exposure changes due to climate change	Only in future	High (H)

PK04: Atmospheric N-deposition	Ongoing and likely to be in the future	High (H)
PK02: Mixed source marine water pollution (marine and coastal)	Ongoing and likely to be in the future	Medium (M)

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	Maintain the current range, surface area or structure and functions of the habitat type
8.3 Location of the measures taken	Both inside and outside National Site Network
8.4 Response to measures	Short-term results (within the current reporting period, 2019–2024)

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
MA03: Maintain existing extensive agricultural practices and agricultural landscape features	High (H)
MA04: Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures	Medium (M)

MA05: Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)	High (H)
MA10: Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities	Medium (M)
MF04: Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures	Medium (M)
MF06: Reduce/eliminate marine pollution from industrial, commercial, residential and recreational areas and activities (incl. contamination with litter)	Medium (M)
MF08: Manage changes in hydrological and coastal systems and regimes for construction and development (incl. restoration of habitats).	High (H)
MJ01: Implement climate change mitigation measures	High (H)
MJ02: Implement climate change adaptation measures	High (H)

8.6 Additional information

No additional information

9. Future prospects

9.1a Future trends of parameters

ai) Range	Negative - decreasing <=1% (one percent or less) per year on average
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	Poor
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	Deteriorating

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	60.8373
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	Stable
11.5 Short-term trend of habitat area within the network; Method used	Based mainly on expert opinion with very limited data
11.6 Short-term trend of habitat area in good condition within the network; Direction	Decreasing
11.7 Short-term trend of habitat area in good condition within the network; Method used	Based mainly on extrapolation from a limited amount of data

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 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. Data Source No 1: Regulation 9 H1330 Atlantic Salt Meadows GIS Layer 2025. Detailed notes regarding methods used to compile this layer and have been written up in a set of processing notes (Lewis, H., 2025, NRW Internal document). This GIS layer updated in 2025 supersedes the layer submitted as part of the Article 17 process in 2019. A data layer was created initially for saltmarsh as a whole by combining all of the most up to date saltmarsh information available to produce a single unified map based on vegetation type by Steven Jones, NRW. The map was also compared to the most up to date aerial images and adjusted incorporate those changes. The H1310 Salicornia feature was then removed from this data layer using the data from the WFD Zonation Maps Cycle 3. Data sources included in this layer are listed below. Data Source No 2: Water Environment (Water Framework Directive, WFD)(England and Wales) Regulations 2017 based on surveys between 2014 to 2019. The mapping is based on the interpretation of aerial images alongside ground truthing. The aerial imagery this was captured between 2014-2019. Hambidge, C., Phelan, N. No Date. Saltmarsh mapping standardisation for the Water Framework Directive provides the more details of the WFD mapping methodology. The primary contribution to the

Regulation 9 map from the WFD map layers came from the lower extent of the marsh and the boundaries with the Salicornia Habitat H1310 and the extent of the saltmarsh within upper estuaries.

Data Source No 3: 2019 Article 17

The 2019 Article 17 Layer was created from the data sources listed below. This layer primarily contributed to the upper edges of the saltmarsh encompassing the transitional saltmarsh vegetation and covering smaller areas of saltmarsh around the Welsh coast.

Data source No 4. National Vegetation Classification Layers

There are numerous NVC layers which have contributed to the creation of this layer. The most recent layers being for the Welsh section of the Severn saltmarsh, the west bank of the Dee and the Thaw in Glamorgan:

Severn Estuary 2017 NRW Saltmarsh Monitoring Extent Layer which is an update of the original 1998 survey layer by Dargie 1998, the updated layer involved a thorough ground survey. GIS layer covering the majority of the Severn Estuary SAC within Wales which was digitised to 2017 aerial photographs and ground truthed. (Wilkinson & Anstice, 2018)

Heathcote S, Sheehan K, Thomas L, Hodgkinson L, Porter C, 2023. National Vegetation Classification Survey of selected areas of the Dee Estuary 2022. NRW Evidence Report No: 747, 141pp, Natural Resources Wales (NRW), Bangor

Heathcote S, Harrison J, In prep. National Vegetation Classification Survey of the Lower River Thaw 2022. Unpublished, Natural Resources Wales.

A total of 12 older Saltmarsh NVC surveys from 1997-2004 NVC were used where was no updated information.

Dargie, 1998, 2000a & 2001, Evans and Clarke, 2000. Prosser and Wallace, 1997, 1998, 1999a, 1999b, 2002, 2003 & 2004).

Data Source No 5: Phase I Intertidal Biotopes Survey 1996-2004, (Brazier et al., 2007). This marine layer is a comprehensive intertidal biotope survey of the Welsh coast. This element of the Regulation 9a contributed to the mapping of some of the areas of Atlantic salt meadows outside of protected sites and outside of WFD mapping areas. The layer captured the majority of the saltmarsh but did not capture some of the upper and transitional marsh vegetation.

Data Source No 6: Phase I Survey (Terrestrial)

Phase I Habitat Survey of Wales (Blackstock et al., 2010).

Comprehensive survey of broad habitat types across Wales. This layer contributed to the identification of areas of the Atlantic salt meadows outside of protected sites and outside of Coastal and Transitional waterbodies covered in WFD mapping. This layer captured some of the upper and transitional marsh vegetation

Other NVC Survey Information

The Phase II survey was based the UK's National Vegetation Classification (NVC) (Rodwell 2000). Detailed National Vegetation Survey (Rodwell (ed.) 2000, 1991b, 1992, 1995) information exists for the majority of the H1330 feature within SACs in Wales. The NVC data comes from numerous different surveys from 1997 through to 2004 (listed below). All saltmarsh and transitional vegetation was included within the Article 17 layer with the exception of SM7, SM8 and SM9 and which relate to H1240 and H1310.

	The majority of the has been assessed against the most up to date aerial photographs rather than ground truthed although some ground truthing was included within the WFD layer. Therefore, there are likely to be some errors in interpretation, particularly in relation to the boundaries with Salicornia Habitat H1130 which is a dynamic habitat difficult to pick up with aerial images.
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 1980s. 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.
4.11: Change and reason for change in surface area of range	There is no evidence to indicate a genuine change in range of H1330 in Wales since 2019, nor is one considered likely to have occurred. The H1330 maps have been updated to combine areas mapped for both the Water Framework Regulations and the previous Article 17 maps and further areas have been digitised using the most up to date aerial photographs.
5.4: Surface area; Method used	The new Regulation 9a Layer for H1330 is based on the Article 17 2018 map layer but has incorporated all of the most up to date information available including data from the Water Watch Wales, 2021 website. Cycle 3 Classification for the Water Environment Regulations 2017 (Water Framework Directive), recent NVC surveys/updates and in some cases local knowledge. All maps were checked against the most up to date aerial images and further areas were digitised or removed if applicable. This provides a near complete coverage of this feature in Wales.
5.6: Short-term trend; Direction	The change from the primary source for the H1330 from the older surveys NVC and Phase I habitat maps to the more up to date WFD maps was much needed, however the WFD methods of data collection and more detailed mapping make change difficult to assess. In particular to mapping of creeks within the saltmarsh is likely to have been the main cause in the decrease in area between the

previous reporting round.

Natural patterns of erosion and accretion mean that net losses and gains in the extent of Atlantic salt meadows can be difficult to quantify, in addition where saltmarsh is breaking up internally or where channels are slowly widening these changes are a challenge to identify.

Many of the Welsh estuaries are believed to be still infilling with sediment allowing for growth of the saltmarsh habitat both vertically and at the expense of intertidal sand and mud.

Losses due to coastal squeeze where habitats are caught between rising sea-levels and fixed defences, are predicted by the Shoreline Management Plans (SMPs) (Atkins, 2010, Halcrow, 2012(a), Halcrow, 2012(b), Royal Haskoning, 2012). Within the first epoch (2005 to 2025) the SMPs estimated that 331ha of intertidal habitat (which includes Atlantic salt meadows) predicted loss from the SACs within or partially within Wales. The figure for predicted losses for intertidal habitats has not been adjusted for estuary infilling or morphological response to sea level rise and in that context, is seen as a worst-case scenario.

The National Habitat Creation Programme has been set up to create compensation habitat to offset intertidal habitat loss due to coastal squeeze caused by coastal defences managed by Risk Management Authorities in Wales (which includes NRW and Local Authorities). In 2021, Welsh Government issued a policy clarification note (Use of the National Habitat Creation Programme in delivering Flood and Coastal Erosion Risk Management projects), which directs competent authorities to only consider coastal squeeze associated with new or upgraded coastal defences but not in relation to maintenance of historic structures. This means that the NHCP now only provides compensatory habitat for a small number of major coastal defence projects. Recent evidence work (Oaten et al, 2024)

	predicts significant losses of saltmarsh due to coastal squeeze. This figure has been arrived at from the predicted losses set out in the Annexes for the four SMPs which partially or wholly cover Wales. The highest losses predicted are from within the Severn Estuary where 679 ha are predicted to be lost within the first epoch, however only approximately a third of this is from within Wales and the overall figure above has been adjusted to reflect this. No loss is predicted for the Dee which is a cross boarder site for the first epoch. Examination of aerial photos between 2000 and 2021 show that for the Welsh section of the Severn there was a net gain in saltmarsh rather than loss. Therefore, the short term trend in area is likely to be stable with losses in extent of saltmarsh due to sea level rise offset by gains due to expansion within infilling estuaries. However there is a lack of evidence to confirm this including evidence gaps relating to estuary the rate and continuation of estuarine infilling therefore the direction of change in extent is listed as unknown.
5.11: Long-term trend; Magnitude	See section 5.6 above.
6.1: Condition of habitat	The extent figures used are taken from the 2024 Regulation 9a GIS layer which relates only to the area of Atlantic salt meadows in Wales.
6.2: Condition of habitat; Method used	Site condition assessments were carried out for five of the 7 SAC's which support the H1330 feature (Grade A-C), these assess pressures operating on the site, however, specific targeted monitoring for the Habitats Regulations was not caried out, therefore some elements in particular vegetation composition had low confidence. An older condition assessment from 2017 was used for the Dee estuary as there was no new updated assessment. Finally, Habitats Directive monitoring was carried out for one SAC, the Severn Estuary SAC within the (2013-2018).

	The site level condition assessments represent a relatively coarse grain assessment of overall habitat condition for the site and mask a significant level of variation in habitat quality, structure and function across the feature and the area of habitat in good condition is likely to be higher than reported. Glannau Môn: Cors Heli : Favourable Pen Llŷn a'r Sarnau: Unfavourable Pembrokeshire Marine: Unfavourable Carmarthen Bay and Estuaries: Unfavourable Kenfig: Favourable Severn Estuary SAC: Unfavourable Dee Estuary SAC: Favourable
6.5: Short-term trend of habitat area in good condition; Method used	The overall trend in the area of habitat in good condition is uncertain. The evidence for the 3 SACs classed as Favourable vary. The Dee Estuary (851ha) had a basic condition assessment in 2017 which had relatively was based mainly on expert opinion, however there are issues on the Dee Estuary with abandonment of grazing in places which are ongoing yet in others there have been improvements in areas previously subject to overgrazing. The Kenfig SAC (15ha of Saltmarsh) had a condition assessment carried out in 2024/25. The site was considered to be favourable however, there is a moderate level of recreational pressure on the saltmarsh. The Glannau Môn SAC (180ha) had a condition assessment carried out in 2024/25. 4 waterbodies within

	the SAC were assessed for DIN. Two of the waterbodies were classes as Poor for DIN and there was uncertainty with the 'Good' assessment for another of the waterbodies. This water quality issue was not considered to be serious enough to warrant an overall fail but there was low confidence in the assessment (Jackson-Bué 2025). Saltmarsh is relatively nitrogen-rich when compared with other natural habitats (Booreman & Hazelden 2012).
7.1: Characterisation of pressures	The majority of the pressures and threats have been identified through Marine Protected Area (MPA) Site Condition Assessments, NRW Evidence Reports, Water Environment (previously known as Water Framework Directive Data), Analysis of Nitrogen Deposition data and in some cases expert judgment was used. Pressures PA05: Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming) PA07: Intensive grazing or overgrazing by livestock Abandonment of grazing on traditionally grazed saltmarsh is increasing. Under-grazing or abandonment of grazing results in the development of course, graminoid-dominated vegetation (Sherry & Douglas 2025) with low species diversity. A recent review of saltmarsh grazing found that there was widespread grazing abandonment and under-grazing of saltmarsh within the MPA network (Sherry & Douglas 2025). This is often due to livestock welfare issues with grazing in the intertidal with the need to move livestock on some high tides and risks to welfare such as livestock getting stuck in creeks. There are often barriers to getting livestock on and off marshes to avoid high tides, including infrastructure such as railway lines and roads which contribute to some areas of saltmarsh being

abandoned. Lack of grazing in the upper and mid marsh can lead to uniform stands of vegetation with low diversity.

Overgrazing on saltmarsh is causing poor conditions comprising uniform sward structure, low species diversity, plants being unable to flower and set seed and areas of bare ground due to livestock poaching and erosion of creek sides. The areas of intensive grazing cover a significant proportion of Welsh saltmarshes particularly within the North Gower area of the Carmarthen Bay and Estuaries SAC. Overgrazing is the cause of failure the condition assessment within the condition assessments for the Carmarthen Bay and Estuaries SACs and the Pen Llŷn a'r Sarnau SAC.

Within the 2013-2018 reporting round just 3% of H1330 within the protected sites was under a positive management agreement with NRW (NRW Management Agreements Current layer, accessed February 2025). A further 37% of the feature was within the Glastir agri-environment scheme in 2023, however some of these areas have not shown improvement.

With the end of the Glastir agri-environment scheme in 2024 there has been an interim scheme set up to bridge the gap until the phased implementation of the Welsh Government Sustainable Farming Scheme. However, take up of the interim scheme for saltmarsh has been below Glastir levels, therefore there is less land under management within Agri-Environment schemes, the outcome of this is not yet known, however it is likely that there will be some declines in condition.

PD01: Wind, wave and tidal power (including infrastructure)

There are currently no solid plans for tidal lagoons in Wales, however, the creation of tidal lagoons and barrages remains a threat. Such developments could have the potential to alter the tidal range both inside and outside the

lagoon structure leading to losses in extent and damage to the structure and function of this feature. However, legislation should ensure that there are mitigation measures and compensation habitat where appropriate.

PD06: Transmission of electricity and communications (cables)

The UK government's commitment to achieving 50 GW of offshore wind generating capacity by 2030 means this growth is going to continue at a rapid pace over the next five years at least. This represents a threat to saltmarsh; cabling through saltmarsh can in some cases lead to permanent loss of extent and poor condition within the cable corridor. However, legislation should ensure that there are mitigation measures and compensation habitat where appropriate.

PE03 Shipping lanes and ferry lanes transport operations

Pressure and threats relate to occasional spills (e.g. Sea Empress) and continued presence and reworking of historic oil. See also PK02.

PF05 Sports, tourism and leisure activities

The pressures for sport, tourism and leisure activities are generally localised. The use of vehicles on the saltmarsh can be particularly damaging and other issues include access on foot, horse riding and moorings boats on the saltmarsh.

PF06 Deposition and treatment of waste/rubbish from built-up areas

265 landfill sites along the Welsh coast and have the potential to release waste directly into the marine environment based on present day flooding and coastal erosion data (Robbins et al. 2023). H1330 was assessed

as having high sensitivity to chemical contamination and medium sensitivity abrasion / disturbance of the substrate on the surface of the seabed and smothering and siltation, nutrient enrichment and organic enrichment (Robbins et al. 2023).

Concentrations of coastal landfill sites occur around the Dee Estuary, Burry Inlet and the Severn Estuary in Wales; the Dee Estuary and Burry Inlet in supporting a significant proportion of H1330 (Robbins et al. 2023).

PF10: Residential, commercial and industrial activities and structures generating marine pollution

Marine litter has been identified as an issue within the Severn Estuary and Dee Estuary SACs (LIFE Data). It is also highlighted as risk for Pembrokeshire Marine SAC, Pen Llŷn a'r Sarnau and Carmarthen Bay and Estuaries SACs. Saltmarshes effectively capture microplastics in their sediments (Lloret et al.,2021); the resulting decomposition of micro plastics could have numerous impacts on the marine ecosystem.

PF15: Modification of coastline, estuary and coastal conditions for built-up areas

Historic land claim has led to considerable changes in saltmarsh distribution and affected coastal processes within the vast majority of the estuaries and sheltered bays. Sea walls and other coastal defence structures will cause coastal squeeze and changes to sediment transport and supply. The vast majority of land claim predates the implementation of the Habitats Directive, therefore this pressure is assessed as a risk. Where coastal defences and structures like groynes disrupt sediment movement this can cause declines in sediment availability this can lead to erosion and will compromise the ability of H1330 to be able to adapt to raising sea levels. However, with rising sea levels there is the requirement for the upgrading or the

implementation of new defences for many built up areas which would lead to coastal squeeze. Such projects would be regulated under legislation and would require compensation habitat if necessary, however the creation of new saltmarsh habitat in good time often needs to overcome significant barriers.

PI02 Other invasive alien species (other than species of Union concern)

Non-native species are ranked as low pressure; saline conditions prevent the more common terrestrial invasive non-native species becoming established, however some species are able to colonize the brackish margins of Atlantic salt meadows such as Crassula helmsii New Zealand pigmyweed.

PI03: Problematic native species

Elymus athericus is beginning to spread on some estuaries such as the Severn and the Dee sometimes at the expense of other more species saltmarsh habitat. The increase has generally occurred in response to the absence of grazing or low grazing levels and once dense patches are established, they are difficult to remove.

Sorobolus anglicus (Spartia anglica) was listed as a pressure and threat in the 2013 submission. In Wales concern relating to this species have declined stands of Spartina anglica have been shown to develop into Atlantic salt meadows.

PJ01 Temperature changes and extremes due to climate change

Sea surface temperatures have warmed by approximately 0.3oC per decade over the last 40 years (Cornes et al., 2023). However, trends noted less observed warming to the west of the UK, with values of 0.1-0.2oC increase per

decade recorded (Cornes et al., 2023).

Vulnerability of Annex I marine habitats to climate change in Wales, assigned saltmarsh a medium sensitivity threshold for between 23.25°C and 28.25°C to increases in sea temperature. Within SACs in Wales 61% of the extent of 'Atlantic salt meadow' habitat within SACs was assessed as having medium vulnerability to increases in sea temperature (Oaten et al., 2021).

Within SACs in Wales 61% of the extent of 'Atlantic salt meadow' habitat within SACs was assessed as medium vulnerability, with 39% assessed as low vulnerability overall (Oaten et al., 2021)

PJ04 Sea-level rise due to climate change

Mean sea-level rise, coastal squeeze and 'natural squeeze' (where saltmarsh is squeezed up against natural landforms) are contributing to a decline in the extent of saltmarshes. UKCP18 marine report scenario RCP 8.5 predicts a rise of 0.51 to 1.13 m in Cardiff by 2100 (Palmer et al., 2018). Saltmarsh may adjust to sea level rise by vertical growth where sediment supply is sufficient but there is potential for tipping points with continued sea level rise. Sea defences and rock armouring have contributed to declines in sediment supplies (Jones et al. 2011). In addition, erosion of channels and creeks is likely to occur, leading to poor condition and habitat loss.

A large portion of saltmarsh (55% of coastline habitat length) has a defence that is preventing it rolling back of saltmarsh in response to sea level rise (Fairley In Prep) . Saltmarsh has been highlighted as the most vulnerable habitat to coastal squeeze; at a Wales level. 21% to 25% loss of saltmarsh as a whole is predicted by 2155 (depending on SLR projection) (Oaten et al., 2024).

The figure for predicted losses for intertidal habitats has not

been adjusted for estuary infilling or morphological response to sea level rise and in that context, is seen as a worst-case scenario (Oaten et al., 2024).

Shoreline management plans (SMPs) covering the Welsh coast; Atkins, 2010, Halcrow, 2012(a), Halcrow, 2012(b) & Royal Haskoning, 2012, together predicted losses of 331ha of intertidal habitat from the SACs wholly or partially within Wales due to sea level rise between 2005 and 2025. The figure for predicted losses for intertidal habitats has not been adjusted for estuary infilling or morphological response to sea level rise and in that context, is seen as a worst-case scenario but to date there is no evidence of loss due to coastal squeeze for intertidal habitats or specifically for saltmarsh.

PJ06 Wave exposure changes due to climate change

Saltmarsh develops in relatively low-energy environments where wave action is limited (Burden et al.,2020). Increase in wave energy is likely to increase erosion and in more exposed areas prevent saltmarsh developing. Erosion predominantly affects lower marsh communities which are more vulnerable to wave action, although mid- and high-saltmarsh is susceptible to internal erosion through creek expansion (Burden et al., 2020).

PJ07 Cyclones, storms, or tornados due to climate change

There is a likelihood that Storms and Waves in the UK will experience increasing storminess and an intensified wintertime storm track (Bricheno et al., 2023). Higher waves driven by storm winds could cause sudden and significant change. However, in some cases this my increase the area of saltmarsh where flood banks breach and are not repaired.

PK02 Mixed source marine water pollution (marine and coastal)

A significant proportion of diffuse pollution is derived from agricultural activities, resulting in raised levels of nutrient (nitrogen and phosphorus) and sediment run off however, there are numerous other sources of marine pollution: diffuse and point source from numerous sources such as sewage, industry, chemical pollution from mines, waste and transport including shipping.

Milford Haven Waterway supports one of the UK's biggest ports, with the Dee, Neath, Taf and Severn estuaries also having port infrastructure in the lower estuary. There is pressure from chronic input of hydrocarbons in port and recreational harbour areas, especially Milford Haven Waterway, though indications are that hydrocarbon contaminant loads there are decreasing (Little, 2009). Bioaccumulation of contaminants indicates some levels high enough to cause adverse effects to biota (Langston et al., 2011). Pressure and threats from occasional spills (e.g. Sea Empress) and continued presence and reworking of historic oil.

Eutrophication of coastal waters with Dissolved Inorganic Nitrogen and Phosphorous can causes enrichment of saltmarshes, increases primary production which can lead to overgrowth of increases in macro-algae (Packham and Willis 2007). Saltmarsh is generally associated with quite high levels of Nitrogen (Boorman & Hazeldean, 2012) but the vegetation of the higher marsh and transitions can be more vulnerable to elevated nitrogen levels for example, causing increases in nitrophilous graminoids.

Of the 32 Transitional and Coastal waterbodies listed as supporting saltmarsh (Water Watch Wales 2021 classification):

3 were classified as 'Good' overall, 27 'Moderate' and 2 'Poor'.

For dissolved inorganic Nitrogen (DIN) 8 waterbodies were assessed as 'High' (quality) 15 'Medium' and 11 were 'Good' and 6 were 'Moderate'.

For Opportunistic macroalgae of the 12 SAC water bodies assessed 7 were classed as 'High' 3 were classed as 'Good' and 2 were classed as 'Moderate'

Opportunistic macroalgae can be an indicator of high levels of DIN. In areas where there are elevated levels of nitrogen opportunistic macroalgae increase and can smother saltmarsh plants, although this would primarily be in the pioneer zone.

Intensive agriculture and associated poor practice can result in sediment, nutrients, organic matter, ammonia, litter, pesticides, pharmaceuticals, bacteria, viruses and antimicrobial resistance affecting surface water and groundwater. 'Major' input of Dissolved Inorganic Nitrogen (DIN) into the Milford Haven Inner waterbody is confirmed from diffuse sources associated with farm infrastructure and probable losses from agricultural land (Lock 2021). An investigative report was carried out in 2021 and updated in 2024 in response to the Milford Haven Inner transitional waterbody failing its WFD objectives for (DIN) and Opportunistic Macroalgae elements in Cycle 2 (2015) and Cycle 3 (2021) (Lock 2021).

PK04 Atmospheric N-deposition

Likely causes of Nitrogen deposition are primarily from agriculture and transport, however inputs from transport have declined significantly since 1990 (Department for Transport 2024).

The critical load for nitrogen deposition set for Atlantic salt meadows feature is 10-20kg/ha/yr. Approximately 94% of this habitat occurs where N-deposition exceeds the critical load. Although only a proportion of the saltmarsh is likely to

	be detrimentally impacted, such as increases in graminoids and increases in late successional species (APIS website), any effects are more likely to be seen in the upper marsh and transitional areas (Boorman and Hazelden, 2012).
8.5: List of main conservation measures	MA03: Maintain existing extensive agricultural practices and agricultural landscape features: Relates to pressure PA05 MA04: Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures: Relates to pressure PA05 MA05: Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning): Relates to pressure PA07 NRW Management Agreements within SSSIs and SACs continue to make an ongoing positive difference to site management. There are currently 190.30 ha just 2.5% of H1330 which are managed under NRW management agreements. A relatively high proportion of saltmarsh was within the Glastir Environment scheme which has since finished. In 2023 there were 2759.42ha (36.9%) of saltmarsh within the scheme. However, improvements failed to materialise in some sites with a significant area of saltmarsh remaining overgrazed. A strategic review of grazing on saltmarsh features in Welsh Marine Protected Areas (MPAs) with development of actions to improve condition was carried out in 2021. The project report highlighted areas to focus on to improve grazing management within the MPA network in Wales. A follow on Nature Networks project (part of a Welsh Government funded Programme) has started on sites on the Severn and on the Gower peninsula., However, there are numerous barriers to implementing positive grazing management on saltmarsh, which means progress is slow and further action is required. A further project within the Burry Inlet is also due to start in Spring 2025 looking to

tackle overgrazing which has been identified as a cause of marine pollution.

The implementation of the Sustainable Farming Scheme in 2026 from onwards could help to bring areas of saltmarsh under positive agricultural management and help restore landholdings where overgrazing, under grazing or abandonment of grazing is causing poor condition.

MA10: Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities: Relates to PK02

Implementation and enforcement of water quality regulation (both marine and freshwater) is ongoing work and is making gains in improving water quality.

The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021 were laid with the intention of reducing losses of pollutants from agriculture primarily to protect water resources. NRW are the responsible regulator of the legislation and as of 2024 have dedicated teams to enforce the regulations. It is hoped that with enforcement of these regulations over time agricultural pollution of water resources will reduce.

MC01: Adapt/manage renewable energy installation, facilities and operation (excl. hydropower and abstraction activities): Relates to pressure PD01

MC06 Energy production processes and related infrastructure development: Relates to pressure PD06

MC07: Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure Relates to pressure: PD01 & PD06

Energy projects are regulated through planning and

licencing legislation. Where compensation habitat for saltmarsh is required due to development of renewable energy installation facilities, managed realignment is generally successful in terms of saltmarsh creation; recognisable saltmarsh communities can develop within about 15 years, generally without the need for other intervention (Garbutt & Wolters 2008) although full restoration will take much longer. However, marshes reactivated by managed realignment do not provide habitats and species in comparable proportions to natural marshes and do not have equivalent biological characteristics (Mossman et al., 2012).

ME01: Reduce impact of transport operation and infrastructure

This measure relates primarily to the risk of oils spills. Shared multi-agency pollution response plans to deal with major incidences are in place and are regularly updated. However, a major incident related to shipping could still lead to considerable impacts.

MF04: Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures. Relates to PF06

MF06: Reduce/eliminate marine pollution from industrial, commercial, residential and recreational areas and activities (incl. contamination with litter)

Relates to PF06 & PF10

A number of initiatives including the examples listed below are tackling pollution and the sources of pollution, however, the sources are numerous and challenging and therefore reducing pollution requires sustained effort.

Implementation and enforcement of water quality regulation

(both marine and freshwater) is ongoing work and is making gains in improving water quality. The Water Resources (Control of Agricultural Pollution) (Wales) Regulations Act 2021 has come into force and it has the potential to improve water quality by decreasing pollution caused by agricultural management.

Management of the wider countryside including the implementation of the River Basin Management Plans by NRW and EA (cross border catchments) continues to contribute to improvements.

The Metal (Non-Coal) Mines Programme was established in 2020 to continue work to reduce pollution from metal mines which can also impact marine waterbodies. For example, the River Ystwyth receives all of the drainage from Cwm Ystwyth mine. WFD standards for zinc remain elevated downstream of the mine as far as the sea at Cardigan Bay (NRW 2025).

MJ02 Implement climate change adaptation measures: Specific PJ01, PJ04,PJ06

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

The National Habitat Creation Programme has been set up to create compensation habitat to offset intertidal habitat loss due to coastal squeeze caused by coastal defences managed by Risk Management Authorities in Wales (which includes NRW and Local Authorities). In 2021, Welsh Government issued a policy clarification note (Use of the National Habitat Creation Programme in delivering Flood and Coastal Erosion Risk Management projects), which directs competent authorities to only consider coastal squeeze associated with new or upgraded coastal defences but not in relation to maintenance of historic structures. This means that the NHCP now only provides

	compensatory habitat for a small number of major coastal defence projects. However, recent evidence work (Oaten et al, 2024) predicts significant losses of saltmarsh due to coastal squeeze. To date there have been two saltmarsh creation schemes: Cwm Ivy (Gower) in partnership with the National Trust has produced 32 ha of new saltmarsh habitat and Morfa Friog at the mouth of the Mawddach Estuary has developed 6 ha of saltmarsh with a further c0.6 ha in a separate area close by. Implementation of climate change adaptation measures set out in the Shoreline Management Plans (SMPs). SMPs set out a shared strategic approach and for managing the coastline from coastal flooding and erosion risks. Their aim is to reduce the risks to people the developed, historic and natural environments over the next century. The plans identify the most sustainable approach to managing the flood and coastal erosion risks to the coastline in the short medium and long term. SMPs have been produced for the whole of the Welsh coast, setting out where there are policies for: Hold the line, No active Intervention, Managed Realignment and Advance the line. However, the plans have yet to be fully implemented (see also section 9.1b). In particular, policy units for Managed Realignment and No Active Intervention need to be taken forward to ensure sustainable coastal management. The creation of buffer zones with appropriate conservation management to allow for the potential movement of saltmarsh inland where there are no existing barriers would be beneficial. Where there are flood defences, targeted realignment to enable more connectivity of saltmarsh.
9.1:Future trends and prospects of parameters	Range: Statutory protection of the vast majority of H1330 provides a good level protection for some pressures. However, there are numerous ongoing threats to the habitat, not least the

threat of sea level rise to which saltmarsh is particularly vulnerable. Coastal squeeze could start to become more apparent in the near future with risks to losses of extent with potential consequent changes in range; there are a small number of grid squares which contain a very small area of habitat. Therefore, the future prospects for range are poor, at least for the next 12 years.

Area:

The main threat to H1330 is sea level rise. The losses of intertidal habitat predicted by the Shoreline Management Plans (SMPs) by coastal squeeze could represent a significant proportion of this habitat which is already much reduced from its historical extent. Saltmarsh can respond to sea level rise by vertical accretion; however, this is dependent on sediment supply (Jones et al. 2011).

The National Habitat Creation Programme has been set up to create compensation habitat to offset intertidal habitat loss due to coastal squeeze caused by coastal defences managed by Risk Management Authorities in Wales (which includes NRW and Local Authorities). In 2021, Welsh Government issued a policy clarification note (Use of the National Habitat Creation Programme in delivering Flood and Coastal Erosion Risk Management projects), which directs competent authorities to only consider coastal squeeze associated with new or upgraded coastal defences but not in relation to maintenance of historic structures. This means that the NHCP now only provides compensatory habitat for a small number of major coastal defence projects. A recent NRW Evidence Report (Oaten et al, 2024) predicts significant losses of saltmarsh due to coastal squeeze.

The Shoreline Management Plans identify the most sustainable approach to managing the flood and coastal erosion risks to the coastline in the short medium and long term. Although SMPs have been adopted by Local

Authorities and are referred to in planning policy and guidance, the implementation of SMPs is often problematic, especially where there has been a change in policy from 'hold the line' to 'no active intervention' or 'managed realignment'. Unless works to maintain a defence require regulation such as a marine licence, there is no specific driver to promote SMP implementation. There are also significant sections of the Welsh coast which are constrained by assets which are in private ownership, including an extensive railway network.

Failure to implement the Shoreline Management Plans or to create new saltmarsh within timescales adequate to allow for development of new habitats prior to losses occurring will lead to declines in the extent of this feature. However, there are some good examples of sustainable shoreline policies in place by NGOs for which we are already seeing the results, for example the National Trusts' (NT) 'Shifting Shores' policy; the Cwm Ivy saltmarsh restoration site within the Carmarthen Bay SAC is a joint project between the NT and NRW.

Habitat creation to provide compensatory habitat is essential to maintain the extent of this feature into the future however, it should be recognised that timescales needed for salt meadows to develop to a level comparable to reference areas may take decades.

Structure & function:

The vast majority of H1330 (88%) is within the protected sites series. and therefore, is under a level of protection and implementation of measures are making positive contribution to improve structure and function of the saltmarsh. However numerous ongoing pressures remain over significant areas of the Atlantic salt meadows and there is the likelihood of climate change pressures becoming more apparent within the next 12 years causing erosion and potential dissection of marshes. To reverse the

	declining trend in structure and function there needs to be more measures over a wider area. The Future prospects for Structure and functions takes into account that at least 25% of the habitat area is expected to be in unfavourable (not good) condition in c.2035 due to nutrient N critical load exceedance, unless measures are taken to reduce N deposition impacts.
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) there has been no significant change in distribution pattern within range
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; and ii) short-term trend in area of habitat in good condition is decreasing
10.4: Future prospects	Conclusion on Future prospects reached because: (i) the Future prospects for Range are poor; (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.
10.6: Overall trend in Conservation Status	Overall trend is Unknown because the short-term trend in range is stable, the short-term trend in area is unknown, and the short-term trend in structure & function is decreasing.
11.1: Surface area of the habitat type inside the pSCIs, SCIs and SACs network	This figure includes all habitat within SACs whether as a qualifying feature or not.

11.6: Short-term trend of habitat area in good condition within the network; Direction	There are number of pressures which are impacting H1330 covering significant areas. Although there are conservation measures in place, they are currently insufficient.
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.