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

2019-2024

Conservation status assessment for the habitat:

H1160 - Large shallow inlets and bays

Wales

Cyfoeth Naturiol Cymru
Natural Resources Wales

JNCC

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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: H1160 Large shallow inlets and bays.

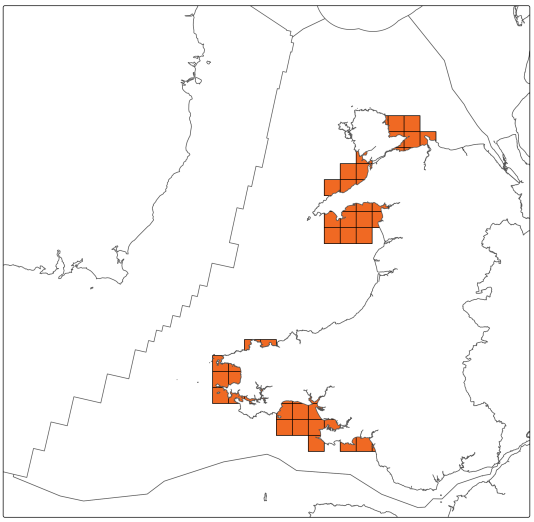
Important note - Please read

- 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: Large shallow inlets and bays

Distribution Map



Range Map

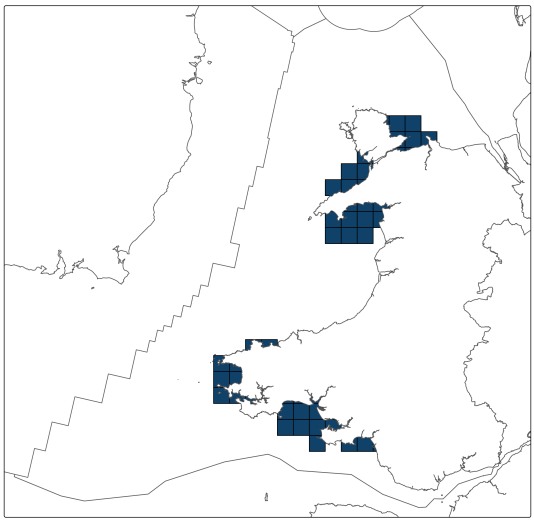


Figure 1: Wales distribution and range map for H1160 - Large shallow inlets and bays. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority. The 10km grid square distribution map is based on available habitat records which are considered to be representative of the distribution within the current reporting period.

Large shallow inlets and bays are physiographic features and so their range is determined primarily by geomorphological and hydrographic processes occurring over long time-scales and is not related to biological communities or processes supported by communities. Therefore, the mapped range was considered equivalent to the surface area (distribution) of the habitat.

Table 1: Table summarising the conservation status for H1160 - Large shallow inlets and bays. 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)	**Favourable (FV)**
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	H1160 - Large shallow inlets and bays

2. Maps

2.1 Year or period	2004-2024
2.2 Distribution map	Yes
2.3 Distribution map; Method used	Based mainly on extrapolation from a limited amount of data

2.4 Additional information

No additional information

Biogeographical Level

3. Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	MATL

3.2 Sources of information

See section 13 References

4. Range

4.1 Surface area (km²)	1,520.15
4.2 Short-term trend; Period	2004-2024
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	Based mainly on expert opinion with very limited data
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	No

d) Different method	Yes
e) No information	No
f) Other reason	No
g) Main reason	Use of different method

4.12 Additional information

No additional information

5. Area covered by habitat

5.1 Year or period	2004-2024
5.2 Surface area (km²)	
a) Minimum	1,520.07
b) Maximum	1,520.07
c) Best single value	1,520.07
5.3 Type of estimate	Best estimate
5.4 Surface area; Method used	Based mainly on extrapolation from a limited amount of data
5.5 Short-term trend; Period	2013-2024
5.6 Short-term trend; Direction	Stable
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	Based mainly on expert opinion with very limited data

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 less than 2% 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	No
d) Different method	Yes
e) No information	No
f) Other reason	No
g) Main reason	Use of different method

5.15 Additional information

No additional information

6. Structure and functions

6.1 Condition of habitat (km²)	
Area in good condition	
ai) Minimum	590.6
aii) Maximum	590.6
Area not in good condition	
bi) Minimum	929.5
bii) Maximum	929.5
Area where condition is unknown	
ci) Minimum	0
cii) Maximum	0
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	
6.4 Short-term trend of habitat area in good condition; Direction	Unknown
6.5 Short-term trend of habitat area in good condition; Method used	Insufficient or no data available
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
PA17: Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	High (H)
PD05: Development and operation of energy production plants (including infrastructure)	Ongoing and likely to be in the future	Medium (M)
PE02: Shipping lanes and ferry lanes transport operations	Ongoing and likely to be in the future	Medium (M)
PE03: Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging)	Ongoing and likely to be in the future	Medium (M)
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	Ongoing and likely to be in the future	Medium (M)
PG01: Marine fish and shellfish harvesting causing reduction of species/prey populations and disturbance of species (professional)	Ongoing and likely to be in the future	Medium (M)
PD06: Transmission of electricity and communications (cables)	Only in future	Medium (M)
PJ01: Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Medium (M)

PJ10: Change of habitat location, size, and / or quality due to climate change	Only in future	Medium (M)
PJ11: Desynchronisation of biological / ecological processes due to climate change	Only in future	Medium (M)
PJ12: Decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change	Only in future	Medium (M)
PG19: Marine aquaculture generating marine pollution	Only in future	Medium (M)
PI02: Other invasive alien species (other than species of Union concern)	Only in future	Medium (M)
PJ04: Sea-level rise due to climate change	Only in future	Medium (M)
PJ13: Change of species distribution (natural newcomers) due to climate change	Ongoing and likely to be in the future	Medium (M)
PK02: Mixed source marine water pollution (marine and coastal)	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
MA10: Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities	High (H)
MC03: Adapt/manage renewable energy installation, facilities and operation (excl. hydropower and abstraction activities)	Medium (M)
MC05: Adapt/manage fossil energy installation, facilities and operation	Medium (M)
MC06: Reduce impact of service corridors and networks	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	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).	Medium (M)
MG01: Management of professional/commercial fishing, shellfish and seaweed harvesting (incl. restoration of habitats)	High (H)
MI03: Management, control or eradication of other invasive alien species	Medium (M)
MG08: Reduce/eliminate diffuse and point source pollution from marine aquaculture	Medium (M)
MJ02: Implement climate change adaptation measures	Medium (M)
MK01: Reduce impact of mixed source pollution	High (H)

8.6 Additional information

Only part of the measures identified have been taken.

9. Future prospects

9.1a Future trends of parameters

ai) Range	Overall stable
bi) Area	Overall stable
ci) Structure and functions	Overall stable

9.1b Future prospects of parameters

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

9.2 Additional information

No additional information

10. Conclusions

10.1 Range	Favourable (FV)
10.2 Area	Favourable (FV)
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 (km²)

a) Minimum	1,260.8
b) Maximum	1,260.8
c) Best single value	1,260.8
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	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
4.1: Surface area	JNCC stated range is the same as the extent. A small change has been recorded since the previous report. This is due to calculation/projection rather than a real change.
4.3: Short-term trend; Direction	The occurrence of this habitat is defined by physiographic processes over long timescales. While the physical area of some of the individual sub-habitats (see section 5.3) may have declined due to localised pressures, the geographic spread and distribution of bays is not thought to have been reduced (stable).
4.11: Change and reason for change in surface area of range	There has been a change in total area calculated by JNCC from the 2019 to the 2025 report, no new data was submitted therefore this is likely due to projection/GIS issues.
5.6: Short-term trend; Direction	Boundaries for Shallow Inlets and Bays are based on physiographic processes and are unlikely to change unless there is substantial shift in geomorphology. Some of the losses in Intertidal Mud and Sand Flats within Large Shallow Inlets and Bays, but the areas of the Large Shallow Inlets and Bays likely remains stable. The key losses in inshore reefs are those associated with the Modiolus beds (outside the Large Shallow Inlet and Bay Feature). Stable indicated in 2013 and 2019 (although minor losses indicated, similar to those forementioned). All the Large Shallow Inlets and Bays passed the extent indicator in recent condition assessments.
5.14: Change and reason for change in surface area	There has been a change of 0.8km2 in total area calculated by JNCC from 2019 to 2025 report, no new data was submitted therefore this is likely due to projection/GIS issues.
6.1: Condition of habitat	Overview:

Area in Good/Not Good Condition:

The area in good/not good/unknown condition for structure and function of Welsh Large Shallow Inlets and Bays were assessed using collated available evidence and conclusions from specific data analyses which were spatially and ecologically relevant to Welsh Large Shallow Inlets and Bays. Evidence used included; conclusions of the site level condition assessments (Jackson-Bué et al., 2025) for monitored Large Shallow Inlets and Bays within Welsh SACs and intersecting Water Framework Directive waterbody classification, additional Infaunal Quality Index analysis (for bays outside of SACs) and specific casework information. Only one area estimate was calculated, there is low - medium confidence in this assessment. Each Large Shallow Inlet and Bay was assessed as a single unit (this includes Red Wharf Bay and Conwy Bay as a single unit – both bays are a combined polygon).

Result Summary:

The majority of the area was assessed as being in 'Not Good' (63.5%) with the remaining area being assessed as 'Good' (38.9%). There has been a change in the area in good/not good from the previous reporting round (In 2019 Area in Good: 624.39km2, Not Good: 881.82.4km2 and Unknown: 13.94km2). The change in area is due to a change in the assessment for St Brides Bay (was good in 2019, now Not Good - low confidence), Caernarfon Bay (was Not Good in 2019 now Good, low confidence), Fishguard Bay (was unknown in 2019 now Good, low confidence). Changes are due to more detailed and updated analysis and assessment and improved understanding (both within and outside SACs) (NRW, 2019).

SAC Condition Assessments Process:

Marine feature condition assessments (Jackson-Bué et al.,

2025) in NRW consisted of selecting performance indicators for the feature, gathering the best available evidence to assess those indicators and conducting the assessment. In a series of workshops, a range of NRW specialists used all available evidence to assess the performance indicator attributes and targets using a pass, fail or unknown. A confidence score for each target conclusion was also provided. The results were combined from the assessment of feature indicators to provide an overall assessment of condition at the feature level.

The indicators were assessed using a combination of NRW Habitats Regulations monitoring (various ecological/ environmental sampling and analysis techniques), Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (henceforth referred to as the WFD), monitoring, commissioned evidence reports, plan and project assessments, external monitoring databases (e.g. National Biodiversity Network) and expert judgement. There are 5 individually monitored Large Shallow Inlets and Bays across 4 SACs in Wales, data from these Large Shallow Inlets and Bays were used in this assessment. One Large Shallow Inlet and Bay (Tremadog Bay) in one of the four SACs were assessed as being in favourable condition (medium confidence) with the remaining Large Shallow Inlet and Bays being assessed as being unfavourable (low-medium confidence) (Jackson-Bué et al., 2025).

Regulation 9a Proxy Condition Assessment:

Large Shallow Inlets and Bays outside of relevant SACs have not been assessed through the NRW condition assessment process. In these cases a regulation 9a proxy condition assessment was undertaken. The proxy condition assessment used readily available casework information, Infaunal Quality Index analysis (using locally collected invertebrate, sediment and salinity data) and WFD assessment data in intersecting waterbodies. Where a

	WFD element which related to one primary indicator (e.g. species composition) or two secondary indicators (e.g. nutrient water quality; and contaminant water quality) failed the Large Shallow Inlet and Bay was assessed to be in not good condition. Note that for Caernarfon Bay, the interim WFD classification has a fail for infaunal quality index (related to a primary Indicator – Phillips et al., 2014) for Caernarfon Bay North (accounting for 16% of Caernarfon Bay). An updated analysis of more spatially relevant samples both to Caernarfon Large Shallow Inlet and Bay (2014- 2021) and Caernarfon Bay North WFD water body (2024 data) showed on average Good and High Status respectively, therefore this superseded the interim WFD assessment which was less spatially representative of the Bay. All proxy assessments were given low confidence due to them not being a full condition assessment.
6.3: Short-term trend of habitat area in good condition; Period	We are currently uncertain of the short-term trend in the area of good condition for this feature. Whilst evidence is available we are unable to assess this field in a meaningful way given current time restrictions. Changes in area reported in this assessment are probably mainly due to improved knowledge/updated assessments.
6.4: Short-term trend of habitat area in good condition; Direction	The short-term trend in the area of good condition for this feature is unknown. Whilst evidence is available, the assessment is extremely complex and we are unable to assess this field in a meaningful way given current time restrictions. Key changes reported are most likely mainly due to updates in knowledge/improved analysis and assessment.
6.5: Short-term trend of habitat area in good condition; Method used	Whilst evidence is available we are unable to assess this field in a meaningful way given current time resources.
7.1: Characterisation of pressures	Pressures (current and likely in the future) were identified using Article 17 2019 Large Shallow Inlet and Bay report (NRW, 2019) (which in turn used the 2013 (NRW, 2013) report, Actions Database and consultation with NRW staff). For this report, where readily available new evidence indicated a specific issue this has been updated (e.g. Water

Environment (WFD Classification (hence forth referred to as WFD) Coastal/Transitional Waterbody Classification (NRW, 2025), SONNAR report findings (related to climate change evidence), 2025 condition assessments and brief NRW internal consultation). Information was also used from 2025 sub feature reports where relevant and possible (Intertidal Sediment or Reef = 9.6%, Reefs = ~14.5%, Intertidal Mudflat and Sand Flat = ~8.3%, Sandbank = ~6.1% and estuary = ~3.1% of Large Shallow Inlets and Bays). Time restrictions meant a pragmatic process was used for this assessment and largely pressures were brought forward from the previous report.

PA17: Agricultural activities generating pollution to surface or ground waters (including marine) (High, ongoing and likely to be in the future)

Text carried forward from 2013 and 2019 Article 17 reports (NRW 2013 & 2019) with updates

It maybe possible to get to more specific codes, however, for consistency all agriculture (nutrient)relates issues covered under this pressure code.

Agriculture is identified as a confirmed major (e.g. at Milford Haven Waterway - Lock et al 2024a & b and at the Three Rivers estuary which flow into Carmarthen Bay – Jepson & Newman, 2021), probable major (e.g. The Gwaun which enters Fishguard Bay – Jones, 2021, Burry Inlet Outer which flows into Carmarthen Bay – Jopson, 2021), suspected major (e.g. The Erch which flows into Tremadog Bay – Newman, 2021a) and suspected minor (e.g. Swansea Bay – Newman, 2021b) reason for raised levels of nutrient in WFD waterbodies intersecting with Large Shallow Inlets and Bays (or tributary waterbodies). Nutrient levels were a key reason for failure in the Large Shallow Inlet and Bay Feature in the Pembrokeshire SAC condition assessment (Jackson-Bué, 2025). Almost 7% of waterbodies intersecting Welsh Bays have elevated

Dissolved Inorganic Nitrogen levels. In Milford Haven Waterway this is resulting in raised levels of suspended silt, silt deposition and increased plant growth (Lock et al, 2024a & b; interim WFD results, 2024). At Milford Haven, raised turbidity and silt deposition is likely to be affecting subtidal algae, whilst dense and widespread macroalgae overlying mud and sand flats is having negative consequences for sediment biota and generating eutrophication and smothering impacts when it is washed up on the rias strandlines, reefs and saltmarsh (carried over from LSIB article 17 report 2013 & 2019 & Jackson-Bué, 2025). High levels of nutrients were reported in Jones and Unsworth (2016) at the seagrass bed at Gelliswick Bay (although no evidence that this represents reduction over time). There is also the possibility that sedimentation has contributed to the substantial decline in live maerl (over 70.8% reduction) since 2005, this is currently being investigated (PA17 assessed as High Pressure in NRW Regulation 9a 2025 Maerl Report) (Ratcliffe et al, in prep). However, the causes of maerl decline are unknown and are likely due to a complex combination of factors (including the presence of non-native slipper limpets). The key water bodies overlapping with Swansea Bay and Milford Haven Waterway have recently failed for Dissolved Inorganic Nitrogen element (WFD Interim Classification 2024). This was a medium pressure for reefs and intertidal mud and sandflats and a high pressure for estuaries (2025 Regulation 9a Sub-feature Reporting).

PB19: Forestry activities generating pollution to surface or ground waters (including marine) (Low, ongoing and likely to be in the future)

Assessed as Low in 2019 Large Shallow Inlet and Bay Report (carried forward without assessment/not reported to JNCC)

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

The equivalent to PD01 was recorded in the 2019 report as a potential threat due to possible impacts from a planned tidal lagoon in Swansea Bay. The scheme is no longer being pursued, and although the final Wales National Marine Plan (WNMP) (Welsh Government, 2019) and other UK planning policy is broadly supportive of low carbon energy development including tidal range but that support isn't spatially specific. This code is therefore now not relevant for Large Shallow Inlets and Bays Regulation 9a reporting.

PD05: Development and operation of energy production plants (including infrastructure) (Medium, ongoing and likely to be in the future)

Pressure brought forward from 2013 and 2019 reports and updated text used (source: Condition Assessment)

An external report (Sutton, 2023) found localised increase in temperature near the Pembroke Power Station. However, they concluded that this is unlikely to be of wider ecological significance. While localised, warming water can provide a safe haven for NNS, which could then spread further.

Operational monitoring of fish impingement and entrainment is carried out at Pembroke Power Station's cooling water intake system in the Milford Haven Waterway. Further monitoring of the fish community of the Milford Haven commissioned by the operators of the Pembroke Power Station includes subtidal trawls, intertidal seine nets and ichthyoplankton sampling. From the operational monitoring programme data and analysis, decreases, and a negative trend, in impingement numbers of numerous species within the fish community have been observed. The species in question include clupeids, gobies, gadoids, flatfish and sandeels and form over 80% of the recorded impingement abundance. A similar decreasing trend in fish

catches was observed in the subtidal trawls. Data from the intertidal seine nets showed variable results with an overall increase in marine juvenile and estuarine resident species in summer but low abundance in winter catches and no trend was observed for the icthyoplankton community composition, which remained similar throughout the monitoring period (A. Scorey (NRW), pers. comm.). Further investigation is needed into the fish community abundance and structure across the LSIB feature in the Milford Haven Waterway. (Jackson-Bué, 2025).

PD06: Transmission of electricity and communications (cables) (Medium, only in future)

Assessed as Low previously updated following internal consultation.

The current Crown Estate offshore wind leasing round (Round 5) for FIOW in the Celtic Sea will offer up to 4.5GW of capacity at 3 sites, with further expansion planned in future rounds. There is increasing plans for renewable energy production in the Celtic sea, which is mostly offshore, the key pressure will be cable laying (this could also be categorised as PD01) which has been undertaken or is planned in several bays across Wales:

It is likely that a cable be routed from the north to Conwy Bay with a cable corridor going through Conwy Bay however there will be no sand wave clearance permitted in Menai Strait and Conwy SAC. Cable protection will be placed in the Menai Strait and Conwy SAC but with reduced height and not anticipated to affect any SAC features. As part of the National Energy System Operator (NESO) Holistic Network Design (HND) activity, a new cable route has been proposed from Scotland to North Wales which will pass through Caernarfon Bay.

There are numerous cabling plans and activities in South Wales, primarily related to floating offshore wind in the

Celtic Sea. To date, activity has focussed on connection to the National Grid at Pembroke Dock: a cable route making landfall at Angle Bay within the Milford Haven LSIB (Erebus OWF) has been consented and the Greenlink Interconnector makes landfall at Freshwater West, also within the Milford Haven LSIB. A second cable route into Freshwater West is going through the consenting process (Llyr OWF). In recognition of the many constraints and cabling congestion around South West Pembrokeshire, the NESO HND for the Celtic Sea (ESO, 2024) proposes a route through the middle of Carmarthen Bay (a second route makes landfall at Baglan, with the proposed route outside but in proximity to Swansea Bay). It is anticipated that cable burial could be achieved in the sedimentary areas of Milford Haven waterway and Carmarthen Bay, negating the need for cable protection and long-term changes to the structure and function of benthic habitats within those bays. Impacts (including cumulative / in combination) on benthic ecology within the bays need to be assessed due to the presence of sensitive habitats such as maerl and seagrass beds in Milford Haven waterway (pressures such as physical damage / disturbance, deposition of sediments and changes to water quality would have a negative impact on these habitats).

PE02: Shipping lanes and ferry lanes transport operations (Medium, ongoing and likely to be in the future)

Text carried forward from 2013 and 2019 Article 17 reports (NRW 2013 & 2019) with updates

There are currently 14 ports in Wales that handle commercial traffic. Some of these are associated with Bays (Milford Haven, Fishguard and Swansea Bay). In the recent Welsh National Marine Plan an objective was set 'to safeguard established shipping routes and support sustainable development in the shipping and ports sector suggesting shipping is likely to remain the same or increase in the future'. In preparing Ports and Shipping related

proposals, developers should apply the WNMP's General Policies and the Safeguarding Policies in relation to all sectors covered by the Plan. This will include all relevant environmental policies including ENV_02: Marine Protected Areas (Welsh Government, 2019).

Milford Haven Waterway supports one of the UK's biggest ports. There is pressure from chronic input of hydrocarbons in port and recreational harbour areas, especially Milford Haven Waterway, although indications are that hydrocarbon contaminant inputs there are decreasing (Little, 2009). Bioaccumulation of contaminants indicates some are levels high enough to cause adverse effects to biota (Langston et al., 2012). There are inputs from occasional spills (e.g. Sea Empress) and there remains the potential for further very significant pollution events. Historically, there have been various peaks in hydrocarbons and metals in sediments in the Milford Haven Waterway, including as a result of the Sea Empress spill in 1996 (Little, 2017). Sediment contaminant levels have also been moderately high through periods of dredging or construction in the later 2000s (contaminants analysed up to 2014) (Little, 2017; Warwick, 2017; Warwick et al., in prep). Various contaminants, including polycyclic aromatic hydrocarbons and heavy metals have been recorded at levels above available ecological quality guidelines in recent monitoring years within Milford Haven Waterway. These factors contributed to a fail of the sediment quality indicator in the most recent condition assessment for the Large Shallow Inlet and Bay feature of the Pembrokeshire SAC (Jackson-Bue et al., 2025).

Significant amounts of commercial (and recreational) vessels anchor and moor in Milford Haven Water way and large vessel anchoring occur in St Bride's Bay and Milford Haven generating seabed impacts on sediment and reef communities ((Jackson-Bue, 2025 & carried forward from NRW 2013 & 2019 Article 17 report (NRW, 2013 & 2019). Further work is required to identify links between silt levels

and the various shipping activities. Anchoring in St Brides Bay is a contributing factor for the fail of the Topography of the feature attribute in the most recent site level condition assessment (Jackson-Bue, 2025).

PE03: Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging) (Medium, ongoing and likely to be in the future)

Text carried forward from 2013 and 2019 Article 17 reports (NRW 2013 & 2019) with updates

Milford Haven Waterway supports one of the UK's biggest ports. It has the majority of freight and cargo traffic in Wales (other ports relevant to Large Shallow Inlet and Bays are Swansea/Port Talbot and Fishguard). Investment in port infrastructure generates frequent plans that have had consequences for the ria (e.g. potentially related to significant damage to Wales' only maerl bed) (carried forward from NRW 2013 & 2019 Article 17 report (NRW, 2013 & 2019)).

These activities also affect the hydrological flow within Milford Haven.

As a consequence of low levels of effects of:

- navigational and development related dredging (Milford Haven Waterway);

- land claim associated with marinas (consented), harbour projects, slipways and coastal defences

- sea walls and significant jetty and harbour wall constructions.

Milford Haven is a busy commercial deep water port. The maerl bed is subject to raised water turbidity and silt deposition which are thought to be possibly due to capital

and maintenance dredging operations. The maerl bed is situated adjacent to areas that have been previously dredged. The Milford Haven Dredging Strategy document (Revision 2) 2016, indicates that according to their multibeam surveys in the region of South Hook there has only been a very small build up in areas above 10m. Multibeam, however, is not a sensitive tool for measuring the sort of changes in sediment composition that would affect the survival of maerl and a small build up may be of significance (NRWe – Maerl Regulation 2025 9a Report).

The maerl bed is bisected by a large jetty that was refurbished between 2005-2008. This resulted in impacts on the bed, some of which are evident on the CCW side scan data (2009), for example foot print depressions from jack-up barges and deposition of other construction material. Other impacts included: the deposition of contaminated material - coal tar coverings of piles were shot blasted and this highly toxic material entered the sea below the jetty – the long-term consequences of this are unknown; Large LNG vessels berth at the end of the jetty, adjacent to the bed and a small boat passage concentrates small vessel traffic in shallow water over the northern edge of the bed. The propeller wash from these vessels manoeuvring under the jetty in the shallow water may have caused localised deterioration of the bed (NRWe – Maerl Regulation 2025 9a Report). Local seagrass beds are likely to be under similar pressures, however, the water quality may be more of an influence (Jones & Unsworth, 2016).

Dredging, both maintenance and capital, impact subtidal and intertidal sediments, reef and hydrological flow (carried forward from NRW 2013 & 2019 Article 17 report (NRW, 2013 & 2019)). In Milford Haven Sediment contaminant levels have been moderately high through periods of dredging or construction in the later 2000s (up to 2014) (Little, 2017; Warwick, 2017; Warwick et al., in prep, Jackson-Bué et al, 2025). Maintenance dredging is also undertaken in Fishguard Bay & Swansea Bay (Marine

Charts).

The Fishguard linkspan project will involve a replacement pontoon that requires land reclamation, the construction of rock armour revetment, capital dredging and ongoing maintenance dredging. These operations are likely to lead to permanent habitat loss, physical disturbance, temporary increases in suspended sediment concentrations, removal of substratum, physical change of seabed habitat type from soft sediment to hard substrate, and increased risk of the introduction of non-native species. The Future Port Talbot project is still in early planning stages but may involve similar activities/risks.

In Milford Haven, there are potential plans to extend and develop the port at Criterion Quay to support vessels associated with offshore renewables industry including replacement and extension of a berth and land reclamation.

The Welsh National Marine Plan includes a sector objective 'to maintain safe and effective navigational access for shipping, fishing and leisure craft and support future growth and increases in port facilities and vessel size whilst promoting the optimal sustainable use of dredged material and ensuring adequate disposal facilities are available' and 'to safeguard established shipping routes and support sustainable development in the shipping and ports sector'. This suggests that shipping is likely to remain at similar levels or increase in the future. In preparing Ports and Shipping related proposals, developers should apply the WNMP's General Polices and the Safeguarding Policies in relation to all sectors covered by the Plan. This will include all relevant environmental policies including ENV_02: Marine Protected Areas (Welsh Government, 2019).

PF05: Sports, tourism and leisure activities (Low, ongoing and likely to be in the future)

Assessed as Low in 2019 Large Shallow Inlet and Bay

Report (carried forward without assessment/not reported to JNCC)

PF10: Residential, commercial and industrial activities and structures generating marine pollution (Medium, ongoing and likely to be in the future)

Text carried forward from 2013 and 2019 Article 17 reports (NRW 2013 & 2019) with updates

Relevant information also in PK02 (ranked as High). Marine macro-pollution (e.g. anthropogenically derived debris) is often found in depositional areas and on strandlines. Lost fishing gear (including angling line, hooks and weights and fishing pots) has been found amongst and around subtidal reefs (e.g. NARC, 2010-2022). There is an increasing trend in marine litter on Welsh beaches (e.g. Marine Conservation Society, 2024 & Nelms et al., 2017), which is directly relevant to intertidal mudflats and sandflats (carried forward from NRW 2013 & 2019 Article 17).

Litter (often plastic particles) was frequently recorded as present in Welsh sublittoral bay grab data sets (NRW 2016-2024 Large Shallow Inlet and Bay Grab Data) however, there is scope for litter contamination within these samples (primarily obtained to assess infauna/sediment). In general, the key physical impact of plastic particles is likely to be linked to ingestion or entanglement. Several invertebrate and fish species have been shown to ingest plastic in field and laboratory experiments. Negative (and some negligible) impacts of ingestion of plastic have been observed on marine species but the research on the impacts of litter in the marine environment is in its infancy and impacts are poorly understood (Bergmann, et al 2015; Gall & Thompson, 2015; Galloway & Lewis, 2016). Further assessment of the impacts is required to aid understanding of the extent and the likely impact of litter on the function of infaunal and epifaunal communities and recommendations of any appropriate management action. Monitoring,

reporting and method development under MSFD and OSPAR will help increase knowledge and confidence of this issue in the future.

Industry has led to increased contaminants in some bays. For example, industry was assessed as being a probable major reason for elevated mercury in Swansea Bay, Carmarthen Bay and Milford Haven and a probable reason for elevated mercury in Conwy Bay/Anglesey North. Industry and Water Industry were assessed probable major reasons for elevated concentrations of BDPE in Carmarthen Bay and Anglesey North (Water Watch Wales).

Diffuse/point source sewage inputs were identified as major/minor probable/confirmed reasons for elevated nutrients within Swansea and Milford Haven (from water industry/urban/domestic sources). Contaminants are present in relevant WFD water bodies encompassed by Welsh Bays which is covered in PK02 narrative.

PF15: Modification of coastline, estuary and coastal conditions for built-up areas (Medium, ongoing and likely to be in the future)

Text carried forward from 2013 and 2019 Article 17 reports (NRW 2013 & 2019) with updates

Multiple infrastructure development projects in Milford Haven Waterway and Carmarthen Bay. The majority of which are consented, however there are a number of un-regulated coastal defences and shoreline structures particularly in Milford Haven Waterway, these include slipways, gabion baskets, rock armour etc (carried forward from NRW 2013 & 2019 Article 17 report (NRW, 2013 & 2019)). Several recorded small losses or modification of habitat are associated with the creation and maintenance of roads, paths and railroads (e.g. Tremadog Bay, Milford Haven Waterway).

Creation of private slipways and hard standing on shoreline reef, and maintenance or establishment of shore defences is increasing in areas where housing has water frontage (e.g. Milford Haven). In some areas the level of dumped construction materials on some shores is significantly changing the nature of the shore. This includes material lost from failed coastal defences (e.g. gabion baskets). There are several areas where these defences are at the end of their useful life and are beginning to disintegrate (carried forward from NRW 2013 & 2019 Article 17 report (NRW, 2013 & 2019)).

PG01: Marine fish and shellfish harvesting causing reduction of species/prey populations and disturbance of species (professional) (Medium, ongoing and likely to be in the future)

Text carried forward from 2013 and 2019 with updates

The condition of commercial fish species populations assessed in the previous Article 17 report, the recent site level condition report (Jackson-Bué, 2025) relevant to Welsh Large Shallow Inlets and Bays (Kay and Dipper, 2009), and commercial fishing pressure on fish species were considered using available ICES/IUCN assessments (ICES reports/IUCN website) in relation to Welsh Large Shallow Inlets and Bays.

122 fish species have been recorded in monitoring programmes associated with cooling water abstraction from inshore waters near Pembroke, Hinkley Point and Wylfa power stations. These species are reasonably assumed to be representative of the fish species typically present in inshore waters including Large Shallow Inlets and Bays in Wales.

Of the 122 species recorded from inshore waters, 26 species (21%) have ICES advice on commercial fishing in ICES areas 7a, f and g covering Welsh waters (ICES

Advice, accessed 2025). The remaining 96 species (79%) are either not commercially fished or have limited/local commercial fishery with no assessment available.

Nine commercially fished species (herring, seabass, cod, whiting, plaice, pollack, horse mackerel, eel and salmon) have stock biomass levels below MSY/MSY proxy in 7a, f and g. Of these 9 species, fishing pressure is assessed as above MSY/MSY proxy for 5 species (herring, cod, whiting, plaice and pollack) in at least one of 7a, f and g, below MSY/MSY proxy for 2 species (seabass, horse mackerel) in 7a, f and g, and not assessed as relative to MSY/MSY proxy for 2 species (European eel and Atlantic salmon), although both these species have zero-TAC advice from ICES but landings occur.

Fifteen commercially fished species (boarfish, anglerfish, haddock, hake, blue whiting, ling, starry smooth-hound, thornback ray, small-eyed ray, spotted ray, sardine, mackerel, lesser-spotted dogfish, nursehound and Dover sole) have stock biomass levels above MSY/MSY proxy in 7a, f and g. Of these 15 species, fishing pressure is assessed as above MSY/MSY proxy for 8 species (haddock, blue whiting, ling, thornback ray, spotted ray, mackerel, lesser spotted dogfish and Dover sole) in at least one of 7a, f and g, below MSY/MSY proxy for 6 species (boarfish, anglerfish, hake, starry smooth-hound, small-eyed ray and nursehound) in 7a, f, g, and not assessed as relative to MSY/MSY proxy for sardine, although this species has TAC advice from ICES.

Finally, 2 commercially fished species are not assessed by ICES (blonde ray and sprat) for either their stock biomass or fishing pressure relative to MSY/MSY proxy, although both these species have TAC advice from ICES.

For stock assessments where MSY reference levels cannot yet be provided (and proxy is used), the status is officially unknown (ICES 2024b).

With respect to the IUCN Red List, 2 species (European eel, allis shad) are assessed as Critically Endangered, 1 species (Atlantic salmon) is assessed as Endangered, 1 species (turbot) is assessed as Vulnerable, and 13 species (twaite shad, thick-lipped grey mullet, lumpsucker, seabass, river lamprey, golden grey mullet, thin-lipped grey mullet, starry smooth-hound, blonde ray, thornback ray, small-eyed ray, sardine and nursehound) are assessed as Near Threatened. The remaining 105 species are assessed as either Least Concern or Data Deficient.

Eleven species (herring, cod, whiting, hake, ling, plaice, blonde ray, thornback ray, mackerel, sole, and horse mackerel) with ICES stock assessments covering Welsh waters and recorded in inshore waters relevant to Large Shallow Inlets and Bays are included on the interim Section 7 list (under review) of the Environment (Wales) Act 2016 (Welsh Government, 2016) as they are of principal importance for the purpose of maintaining and enhancing biodiversity in Wales.

Regionally, there is concern about the level of some commercial fish populations (herring, seabass, cod, whiting, plaice, pollack, horse mackerel, European eel and Atlantic salmon). It would be expected that these species would use Welsh Large Shallow Inlets and Bays for spawning, nursery, foraging, residing, over-wintering and/or migration. It is unclear how long it will take for these populations to recover; their recovery may also be impacted by other factors such as climate change. While ICES/IUCN assessments provides some wider geographic context, there is limited evidence on the removal of these fish species from the vicinity of Welsh Large Shallow Inlets and Bays. The majority of the Welsh fishing fleet is comprised of <10m vessels which predominantly target shellfish (HM Government, 2024), however some vessels will target commercial fish species. The abundance of commercial fish species in Large Shallow Inlets and Bays

will be influenced by fishing related mortality that does not occur in the Welsh Large Shallow Inlets and Bays themselves, including mortality outside Welsh waters. The data assessed was considered relevant to Welsh Large Shallow Inlets and Bays, but low confidence should be associated with this assessment due to the size of the area covered by ICES/IUCN assessments. There is a lack of fisheries data available for the assessment and what data is available are of low confidence in relation to Welsh Large Shallow Inlets and Bays.

Overall, on a UK level, a positive trend towards a greater proportion of fish stocks fished sustainably is evident in both the long term and short term. There is also a positive trend for fish within safe biological limits in the long term, however no change in the short term. For stocks fished sustainably, the percentage of stocks with an 'unknown status' is decreasing and was 23% in 2020 (Lynam et al, 2022, cited by JNCC website, accessed 2025).

Commercial whelk, mussel and cockle fisheries occur in Large Shallow Inlets and Bays. HRAs are completed for these fisheries. Cockle gathering is managed under The Cockle Fishing Management and Permitting (Specified Area) (Wales) Order 2024 with annual cockle stock assessments informing TACs.

Collection of mussel subject to MCRS and HRA if undersize (if likely to affect SAC feature).

Whelk fishing is managed through The Whelk Fishing Permit (Wales) Order 2021 with annual stock assessments completed. Potting for crustacea species are managed through Welsh Government regulations.

PG03: Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats (Low, ongoing and likely to be in the future)

Assessed as Low in 2019 Large Shallow Inlet and Bay Report (carried forward without assessment/not reported to JNCC). An assessment of inshore fisheries activity data would be useful to assess this pressure in the future.

PG13: Bycatch and incidental killing (due to fishing and hunting activities) (Low, ongoing and likely to be in the future)

Assessed as Low in 2019 Large Shallow Inlet and Bay Report (carried forward without assessment/not reported to JNCC).

PG19: Marine aquaculture generating marine pollution (Low ongoing & Medium only in future)

Text carried forward from 2013 and 2019 with updates

Aquaculture, depending on the type, scale and intensity, can cause local water quality changes. For example from elevated suspended sediment on harvest, pickup and relay and from suspended shellfish faeces/pseudofeces. Marine aquaculture in Wales is subject to HRA which will consider water quality impacts.

The WNMP has a sector objective for aquaculture that aims 'to facilitate the development of sustainable aquaculture in Welsh waters, including promoting innovative finfish, shellfish and marine algal businesses and associated supply chains”. The aquaculture resource area identified intersects with large sections of Large Shallow Inlet and Bays. For species already cultivated, the Plan identifies potential for the future development of additional production capacity and options for value added processing. Oysters, scallops, clams and abalone are identified as examples of potential new species for cultivation, along with consideration of potential for sustainable finfish and marine algal aquaculture production. The WNMP also contains a series of environmental policies that apply throughout

Welsh seas that should help to ensure that all development is sustainable, including ENV_02: Marine Protected Areas. Where Regulating and Several Orders are applied for, this also provides some safeguards to protect Annex I habitats through HRA processes (where likely to impact Annex I habitats), although these orders are not compulsory. However, the majority of aquaculture developments require multiple permissions (e.g. landowner lease, FHI, possible marine licence) which are subject to HRA (Welsh Government, 2019).

PG21: Introduction and spread of new species in aquaculture (including GMOs) (Low, only in the future)

Assessed as Low in 2019 Large Shallow Inlet and Bay Report (carried forward without assessment/not reported to JNCC).

The spread of INNS from aquaculture is a possibility. There may be pressure for aquaculture expansion into new sheltered areas such as Milford Haven Waterway. Cultivation of triploid Magallana gigas Pacific oysters in the Milford Haven and Menai Strait is considered a threat due to known spread of this species and damage to habitats at other locations in the UK. Climate change will increase the chances of reaching the spawning temperature threshold. Where it may affect SAC features, marine aquaculture in Wales is subject to HRA which should consider INNS impacts.

The WNMP has a sector objective for aquaculture that aims 'to facilitate the development of sustainable aquaculture in Welsh waters, including promoting innovative finfish, shellfish and marine algal businesses and associated supply chains”. The aquaculture resource area identified intersects with Estuaries. For species already cultivated, the Plan identifies potential for the future development of additional production capacity and options for value added processing. Oysters, scallops, clams and abalone are

	identified as examples of potential new species for cultivation, along with consideration of potential for sustainable finfish and marine algal aquaculture production. The WNMP also contains a series of environmental policies that apply throughout Welsh seas that should help to ensure that all development is sustainable, including ENV_02: Marine Protected Areas. Where Regulating and Several Orders are applied for, this also provides some safeguards to protect those Annex I habitats that are SAC features through HRA processes, although these orders are not compulsory. However, the majority of aquaculture developments require multiple permissions (e.g. landowner lease, FHI, possible marine licence) which may also be subject to HRA (Welsh Government, 2019). PH08: Other human intrusions and disturbance not mentioned above (Low, ongoing and likely to be in the future) Assessed as Low in 2019 Large Shallow Inlet and Bay Report (carried forward without assessment/not reported to JNCC)
7.1: Characterisation of pressures	7.1 narrative continued… PI02: Other invasive alien species (other than species of Union concern) (Low ongoing, Medium, only in the future) Invasive non-native species are present, particularly on reefs, within most bays in Wales (Jackson-Bué, 2025). Key invasive non-native species of significance include Crepidula fornicata (Bohn, 2014), Didemnum vexillum, Agarophyton vermiculophyllum , Magallana (Crassostrea) gigas and Sargassum muticum. Modification of habitat and associated community is observable in areas of high density, in particular C. fornicata in Milford Haven Waterway. Milford Haven is a hot spot for marine INNS, likely due to the high intensity of commercial and recreational shipping, with a high diversity

of non-natives being present (Mieszhowska, 2011, NRW, 2018, Wood et al., 2015 & Wood et al., in prep, Jackson-Bué et al., 2025). C. fornicata is now present in large quantities in areas of Milford Haven and D. vexillum was found in several locations in Milford Haven in 2023. Previously the only Welsh colony of D. vexillum was in Holyhead. The future threat of high impact species such as D. vexillum colonisation is high for reef habitat.

The spread of feral populations of M. gigas in the Milford Haven Waterway and Menai Strait is also considered a threat due to the known spread of this species at other locations in the UK, future climate change predictions of warming sea temperatures, and the ongoing cultivation of this species at both sites.

PI04: Plant and animal diseases, pathogens and pests (Low, ongoing and likely to be in the future)

Assessed as Low previously and due to time constraints this has not been updated (see 2019 Article 17 submission for information).

Climate Change Related Pressures:

Review of JNCC offshore pressures and timing for sandbanks and reefs have been reviewed and subsequently adopted for Large Shallow Inlets and Bays with additional text from the draft SONARR report which is more specific to Welsh waters (although some extrapolation was necessary). The majority of bays are sediment habitat which has been focused on for most of the related codes.

• PJ01 Temperature changes and extremes due to climate change Medium (3)

JNCC text (UK offshore): 'There is evidence to suggest temperatures are increasing in the North Sea and benthic

habitats are predicted to face increased temperatures and frequency of heatwaves under climatic projections in the future (QSR, 2023). Offshore circalittoral sediments/rocks are thought to face a strong effect of increased temperatures in the future (QSR, 2023). While confidence in evidence has increased from low to medium, there are still knowledge gaps meaning we are unable to fully assess the scale of benthic species and community responses in relation to climate change for broadscale habitats (Moore & Smale, 2020).”

• PJ10 Change of habitat location, size, and / or quality due to climate change Medium (4)

JNCC text (UK offshore): 'Large knowledge gaps in current climate change and ocean acidification impacts and how this will influence the habitat's quality on this habitat remain (QSR, 2023). Calcifying organisms are most likely to be vulnerable to increases in ocean acidification (Hoppit & Schmidt, 2022). Climatic models predict there will be changes to area of suitable habitat in the future depending on the climatic scenario (Moore & Smale, 2020)”

• PJ11 Desynchronisation of biological / ecological processes due to climate change Medium (4)

JNCC text (UK offshore): 'The changes in community structure predicted under different climatic scenario models could alter ecosystem functioning and trophodynamics of North Sea benthic habitats in the future. Other studies suggest ecosystem-level responses could remain stable over long periods of time, depending on the species involved (Moore & Smale, 2020).”

• PJ12 Decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change Medium (4)

JNCC text (UK offshore: 'There is evidence to suggest that

climate change is driving changes in amphipod assemblages and negatively affecting some primary productivity in the North Sea and Western Channel, however there have also been slight increases in other benthic species (Moore & Smale, 2020). 'Future European benthic ecosystems are predicted to undergo restructuring based on current climate emission pathways' (Hoppit & Schmidt, 2022). While confidence in available evidence has increased from low to medium, knowledge gaps remain meaning it is difficult to assess how trophic interactions will respond to climate change (Moore & Smale, 2020).”

• PJ13 Change of species distribution (natural newcomers) due to climate change Medium (3)

JNCC text (UK offshore): 'There is evidence to suggest climate change is causing changes in benthic infaunal invertebrate species distributions and range shifts of local species, with some increase in warm-water affinity species especially in the South-West (UK). Climatic models predict this trend will continue (Moore & Smale, 2020).”

Additional text for Large Shallow Inlets and Bays (source: SONNAR reporting):

UK seas show an overall warming trend. Over the past 30 years, warming has been most pronounced to the north of Scotland and in the North Sea. Warming of UK shelf seas is projected to continue over the coming century. Most models suggest an increase of between 0.25°C and 0.4°C per decade (MCCIP, 2020) (PJ01).

Data from the Irish Sea region shows a strong warming trend over the period 1960 to 2020 of 0.3°C per decade, with values since 2000 being consistently above the 1991–2020 average (Cornes et al., 2023) (PJ01).

The annual mean sea-surface temperature (SST) for 2023 for near-coast waters around the UK was 1.3°C above the

1961-1990 long term average, making this the UK's warmest year for near-coast SST in a series from 1870 for the second successive year (Kendon et al., 2024) (PJ01).

The annual number of marine heatwaves experienced in the British Isles increased by an average of four events per year in the period 2000–2016 compared with the period 1982–1998 (Cornes et al., 2023) (PJ01).

Increases in warm-water fish species in UK waters continue to be observed, along with local declines of some cold-affinity species (Wright, Pinnegar and Fox, 2020) (PJ13).

General marine Short term Trend overview:

If decadal observations of water temperatures (Cornes et al., 2023) are consistent, sea surface temperature is likely to have increased by 0.05-0.15oC over the five years between 2020 and 2025 (PJ01).

Short term measurements (2014-2015) for the Celtic Sea indicated oxygen deficiency in late summer, which can have negative effects on marine ecosystems, although the lack of historic data means it is not possible to verify whether this is a recent development or a regularly occurring phenomenon (Mahaffey et al., 2020) (PJ10).

General Marine Future Outlook:

Model simulations indicate a continuing warming trend in sea surface temperatures around the UK, with an average increase of 0.3°C per decade in the short term (PJ01 likely to lead to issues relating to other pressures identified).

Ocean temperatures are expected to continue to rise and will affect species composition and abundances. Shifts in food-webs may occur due to changes in species composition and abundances affecting predator-prey relationships (Burton et al., 2023; Fox et al., 2023; Martin,

Banga and Taylor, 2023) (PJ10, PJ11, PJ12 & PJ13).

Warming of UK shelf seas is projected to continue over the coming century. Most models suggest an increase of between 0.25°C and 0.4°C per decade. There may be some regional differences. For example, warming is expected to be greatest in the English Channel and North Sea, with smaller increases in the outer UK shelf regions (MCCIP, 2020) (PJ01).

Projections suggest that by 2100, thermal stratification in UK shelf seas will extend in duration by around 2 weeks, and increase in strength, due to changes in air temperature. This may lead to less upward mixing of nutrients and possible reductions in primary productivity (Sharples et al., 2022) (PJ10).

Average annual mean SST values in the Irish Sea region are predicted to increase by 3.11←C (±0.98←C) for the end of the century (2079–2098) under the business-as-usual RCP8.5 scenario. Near bed temperatures are predicted to increase by 2.87←C (±0.97←C) for the same period (Cornes et al., 2023) (PJ01).

Ocean temperatures increases will affect species compositions and abundances. Shifts in food-webs are likely to occur due to changes in predator-prey relationships (Burton et al., 2023; Fox et al., 2023; Martin, Banga and Taylor, 2023) (PJ11 & PJ12).

By the end of the century, conditions could become favourable for warm-water species such as Mediterranean horse mackerel to be present as far north as the middle of the Irish and North Seas (Fox et al., 2023) (PJ13).

For UK shelf waters, models project that annual mean oxygen concentration will decline most strongly in North Sea regions and the Celtic Sea (5.6 to 5.9% by 2100, RCP

8.5) (Mahaffey et al., 2020). This could affect the metabolism, health, and reproduction of many marine organisms, which could have major impacts on ecosystems and commercial fisheries (PJ10).

By 2050, under a high emissions scenario, UK waters will experience marine heatwave conditions 66% of the year, rising to 93% by 2100, up from the current 8% (2000-2019) (Berthou et al., 2024) (PJ01).

Infauna specific:

It has been noted that climate change is likely to impact the benthos in the future. The changes documented in soft-sediment communities in adjacent seas are expected to continue, and probably escalate, in response to the cumulative effects of seawater warming and ocean acidification (Gihwala, 2024) (PJ10-13). Some infauna related examples below: Change to the species dominating crustacean assemblages in the Bristol Channel and the occurrence of previously undocumented species in the western Channel suggest some degree of climate-influence (Birchenough et al., 2013) (PJ13). North Sea infaunal (burrowing) species have shifted their distributions in response to changing sea temperature, however, most species have not been able to keep pace with shifting temperature, meaning that species are subjected to warmer conditions (More and Smale, 2020) (PJ01). Analysis of a 40-year data–series found that small, generally shorter lived, infauna experienced some changes in community structure related to changes in Sea-Surface Temperature (SST), but this affect was dampened because increased food availability meant that temperature induced rises in energy use were counteracted. This was not the case for large-bodied species that experienced increased competition leading to altered community structures (PJ13). This highlights that changes in non-climate drivers may interact with climate change to mediate species – community level responses and that responses may

depend on species life-history traits (for a synthesis see More and Smale, 2020). There is evidence to climate-generated shifts in the zooplankton species composition lead to a mismatch in timing between food availability and the early life history of lesser sandeels (an important species) in the North East Atlantic (North Sea) (PJ11, possibly other climate pressures) (van Deurs et al., 2009).

Climate change was highlighted as a threat in all Large Shallow Inlet and Bay condition assessments (Jackson-Bué et al., 2025). A recent study which looked at vulnerability of Annex I habitats within SACs showed that component biotopes within Large shallow inlets and bays were also mainly assessed as medium vulnerability to changes in sea temperature (52%). Carmarthen Bay and Estuaries SAC had the greatest extent of medium vulnerability Large shallow inlets and bays component biotopes at 71% (Oaten, 2021).

It is difficult to make predictions on temperature trends over the next two Article 17 reporting cycles (12 years). With the limited information available it seems likely that temperatures will rise at a magnitude which associated communities of the a significant proportion of Welsh Large Shallow Inlets and Bays may have a medium sensitivity to over long-time periods. It was also thought that Large Shallow Inlets and Bays would be susceptible to increases in wave exposure if wave exposure increases this is likely to have an impact (relates to PJ04). Climate change could affect storms and waves in the North Atlantic, but natural variability will continue to dominate over the next few decades and past observed trends in storms and waves cannot be directly attributed to climate change because of the high variability and limited understanding of associated mechanisms (Bricheno et al., 2025).

PJ04: Sea-level rise due to climate change (Low, ongoing, Medium, only in the future)

Text carried forward from 2013 and 2019 with updates

As a consequence of climate change: Changes in abiotic conditions, including sea level rise and wave climate are likely to cause the greatest changes in intertidal sediments morphology and dynamism. Natural patterns of erosion and accretion mean that net losses and gains in the extent of this feature can be difficult to quantify. 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) and Jones et al (2011). Recent assessment has shown very significant losses to all intertidal habitat features from anthropogenic structures causing coastal squeeze within both hold the line policy areas and from assets within 'no active intervention" and 'managed retreat" policy areas. Significant natural losses from coastal squeeze associated with high ground have also been predicted within the assessment period (present to 2155) (Oaten et al, 2024). Actual losses for intertidal sediments within the period of the regulation 9a short-term trend are relatively significant. The Assessment of scale of loss for the period 2005-2025 identified a loss of saltmarsh and intertidal mudflat habitats in the order of 444 Ha across Wales (including English side of Severn Estuary). Over this period only about 30Ha of these losses have been compensated for. Although these are only estimates of loss they were based on old (PAG3) sea level rise projects so it can be assumed that the losses are an underestimate as there have subsequently been two UKCP sea level rise revisions. These figures are across Wales, an assessment of the habitat lost within the bay feature is likely a lot less than this and hasn't been calculated but figures indicate a sense of scale of this issue. The National Habitat Creation Programme (NHCP) has been set up to create compensation habitat to offset intertidal habitat loss due to coastal squeeze caused by coastal defences owned and maintained by Risk Management Authorities in Wales

(which includes NRW and Local Authorities) (PJ04).

For intertidal mud and sand flats temperature changes, flooding and increased precipitation (increasing runoff from land) and changes in acidity due to climate change do not currently have a known effect on the feature.

Relevant to PJ06 (low pressure in related sub feature reports – previously considered under PJ04) it was also thought that some sediments and reefs would be susceptible to increases in wave exposure if wave exposure increases. Wave heights are expected to decrease in the mean but experience increased frequency and intensity of extreme events. However, projections imply that more very severe winter storms will cross over the UK. Overall, Climate change could affect storms and waves in the North Atlantic, but natural variability will continue to dominate over the next few decades and past observed trends in storms and waves cannot be directly attributed to climate change because of the high variability and limited understanding of associated mechanisms (Bricheno et al., 2025).

PJ06: Wave exposure changes due to climate change & PJ07: Cyclones, storms, or tornados due to climate change Assessed as low (only in the future) (included in Mud Flats and Sandflats sub feature report as low).

PK02: Mixed source marine water pollution (marine and coastal) (High, ongoing and likely to be in the future)

Text carried forward from 2013 and 2019 with updates

There are an assortment of sources to pollution to the marine environment that are difficult to quantify and apportion. Open coast areas are relatively unpolluted, but several bays adjacent to large catchments have raised levels of nutrients and contaminants. Contaminants in sediments and/or poor water quality is present in several

bays (e.g. Milford Haven Waterway, Conwy Bay, Carmarthen Bay and Swansea Bay) and was highlighted as a threat in condition assessments for all SACs. Water quality contaminants were a reason for failure in all of the assessed SACs for Large Shallow Inlets and Bays and nutrients were also a key reason for failure in Pembrokeshire Marine SAC (e.g. Little & Galperin, 2014; Jackson-Bué, 2025).

Below 'Good' WFD water body assessments tend to reflect related issues. Recent water bodies at less than Good status (including all ecological and chemical elements) represent approximately 55% of Large Shallow Inlet and Bay Feature area; approximately 48.4% of the area represented by metals and/or organic determinand failure (WFD waterbody interim classifications, 2024). Pollution to groundwater also contributes to diffuse nutrient input.

TBT levels are reducing but pressure from use of antifoulants on recreational boats and commercial shipping is still present. Furthermore, long term monitoring of Imposex in the dogwhelk (Nucella lapillus), used as an impact indicator for high levels of TBT, demonstrated a decreasing trend with all 43 sites in Welsh seas reaching low incidence levels by 2014 (Nicolaus and Barry, 2015). There are now no WFD failures for imposex in Welsh Waters.

Contaminant levels are greatest where industry is associated with the bay or adjacent catchment e.g. Milford Haven Waterway & Swansea Bay (WFD Interim Classification, 2024). Sediments adjacent to a capped landfill discharge in Milford Haven Waterway have significantly raised contaminant levels (PAH & metals) (2013 and 2019 Article 17 submission).

There is pressure from chronic input of hydrocarbons in port and recreational harbour areas, especially Milford Haven Waterway, although indications are that hydrocarbon

	contaminant inputs there are decreasing (Little, 2009). Bioaccumulation of contaminants indicates some levels are high enough to cause adverse effects to biota (Langston et al., 2012). There are acute inputs from occasional spills (e.g. Sea Empress) and there remains the potential for further very significant pollution events (carried forward from 2013 Article 17 report). Groundwater contamination from the oil industry (and historical hydrocarbon infrastructure) is present in some limited areas (e.g. Milford Haven Waterway), typically related to infrastructure failures, accidents and historical war-time events (carried forward from 2013 Article 17 report). This pressure/threat for key sub annex I habitat assessed as high/medium (High: NRW Regulation 9a Intertidal Mud and Sand Flat; Medium: Reefs and Sandbanks report submissions). See other related pressure audit text for PE02, PF10 and PA17. PK03: Mixed source air pollution, air-borne pollutants (Low, ongoing and likely to be in the future) Assessed as Low in 2019 Large Shallow Inlet and Bay Report (carried forward without assessment/not reported to JNCC)
8.1: Status of measures	The majority of the most important conservation measures relating to this habitat type have been taken (e.g. improved nutrient regulation, Priority Hazardous Substances Regulation, EIA, HRA & Marine Licence and some fisheries regulations etc), are under investigation (e.g. key water quality related ecological failures) or being planned to some degree. There are still measures needed to be identified, this is in process but is likely to take time due to the complexity and scale of the issues and the dynamic nature of marine ecosystems (i.e. identifying causes of key failures and the development and implementation of measures to mitigate them).

	This is considered to be a low confidence assessment because the ability of some of these measures to fully address known and potential pressures and threats is uncertain and the time scale is also uncertain.
8.2: Main purpose of the measures taken	Selection could also be a or b. The majority of main conservation measures relating to this habitat focus on issues relating to (d). This is considered to be a low confidence assessment because the ability of these measures to fully address known and potential pressures and threats is uncertain.
8.3: Location of the measures taken	Key measures (wider policy regulation, WFD & fisheries controls) are undertaken in general waters, however important measures are taken only in SACs such as HRA and specific fisheries controls.
8.4: Response to the measures	The key issues identified in the pressures and threats and key issues causing unfavourable condition of Bays are generally persistent and long-term in nature. See text in 8.1. There is low confidence in this assessment due to the complexity of the issues and uncertainty of future prospects. Indicated stable due to uncertainty in the timing of measures.
8.5: List of main conservation measures	MA10 Reduce/eliminate marine pollution from agricultural activities (High) & MK01: Reduce impact of mixed source pollution (High): General water quality measures: Key measures which are in place to mitigate water quality related pressure and threats identified in this assessment are mainly driven by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, henceforth referred to as the WFD. The WFD aims to: • maintain the 'High and Good status” of waters,

• prevent any deterioration in the existing status of waters, and

• restore at least to 'Good status” in relation to all waters, unless other objectives have been set.

The mechanism by which this is to be achieved under the WFD is through the adoption and implementation of WFD Assessments, River Basin Management Plans (RBMPs) and Programmes of Measures (PoM) for each of the identified River Basin Districts. Many national measures aim to deal with issues causing WFD coastal and estuarine waterbody failures for ecological and chemical elements. The PoM delivers many of the statutory requirements for other Regulations and associated legislation e.g. Habitats Regulations, UK Marine Strategy, Urban Wastewater Treatment Regulations, Bathing Waters Regulations and Eel Regulations. The PoM can be found on the Water Watch Wales website.

WFD investigations are carried out when WFD classifications indicate a waterbody is failing to meet WFD standards. Investigations are undertaken when an element fails to meet Good status and/or when a waterbody status deteriorates between WFD Cycle classifications (includes deteriorations from High to Good) (does not include interim classifications); however, deterioration investigations are only undertaken when there is high confidence a classification has changed (i.e. quite/very certain confidence in past and present classifications). The goal of investigations is to identify if a failure or deterioration is a true failure/deterioration (Stage 1) and if deemed a true failure/deterioration, a Stage 2 investigation is carried out to identify reasons for not achieving good (RNAGs) or reasons for deterioration (RfDs). These investigations help to then inform actions that can be put in place to address the failures or deteriorations occurring in the water body and bring the water body back up to at least Good status.

Contaminants:

Priority Hazardous Substances are defined under annex 10 of WFD. These are regulated (e.g. restrictions of the use of Mercury) and monitored through various mechanisms.

There are national and international measures in place to prevent use and marketing of PBDEs. Production of PBDEs in Wales stopped in 1996 and use and sales is prohibited. Although still in use, Cypermethrin has been controlled for its main uses.

Industrial emissions have been largely controlled by the Environmental Permitting Regulations (2013). Further legislation under REACH restricts the use of PAHs containing products and separate regulations have reduced PAH content in diesel and tyres. The Clean Air Plan for Wales introduce local and national actions to further reduce PAH emissions to air.

Nutrients:

The impact of nutrients is thought to be high on Large Shallow Inlets and Bays.

The PoM relating to nutrients include implementation of the Water Resources (Control of Agricultural Pollution)(Wales) Regulations 2021 in Wales including: nutrient management planning; sustainable fertiliser applications linked to the requirements of the crop; protection of water from pollution related to when, where and how fertilisers are spread; manure storage standards.

Dŵr Cymru Welsh Water are undertaking source apportionment studies for nutrients entering the marine environment in some Welsh water bodies failing for DIN in AMP8 with the possibility of asset improvements thereafter. Also, the marine WFD Opportunity Catchments project is

aiming to reduce nitrogen loading to the marine environment through measures such as development of riparian buffers. Glastir incentives from the Welsh Government have also been used to deliver water quality improvements. There are also Local Actions in place around Milford Haven to reduce nutrient inputs (Water Watch Wales).

Investigations Overview:

Key failing waterbodies relevant to Large Shallow Inlet and Bays are at different stages of investigation for various elements for 2015 and 2021 WFD classifications. WFD investigations are in process. NRW's ability to assess and investigate WFD failures has vastly improved in recent years due to the development of a small marine WFD investigation team. More progress is expected in the next reporting cycle than the last but the timeline is still uncertain as investigations continue. It is therefore difficult to assess the timeframe of delivery of the measures for WFD water bodies relevant to the large shallow inlet feature or the success of those measures at a feature scale; however, we expect the timescale to be longer term due to the time taken to implement measures and identify / measure improvements in large dynamic marine waterbodies.

This conservation measure relates to pressure PK02 and PA17 and other pressures with water quality elements. Related actions are relevant for large areas of large shallow inlet and bay, therefore, pressure ranked high.

MC05: Adapt/manage fossil energy installation, facilities and operation (Medium)

The abstraction licences are currently being reviewed under the Water Resources Act. Ongoing compliance and operational monitoring is being undertaken. Any new variations or development are considered on a case by case basis.

MC03: Adapt/manage renewable energy installation, facilities and operation (excl. hydropower and abstraction activities) (Medium) & MC06: Reduce impact of service corridors and networks (Medium)

This conservation measure is related to pressure PD06 (which could also be recorded as PD01). All marine renewable energy projects will require consents, which is likely to include a Marine Licence (Pt4 of Marine and Coastal Access Act 2009) and a Section 36 Energy Consent under the Electricity Act and or a Development Consent Order (Planning Act 2008). The consents required depends on the location (e.g. Environmental Impact Assessment, WFD assessment, Habitats Regulations Assessment) of the project and the energy generation thresholds. The Welsh Government have legislated a new Infrastructure Consents (Infrastructure (Wales) Act 2024), however at the time of writing is yet to be enacted. This measure relates to PD06 and was ranked as medium as relates to a small area of bays for now.

Cable Specific: Development of cable laying is required to go through a regulatory process. For all projects such as these a marine licence is required (Marine and Coastal Access Act, 2009). The licence application is determined by NRW. Each application requires an Environmental Impact Assessment and Habitats Regulation Assessment (where within or adjacent to a Natura 2000 site). Based on evidence produced mitigation is agreed and implemented as appropriate. This generally reduces the impact of developments to an acceptable level. Ranked medium because impacts are likely over a small area but relevant to several bays.

ME01: Reduce impact of transport operation and infrastructure (Medium)

Development of shipping infrastructure and dredging is

required to go through a regulatory process. For all projects such as these a marine licence or other permission is required (Marine and Coastal Access Act, 2009). The licence application is determined by NRW. Each application requires Habitats Regulation Assessment (where within or adjacent to a Natura 2000 site). Based on evidence produced mitigation is agreed and implemented as appropriate. This generally reduces the impact of developments to an acceptable level. Ranked Medium because it is relevant to a moderate area (ports, e.g. Milford Haven). This code relates to pressure and threat codes E02 & E03.

MF02: Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities (Medium)

Updated conservation measure

The National Habitat Creation Program has been put in place by the Welsh Government to identify and progress opportunities for managed retreat of the coastline, in order to compensate for predicted losses of intertidal habitats as a result of coastal squeeze. Coastal squeeze occurs where habitats are caught between rising sea-level and man-made structures and are reduced in extent over time. The National Habitat Creation Programme provides compensatory habitat for schemes which maintain or upgrade Local Authority or Natural Resources Wales' assets in line with Hold The Line policies within the Shoreline Management Plans. The National Habitat Creation (NHCP) Programme does not provide compensatory habitat for coastal squeeze losses in relation to third party assets, and these are considered on a case by case basis (Welsh Government, 2018). There is however a limitation on the effectiveness of the NHCP in maintaining coherence of the National Site Network as the offset provision only relates to the point at which a man made structure is improved beyond its current design.

Consequently a large proportion of the coastal squeeze losses within both hold the line and all other SMP2 policies are continuing to cause an impact on the MPA through coastal squeeze process which is assigned to 'general degradation” (Article 6/2 HD). There is no current funding to support direct mitigation of these losses. The scale of loss is now identified as being very significant across Wales (Oaten, 2024).

General regulatory framework for assessment of environmental impacts prior to development, plans and projects (see other related measures). 84.8% of Wales's 'Large Shallow Inlet and Bay' area is an Annex I feature that is protected by Welsh SACs, approximately 9% of this is intertidal habitat (reef or sediment).

The assessment of coastal squeeze at the point of a Habitat Regulation Assessment of the coastal plan or project is undertaken in accordance with 'Assessment of Coastal Squeeze Guidance note Reference number: GN 062”. The period of coastal squeeze assessment is related to the residual life of the asset which is normally 100years.

A voluntary ”no dig” zone was implemented at part of the Gann to reduce the impact of bait digging but it was not adhered to. Partially as a result, the introduction of an Order or byelaw is being explored.

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

This conservation measure relates to pressure and threat PF10. National and international action aims to reduce the effect of marine litter, which has been well publicised as a threat. Note in the description on this measure there is no mention of plastic but this measure was thought to be the best fit.

In the UK, the UK Marine Strategy identifies marine litter as a descriptor of clean seas (Descriptor 10), and requires UK administrations to ensure that 'properties and quantities of marine litter do not cause harm to the coastal and marine environment'. As a Contracting Party to the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, UK government in collaboration with devolved governments is also developing and implementing actions under the OSPAR Regional Action Plan for Marine Litter to 'prevent inputs of and significantly reduce marine litter, including microplastics, to reach levels that do not cause adverse effects to the marine and coastal environment with the ultimate aim of eliminating inputs of litter". The Action Plan has three key themes: actions to reduce land-based sources of marine litter, actions to reduce sea-based sources of marine litter and cross cutting actions.

In Wales, the Welsh National Marine Plan (Welsh Government, 2019) encourages action to reduce litter in the marine environment (ENV_04), and requires developers to consider how to prevent or minimise marine litter in their proposals. The Wales Clean Seas Partnership, part of the United Nations Clean Seas Campaign and Global Partnership on Marine Litter is a multi-stakeholder group which develops and delivers the Marine Litter Action Plan for Wales. Welsh Government funds Keep Wales Tidy and Natural Resources Wales' Fly Tipping Action Wales Programme, which work to enable proper waste management and prevent fly tipping which can be a source of marine litter. In 2021, Welsh Government published the Beyond Recycling Strategy (Welsh Government, 2021), to implement a circular economy in Wales. This encourages proper waste management and commits to phase out single-use plastics which could end up as marine litter. In 2023, the Welsh Government launched the Environmental Protection (Single-use Plastic Products) Act (Welsh Government 2023), which bans the sale and supply of selected single use plastic items, such as plastic cutlers

and straws, many of which are commonly found as marine litter. Future exemptions are likely to also include wet wipes and single use vapes.

In NRW, actions relating to marine litter identified by the actions database (site level) include:

• Direct management is the most frequently identified mechanism for addressing marine litter impacts. This mechanism predominantly refers to action required by Local Authorities (LA) to support and help implement measures to remove litter from beaches (e.g. third party collections and LA beach cleaning), ensuring that approaches are sensitive to features.

• Investigation actions principally relate to improving the evidence base to underpin better management and reduce both sources of marine litter and impacts on features. This includes investigations to develop better understanding of local sources of marine litter and its disposal, and identification or high risk areas for marine litter.

• Targeted education, awareness raising and liaison actions include, for example, developing opportunities to reduce litter at source (locally), including site level awareness.

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

Updated conservation measure

Modification of coastline, estuary and coastal conditions and the associated hydromorphological pressures on the intertidal habitats of the MPA in particular are fairly synonymous with the 'hold the line” policy areas identified in the SMP2. NRWs Coastal Adaptation Programme is now integrated with the National Habitat Creation with a focus on managing the adaptation of hold the line policy areas

subject to particular vulnerability from coastal erosion and rising sea levels. This complex process of assessing the best plan for coastal adaptation and realising opportunities for maintaining the coherence of the National Site Network through marine habitat creation involves developing a portfolio of coastal adaption plans for vulnerable areas around Wales's coastline that have been consulted upon and fully appraised. The projects are managed and delivered by NRWs 'Project and Programme Delivery Team” and typically involve prioritised sites that are evaluated through a five-case business model and due diligence of costs, risks, and benefits, leading to a fully (public and stakeholder consulted) preferred option for sustainable flood risk management. The projects can be delivered in a phased approach governed by available resources, the condition of failing FRM assets and through consultation with Welsh Government (Flood and Coastal Erosion Risk Management) and key stakeholders.

Additional 'mitigation” for impacts on Heavily Modified Water Bodies (HMWBs) through managed realignment and soft engineering or Natural Flood Risk Management also interface with the NHCP and CAP programmes. These also relate to Water Framework Directive drivers for offsetting hydromorphological impacts on the achievement of favourable condition or potential. Habitat creation and its associated tidal exchange into new areas of developing saltmarsh may also support other pressures such as nutrient considerations, as the new habitat will maintain coherence or increase the area of the marine carbon and nutrient cycles.

Dredging and new port projects are covered under ME01.

MG01: Management of professional/commercial fishing, shellfish and seaweed harvesting (incl. restoration of habitats) (High)

Key measures in place to mitigate fisheries related

pressures and threats identified in this assessment are driven by UK and Welsh fisheries legislation.

The UK's fisheries management framework is based on the Fisheries Act 2020 (HM Government, 2020) which sets out the legal framework for managing UK fisheries post EU exit. The Act contains seven key objectives to guide decision making including the sustainability objective, the precautionary objective, the ecosystem objective, and the scientific objective.

The Fisheries Act 2020 requires Fishery Policy Authorities to produce Fishery Management Plans (FMPs). FMPs will set out details for managing specific fish stocks or fisheries at maximum sustainable yield or explain why that has not been possible and what needs to be done to achieve MSY. The Celtic Sea and Western Channel Demersal, Irish Sea Demersal, King Scallop, Whelk, Bass, Crab and Lobster FMPs will all be relevant for assessing and managing the interactions of relevant fishing activities with Large Shallow Inlets and Bays fish and shellfish species in Welsh waters. The FMPs will aim to ensure stocks are fished sustainably in line with the ecosystem objective which will include consideration of impacts on benthic habitats. The plans will be reviewed and if necessary updated every 6 years.

The Marine and Coastal Access Act (MCAA) 2009 (HM Government, 2009) aims to improve management and protection of the UK marine and coastal environment. It has eight key elements, including fisheries management and marine enforcement

The Scallop Fishing (Wales) (No.2) Order 2010 (HM Government, 2010) and The Whelk Fishing Permit (Wales) Order 2021 (Welsh Government 2021a) are both assessed annually for their impact on Welsh Large Shallow Inlets and Bays.

Cockle gathering is managed under the Cockle Fishing

Management and Permitting (Specified Area) (Wales) Order 2024 with annual cockle stock assessments informing TACs.

In general, the impacts from offshore (outside 12nm) fishing on Welsh Large Shallow Inlets and Bays, by non-Welsh boats, in Wales is poorly understood.

The measure is ranked as High, as related pressure and threat in PG01 is ranked as medium and is relevant to a wide area and controls potentially prevent damage to seabed habitats and species communities (e.g. The Scallop Fishing (Wales) (No.2) Order).

MG08: Reduce/eliminate diffuse and point source pollution from marine aquaculture (Medium)

For all projects such as these a Marine Licence or other permissions may be required (Marine and Coastal Access Act, 2009). Marine Licence applications are determined by NRW Marine Licensing Team. Each application requires a Habitats Regulation Assessment to be carried out where there are potential impacts, or a project is within or adjacent, to a Natura 2000 site. Based on evidence produced, if required, mitigation and/or compensation is agreed and implemented as appropriate. The WNMP also contains a series of environmental policies that apply throughout Welsh seas that should help to ensure that all development is sustainable, including ENV_02: Marine Protected Areas. Where Regulating and Several Orders are applied for, this also provides some safeguards to protect Annex I habitats through HRA processes, although these orders are not compulsory. However, the majority of aquaculture developments require multiple permissions (e.g. landowner lease, FHI, possible marine licence) which are subject to HRA if within or near EMS (Welsh Government, 2019).

MI03: Management, control or eradication of other invasive

alien species (Medium)

This conservation measure relates to pressure PI02.

Legislative agreements seek to protect biodiversity, species and habitats, and include provisions requiring measures to prevent the introduction, spread and control of, invasive non-native species, especially those that threaten native or protected species and habitats.

The UK is a signatory to the Ballast Water Convention which aims to prevent the spread of harmful aquatic organisms by establishing standards and procedures for the management and control of ships' ballast water and sediments. These include specific ballast water management standards (e.g. concerning the efficacy of water exchange), the requirement for international vessel traffic to manage ballast water and sediments in accordance with vessel-specific ballast water management plans, and for all such vessel to carry a ballast water record book and an international ballast water management certificate.

The implementation of the Marine Strategy Framework Directive (MSFD) in the UK, through the Marine Strategy Regulations, aims to ensure that INNS introduced by human activities are at levels that 'do not adversely alter the ecosystems'. The strategy sets out indicators for Good Environmental Status (GES) which is defined by 11 Descriptors. Descriptor 2 covers non-indigenous species. Criteria and targets for measuring progress towards GES include 'The number of newly introduced NIS is minimised and where possible reduced to zero' and 'The rate of spread of invasive NIS, as a result of human activities is minimised and reduced where possible'. As there are no dedicated monitoring programmes for the detection of marine NIS introduction and spread in the UK, various monitoring data from statutory bodies is used. In Wales, statutory and ad-hoc monitoring programmes contribute

towards the MSFD INNS evidence baseline, including marine rapid assessment surveys of Welsh marinas carried out most recently in 2023/2024.

Contingency plans are currently being developed for priority marine INNS species not yet established in Wales. Where potentially high impact INNS have been detected historically, innovative approaches to eradication or control have been implemented where appropriate/technically feasible (e.g. Didemnum vexillum at Holyhead Marina). This has recently been supplemented by laboratory trials of eradication of Didemnum vexillum using ultrasound.

The impacts associated with INNS are also recognised as potentially significant anthropogenic pressures through the UK's approach to implementing the Water Framework Directive. Impacts from invasive non-native species are considered as part of the assessment of the ecological status of water bodies and, in general terms, measures are adopted to improve status and address impacts, on a water body by water body basis, where INNS are implicated in a water body failing to achieve its objectives.

At a national level, specific legislation restricts the spread or release of INNS in the wild. Section 14 of the Wildlife and Countryside Act 1981, contains specific provisions relating to the introduction of new species and provides that it is an offence to release or allow to escape into the wild, any animal which is not ordinarily resident in Great Britain, or those listed in Schedule 9. Of the marine species listed under Schedule 9, Crepidula fornicata is of particular relevance to Large Shallow Inlets and Bays. In Wales, anthropogenic activities with the potential to introduce or spread INNS are managed through the implementation of biosecurity risk assessment and management planning under existing regulatory and consenting frameworks. Examples include the marine licensing provisions of the Marine and Coastal Access Act, Habitats Regulations Assessments under the Conservation of Habitats and

Species Regulations 2017 and Sites of the Special Scientific Interest (SSSI) consenting procedures under the Wildlife and Countryside Act 1981.

Natural Resources Wales and the Welsh Government were members of the UK Marine Pathways Group, a coordinated approach to preventing new INNS introductions, early detection and rapid response and containment and long-term control measures. The group produced INNS guidance, voluntary best practice and supported specific Welsh control and eradication projects. This group no longer exists in its current form. However, a UK Marine INNS T&F group has been running since 2023 and has produced a recent paper with recommendations on the management of three pathways for INNS (recreational boating, aquaculture and shipping) presented in spring 2025.

NRW (with APEM) carried out work as part of the Welsh Government funded Nature Networks INNS and Biosecurity project to produce a series of biosecurity action plans which cover protected sites in Wales, pathways and species. These aim to raise awareness of INNS and provide actions for all users to reduce the introduction and spread of INNS in Wales.

MJ02: Implement climate change adaptation measures (Medium)

The UK, including Wales, has implemented various conservation measures to mitigate climate change impacts, focusing on carbon reduction, habitat restoration, and sustainable resource management.

One major initiative is the UK's net-zero by 2050 target, which Wales supports through its Net Zero Wales plan under the Environment (Wales) Act 2016 (HM Government, 2016). This includes decarbonising industries, investing in marine renewables like floating offshore wind farms in the

	Celtic Sea, and restoring natural carbon sinks (Welsh Government, 2021c). There is growing focus on marine and coastal restoration of habitats such as salt marsh, seagrass and native oyster, all of which are important for blue carbon storage. A number of projects to restore these habitats right across Wales, and a further focus on restoration is supported by WG's Programme for Government commitment to put in place targeted programmes of restoration for sea grass and salt marsh. Restoration initiatives also are relevant for other codes. Habitat conservation plays a crucial role in climate mitigation. For example, peatland restoration is a key focus in Wales, as peatlands store vast amounts of carbon. The National Peatland Action Programme aims to restore 600-800 hectares of peatland per year, with projects in Eryri (Snowdonia), Bannau Brycheiniog (Brecon Beacons), and the Cambrian Mountains (NRW, 2022). Similarly, the National Forest for Wales is expanding tree planting to improve carbon sequestration and biodiversity. Wales is also reforming agriculture under the Sustainable Farming Scheme, which rewards farmers for climate-friendly practices like soil conservation and agroforestry. These conservation efforts, combined with emissions reduction policies, contribute to Wales' climate resilience strategy. MK01: Reduce impact of mixed source pollution (High) See above.
9.1:Future trends and prospects of parameters	Range: The occurrence of this habitat is defined by physiographic processes over long timescales. While the physical area of one bay may change (although this is very uncertain) (see 9.1b), the geographic spread and distribution of features is not expected to change within the next 12 years.

	Area: Boundaries for Large Shallow Inlets and Bays are based on physiographic features and are therefore unlikely to change, unless there is substantial shift in geomorphology. Previously unknown was included due to the possibility of the development of a tidal lagoon in Swansea this is now thought less likely. Structure & function: The key issues identified in the pressures and threats and key issues causing unfavourable condition of Bays are generally persistent and long-term in nature. Although some measures are in place to identify causes, mitigate some issues and plan conservation measures this is likely to take place over longer term. There is low confidence in this assessment due to the complexity of the issues and uncertainty of future prospects. Indicated stable due to uncertainty in the timing of measures.
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 stable; (ii) the current Area is approximately equal to 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; ii) short-term trend in area of habitat in good condition is unknown; and iii) expert opinion determines that there are significant issues for this habitat (large proportion of the habitat is in 'not good' condition), and as the short-term trend in area of habitat in good condition is unknown then this habitat

	should be considered as unfavourable-bad under the precautionary principle.
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 good; 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	A difference in approximately 20km2 has been reported from the previous report. This is due to calculation rather than any changes in designation.
11.4: Short-term trend of habitat area within the network; Direction	Boundaries for Large Shallow Inlets and Bays are based on physiographic features and are therefore unlikely to change, unless there is substantial shift in geomorphology. Previously unknown was included due to the possibility of the development of a tidal lagoon in Swansea this is now thought less likely.
11.6: Short-term trend of habitat area in good condition within the network; Direction	The short-term trend in the area of good condition for this feature is unknown. Whilst evidence is available we are unable to assess this field in a meaningful way given current time resources. Key changes are most likely mainly due to updates in knowledge/improved analysis and assessment.
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.