Condition Assessments for the Designated Features of Ardal Cadwraeth Arbennig Glannau Môn: Cors heli / Anglesey Coast: Saltmarsh Special Area of Conservation

Author Names: M. Jackson-Bué, E. Wynter, S. Cuthbertson, and M. Hatton-Ellis.

Author Affiliation: Natural Resources Wales

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Crynodeb Gweithredol

Er mwyn rheoli ein hardaloedd morol gwarchodedig yn effeithiol ac yn gynaliadwy, mae'n hanfodol deall cyflwr eu cynefinoedd a'u rhywogaethau gwarchodedig. Mae gwybod cyflwr nodweddion dynodedig yn caniatáu i ni dargedu rheolaeth ac adnoddau lle mae eu hangen i wella ac adfer cyflwr.

Mae'r adroddiad tystiolaeth hwn, a gyflwynwyd fel rhan o brosiect gwella cyngor cadwraeth forol (IMCA) a ariannwyd gan Lywodraeth Cymru, yn cyflwyno canfyddiadau asesiadau cyflwr Cyfoeth Naturiol Cymru ar gyfer Ardal Cadwraeth Arbennig (ACA) Glannau Môn: Cors heli. Mae adran un yn rhoi trosolwg o'r broses asesu ac mae adran dau yn rhoi disgrifiad o'r ACA a'i nodweddion.

Mae'r asesiadau'n seiliedig ar y dystiolaeth orau a oedd ar gael ar y pryd (e.e. 2024). Adroddir canlyniadau asesiadau gyda hyder cysylltiedig yn y casgliad. Gellir dod o hyd i esboniadau manwl o'r rhesymeg y tu ôl i gasgliadau, ac unrhyw resymau dros fethu, yn yr asesiad cyflwr llawn yn Adran 3. Gellir dod o hyd i adroddiad ar y broses asesu a ddefnyddiwyd yn adroddiad terfynol IMCA.

Crynodeb o asesiadau cyflwr ar gyfer nodweddion dynodedig ACA Glannau Môn: Cors heli.

Nodweddion ACA	Asesiad cyflwr	Hyder yn yr asesiad
Salicornia a phlanhigion unflwydd eraill sy'n cytrefu llaid a thywod	Ffafriol	Isel
Dolydd ar forfeydd arfordir y gorllewin *Glauco-Puccinellietalia maritimae*	Ffafriol	Canolig
Aberoedd	Anffafriol	Isel
Gwastadeddau llaid neu dywod nas gorchuddir gan y môr ar lanw isel	Anffafriol	Isel

Executive summary

To manage our marine protected areas effectively and sustainably it is vital to understand the condition of their protected habitats and species. Knowing the condition of designated features allows management and resources to be targeted where it is needed to improve and restore condition.

This evidence report, which was delivered as part of the Welsh Government funded improving marine conservation advice (IMCA) project, presents the findings of NRW's condition assessments for the designated features of the Anglesey Coast: Saltmarsh Special Area of Conservation (SAC). Section one gives an overview of the assessment process and section two provides a description of the SAC and its features.

The assessments are based on the best evidence available at the time (e.g. 2024). Assessment outcomes are reported with an associated confidence in the conclusion. Detailed explanations of the rationale behind conclusions, and any reasons for failure, can be found in the full condition assessment in Section 3. A report on the assessment process used can be found in the IMCA final report.

Summary of condition assessments for the designated features of Anglesey Coast: Saltmarsh SAC.

Feature	Condition assessment	Confidence in assessment
Salicornia and other annuals colonising mud and sand	Favourable	Low
Atlantic salt meadows *Glauco-Puccinellietalia maritimae*	Favourable	Medium
Estuaries	Unfavourable	Low
Mudflats and sandflats not covered by seawater at low tide	Unfavourable	Low

1.   Introduction

It is important for NRW to understand the condition of designated features in marine protected areas (MPAs) to allow NRW to prioritise management actions and advise on activity in the marine environment.

Having robust, evidence-based assessments of feature condition will ultimately lead to better protection through better management. The improvements in condition brought about by implementing targeted management will ultimately improve the resilience of Wales' marine ecosystems. As MPAs in Wales cover extensive areas of sea and coast, it can be challenging and resource intensive to monitor them. This can make thorough assessments of feature condition difficult. The process used for these condition assessments builds on work undertaken to produce indicative condition assessments published in 2018.

The 2018 indicative assessments used all available data and expert judgement to assess features using a workshop approach with internal NRW specialists. The new full assessment process, which has been delivered through the Welsh Government funded improving marine conservation advice (IMCA) project, has been improved by using carefully chosen performance indicators judged to be the most appropriate to assess condition (see section 3). The best available evidence has been used to conduct the assessments. Due to the differences in assessment methods between these full assessments and the indicative condition assessments, the results are not directly comparable.

1.1.   Assessment process

Marine feature condition assessments in NRW consist of selecting performance indicators for the feature, gathering the best available evidence to assess those indicators and conducting the assessment.

Performance indicators have targets which have a primary, secondary or tertiary weighting. Failure of a primary target will mean the feature is classified as unfavourable, on a 'one out all out' basis. If all primary targets pass but two secondary targets fail, the feature would also be classified as unfavourable. Likewise, if all primary and secondary targets pass but three tertiary targets fail, the feature will also be unfavourable. Condition assessment outcomes are not strictly determined by target weightings and are also subject to expert judgement.

Each indicator result has an associated confidence which is determined by the quality and age of the evidence along with the confidence in the indicator itself and what it is telling us about condition of the feature. The confidence in the overall assessment is derived from the confidence in each target pass or failure, as well as expert judgment/ assessor consensus.

Each feature condition assessment will also identify reasons for indicator failure where known and any known threats to feature condition.

Table 1 summarises the steps taken in marine feature condition assessments. Details on the full condition assessment process, including indicator selection and target weighting can be found in the IMCA final report.

Table 1. The main steps of the marine feature condition assessment process.

Assessment Step	Process
Step 1: Preparation and evidence gathering.	Prepare site information. Source relevant evidence and any previous assessments. Evaluate quality of evidence according to suitability for use in assessments and carry out any analysis required.
Step 2: Indicator assessment.	A range of NRW specialists use all available evidence to assess the performance indicators and targets using a pass, fail or unknown. Record findings in the condition assessment form. Provide a confidence score for each target conclusion.
Step 3: Feature level assessments.	Combining the results from the assessment of feature indicators to provide an overall assessment of condition at the feature level.
Step 3.5. Complex features.	If the feature is a complex feature (i.e., estuaries or large shallow inlets and bays) consider the results of any nested feature assessments within the overall complex feature assessment.
Step 4: Condition pressures and threats.	Use the evidence gathered and information on management and activities to determine threats and pressures on feature condition.
Step 5: Finalise the assessments.	Ensure all required fields in the assessment have been completed and all assessed targets have an associated confidence. Circulate the reports to the relevant NRW specialists for review and comment. After issues have been resolved, the assessments will be signed off by the project task and finish group.
Step 6: Publish the assessments.	After signing off, the assessments will be published on the NRW website, and stakeholders and internal staff notified. Assessments are then ready to use by internal and external parties.

2. SAC description

The ardal cadwraeth arbennig Glannau Môn. Cors heli / Anglesey Coast: Saltmarsh has extensive areas of ungrazed saltmarsh, with a good range of typical saltmarsh plants. Large areas of glasswort occur on Malltraeth Sands in the Cefni estuary. In the Braint estuary vegetation is characterised by unusually large amounts of greater sea-spurrey. Below the saltmarsh there are extensive mud and sand flats which are important feeding areas for migratory waders and wildfowl.

The site was designated in 2004 under Article 4.2 of the Conservation of Natural Habitats and of Wild Fauna and Flora Directive (92/42/EEC) for five habitat features under Annex I. It is one of the best areas in the UK for the following features:

- *Salicornia* and other annuals colonising mud and sand (Abbreviated to *Salicornia)*
- Atlantic salt meadows *Glauco-Puccinellietalia maritimae* (Abbreviated to ASM)

And supports a significant presence of:

- Estuaries
- Mudflats and sandflats not covered by seawater at low tide (abbreviated to mudflats and sandflats)

Figure 1 is a map of the location of the designated features within Anglesey Coast: Saltmarsh SAC. The feature maps in this document are for illustrative purposes only. Detailed maps for the features in Wales can be found on Data Map Wales.

More information on the SAC and its features can be found in NRW's conservation advice for the site on our website.

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Figure 1. Map of the designated features of the Anglesey Coast: Saltmarsh SAC.
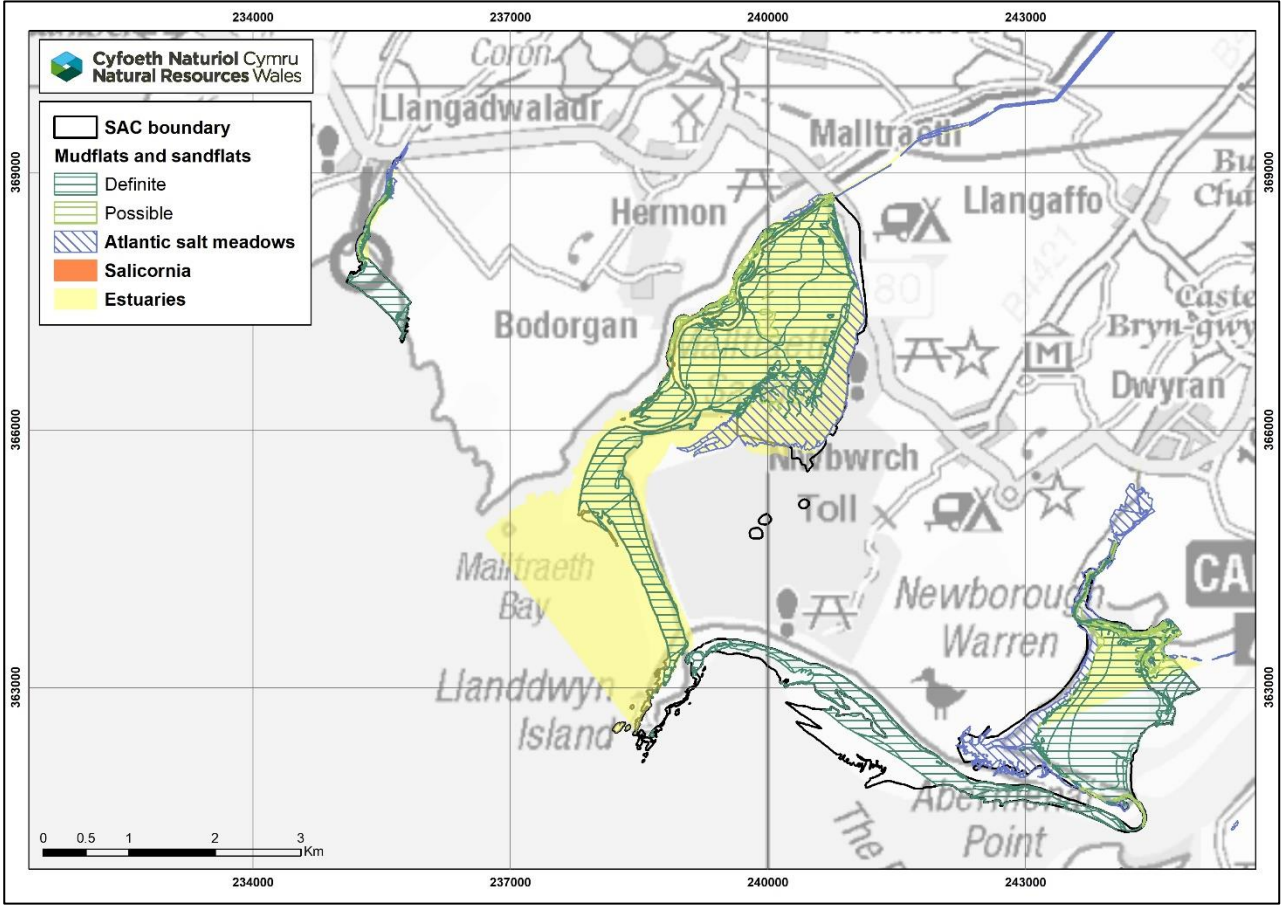
3. Feature condition assessments for Anglesey Coast: Saltmarsh SAC

This section contains assessments for the following designated features in Anglesey Coast: Saltmarsh SAC:

- *Salicornia* and other annuals colonising mud and sand
- Atlantic salt meadows *Glauco-Puccinellietalia maritimae*
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide

Each feature has been assessed against their own performance indicators using all available evidence. The performance indicators were assessed using a combination of data from NRW Habitats Regulations monitoring, Water Framework Directive (WFD) Regulations 2017 (WFD Regulations) monitoring, commissioned evidence reports, scientific literature, plan and project assessments, external monitoring databases (e.g. National Biodiversity Network) and expert judgement. The outcome of the assessment and reasons for failure are discussed in more detail in the sections below.

In these condition assessments, the WFD 2024 cycle 3 interim classification was the default information used for water quality, however other earlier cycles were referenced, as follows:

- 2009 cycle 1 classification
- 2015 cycle 2 classification
- 2018 cycle 2 interim classification
- 2021 cycle 3 classification

In the WFD classification, results are rolled forward from previous assessments where there is no new monitoring data to provide a new classification. It is used to gap fill and provide a more complete classification. A decision was made to limit roll forward to six years which has been applied to the 2024 cycle 3 interim classification.

Additional information on water quality can be found in the IMCA final report.

3.1. *Salicornia* condition assessment

The *Salicornia* feature in Anglesey Coast: Saltmarsh SAC includes *Salicornia* from the Ffraw, Braint and Cefni estuaries (Figure 2). The *Salicornia* feature has been assessed against the performance indicators and an overall condition was assigned for the feature.

Figure 2. Map of the *Salicornia* feature in Anglesey Coast: Saltmarsh SAC.
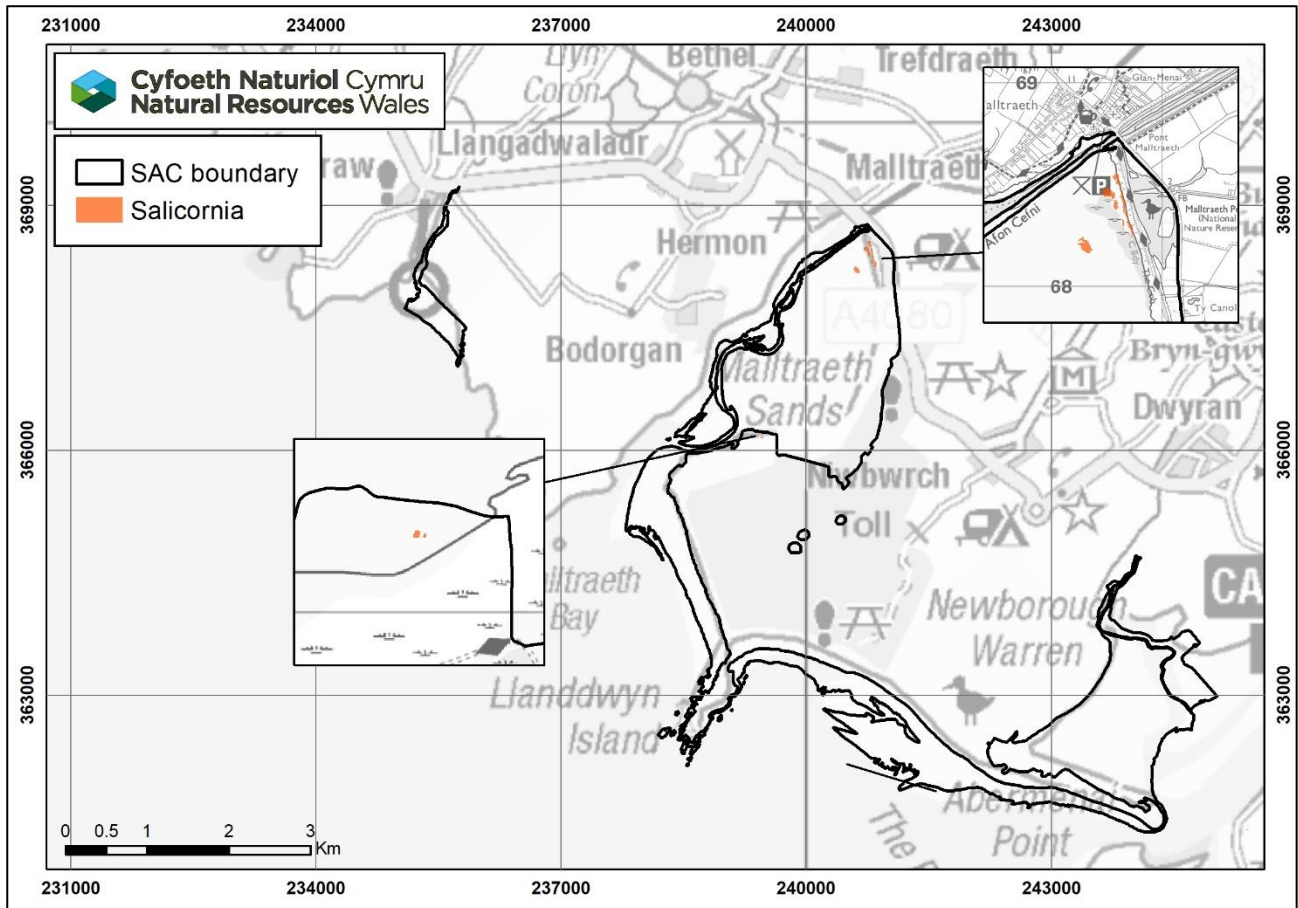
Table 2 has a summary of the assessment outcome against each performance indicator. The outcomes and any reasons for failure are discussed in more detail in the sections below.

Table 2. Condition assessment of the *Salicornia* feature in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting (see Section 1.1).

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Feature extent	The extent of *Salicornia* within the SAC should be stable or increasing, allowing for natural change and variation. (P)	• The baseline extent of *Salicornia* in Anglesey Coast SAC has been measured as 4.19 ha (1990-2003). • There is no current extent estimate as no up to date mapping of *Salicornia* exists. • There is no evidence to indicate a genuine change in extent of *Salicornia* and the extent of the adjacent Atlantic salt meadows (ASM) feature was maintained. • As there are limited recent data, this indicator was assessed as unknown.	**Unknown**	N/A
Distribution of feature	Maintain the distribution of *Salicornia* throughout the SAC, allowing for natural change and variation. (P)	• *Salicornia* is likely still present in the two defined sectors but due to its pioneer nature the distribution is variable. • There is no evidence to indicate a genuine change in range of *Salicornia.* • As there are limited recent data, this indicator was assessed as unknown.	**Unknown**	N/A

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Physical structure: creeks and pans	Maintain the expected patterns of creeks and pans throughout the SAC, allowing for natural change and variation (P). Artificial drainage channels adversely affecting hydrology are absent or rare. (P)	• There are no anthropogenic impacts known to have significantly affected the creeks and pans in the *Salicornia* feature since SAC designation. • There are currently no known artificial drainage channels that would adversely affect the hydrology within the saltmarsh. • As the saltmarsh in the SAC is relatively small, any significant impact would likely be noticed, therefore the confidence in the pass is high.	**Pass**	High
Hydrodynamic and sediment transport processes	Maintain hydrodynamic and sediment transport processes, including connectivity: allowing for natural variation and change. (T)	• There are currently no anthropogenic impacts known to be significantly affecting the hydrodynamic and sediment transport processes. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium
Topography of the feature	No significant anthropogenic impacts to the small or large scale topography of the *Salicornia*. (P)	• There are currently no anthropogenic impacts known to be significantly affecting the topography of the *Salicornia* feature. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: contaminants	Water column contaminants not to exceed the environmental quality standards (EQS). (T)	• Two of the three WFD waterbodies were not classified as the chemicals have not been assessed within the last six years (Cefni and Braint). Combined, these waterbodies overlap with 47% of the feature. • The other WFD waterbody has a pass for chemicals, however all chemical classifications were rolled forward from the 2018 cycle 2 interim classification (Menai Strait). This waterbody overlaps with 32% of the *Salicornia* feature. • Confidence is low due to the unclassified waterbodies and the rolled forward classifications; and as the WFD water quality sampling is not focused on areas within the *Salicornia* feature.	**Pass**	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: nutrients (dissolved inorganic nitrogen - DIN only)	The WFD classification achieved for winter DIN should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (T)	• One of the three overlapping WFD waterbodies was classified with a High status for DIN in the 2024 cycle 3 interim classification (Menai Strait). This waterbody overlaps with 32% of the feature. • One WFD waterbody was classified as Good status (Cefni). However, the confidence of the classification was uncertain. This waterbody was Moderate status for DIN in the 2021 cycle 3 classification. The reported improvement may be due to the different methodologies used for DIN classification. It is not certain if there has been a true improvement in the DIN levels. This waterbody overlaps with 29% of the feature. • The other WFD waterbody was classified with a Poor status (Braint). It overlaps with 18% of the feature. • Confidence is low as there is uncertainty in the Cefni waterbody classification, and as the WFD water quality sampling is not focused on areas within the *Salicornia* feature.	**Fail**	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: opportunistic macroalgae	The WFD classification achieved for opportunistic macroalgae should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (S)	• One of the three overlapping WFD waterbodies was classified with High status for the opportunistic macroalgae WFD element in the 2024 cycle 3 interim classification (Cefni). This waterbody overlaps with 29% of the *Salicornia* feature. • One WFD waterbody was not classified for the opportunistic macroalgae WFD element (Menai Strait). This waterbody overlaps with 32% of the feature. • The other WFD waterbody was classified with a Moderate status (Braint). It overlaps with 18% of the feature. • Confidence is low as the WFD water quality sampling is not focused on areas within the *Salicornia* feature, and because the failing waterbody overlaps with a comparatively small proportion of the feature.	**Fail**	Low
Air quality	Nitrogen deposition should not exceed the critical load range of 20-30 kg N per ha^{-1} per year. (S)	• Nitrogen deposition within the SAC (where data were available) was under 12 kg N per ha per year for all saltmarshes and did not exceed the critical load on average (UK air pollution information system (APIS)). • Confidence is high as the recorded nitrogen deposition is below the lower range of the critical load.	**Pass**	High
Vegetation structure: sward height	Maintain the expected structural variation within the sward height: allowing for natural change and variation. (P)	• There is no evidence of major grazing impact with the saltmarsh therefore the target was met. • Overgrazing is less likely to occur in *Salicornia* as sheep appear to find *Salicornia* unpalatable. • Confidence is high as this feature is in a National Nature Reserve and therefore it is well-maintained.	**Pass**	High

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Vegetation structure: Zonation of vegetation	Maintain the expected range of saltmarsh zonation for the SAC, allowing for natural change and variation. (P)	• The *Salicornia* mapping is out of date and of poor quality and *Salicornia* is difficult to assess using aerial photography. This indicator was therefore assessed as unknown.	**Unknown**	N/A
Invasive non-native species (INNS)	Spread and impact of INNS caused by human activities should not adversely affect the condition of the feature. (P)	• There is limited evidence of INNS presence within the *Salicornia* feature. • Confidence is medium as the spread and impacts of any INNS present within the SAC are not well understood, and there have been no targeted surveys of NNS within the *Salicornia* feature.	**Pass**	Medium
Non-native species (NNS)	No increase in the number of introduced NNS by human activities. (T)	• There are no known records of NNS within the *Salicornia* feature. • Confidence is medium as there are no targeted surveys for NNS within the *Salicornia* feature.	**Pass**	Medium

Assessment conclusions

The *Salicornia* feature in Anglesey Coast: Saltmarsh SAC has been assessed as being in **favourable** condition (low confidence). Overall, the absence of any significant anthropogenic impact on the feature has contributed to this favourable assessment outcome. There were two indicators with failing targets (Table 3). There were also limited or absent data for five key indicators to inform on the condition of the feature (see evidence gaps). This has reduced the confidence in the assessment conclusion. Further investigation is needed to better understand all of the indicator failures to be able to identify management options.

A summary of the assessment can be seen in (Table 3) with more detail on each performance indicator, and any reasons for failure, provided in the sections below.

Table 3. Summary of the condition assessment for the *Salicornia* feature in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting.

Feature	Overall Condition Assessment	Indicator failures	Reason for indicator failure	Threats to condition
Salicornia	**Favourable (low confidence)**	Water quality: opportunistic macroalgae (S) Water quality: nutrients (DIN only) (T)	• There has been opportunistic macroalgae growth in the Braint waterbody. • High nutrient levels have been recorded in the Cefni and Braint waterbodies.	• INNS • Water quality: contaminants • Climate change

Detailed assessment information

Extent and distribution

The baseline extent of *Salicornia* in Anglesey Coast SAC has been measured as 4.19 ha (1990-2003). The current extent of *Salicornia* cannot be calculated as there is no up to date mapping. The extent and distribution of the feature indicators have therefore been assessed as unknown due to a lack of evidence. *Salicornia* is likely still present in the two defined sectors but due to its pioneer nature the distribution is variable. There is no evidence to indicate a genuine change in extent or range of *Salicornia* in Wales since 2013, nor is one considered likely to have occurred. In addition, the extent of the adjacent Atlantic salt meadows (ASM) feature was maintained. However, the lack of data resulted in the distribution and extent of habitats indicator not being assessed. These are key indicators to inform on the condition of the feature and the lack of data has influenced the overall confidence in the assessment.

Physical structure

The assessment of this indicator for the *Salicornia* feature has been based on the outcomes of the ASM feature assessment by proxy (see Section 3.2). There are no anthropogenic activities known to have significantly affected the creeks and pans in the saltmarsh since designation and no known artificial drainage channels that would adversely affect the hydrology within the saltmarsh. The physical structure (creeks and pans) indicator therefore passed its target. The assessment of this indicator was based on expert judgement. There is no evidence of any significant incidents affecting the physical structure in recent years. As the saltmarsh within the SAC is relatively small, any significant impact to the saltmarsh would likely be noticed. For these reasons, the confidence in the indicator pass is high. The *Salicornia* extent in this SAC is smaller compared to other SACs therefore it is possible to be more confident that there are minimal impacts.

Hydrodynamic processes and topography

The hydrodynamic and sediment transport processes, and the topography of the feature indicators were assessed as passing their targets as currently there are no known anthropogenic activities that would have significantly altered these aspects. This assessment was based on expert judgement and knowledge of assessments of plans and projects in the SAC which has reduced the confidence in the assessment to medium, as it is difficult to be certain of impacts in the absence of data. In future, Lidar data could potentially be used to quantify changes in topography.

Water and air quality

It has been estimated that approximately 78% of the *Salicornia* feature within the SAC falls within three WFD waterbodies. As there is no up to date mapping of *Salicornia* this overlap figure may not be completely accurate. Due to this and as the WFD water quality sampling

is not focused on areas close to the *Salicornia* feature, the confidence has been reduced in all of the relevant water quality assessments.

Contaminants

The contaminants indicator met the target as one WFD waterbody has a pass for chemicals in the 2024 cycle 3 interim classification. This waterbody, Menai Strait, overlaps with 32% of the *Salicornia* feature. The chemical classifications for this waterbody were rolled forward from the 2018 cycle 2 interim classification. This reduced the confidence in the pass. The confidence was further reduced to low as the other two WFD waterbodies were not classified as the chemicals have not been assessed within the last six years. Combined, these waterbodies overlap with 47% of the feature. The impact of contaminants on the feature are not fully understood. The target weighting of the indicator is tertiary to reflect this.

Nutrients (dissolved inorganic nitrogen - DIN only) and opportunistic macroalgae

The Cefni waterbody was classified with a Good status for the DIN element in the 2024 cycle 3 interim classification. This is an improvement from the 2021 cycle 3 classification of Moderate status. However, the confidence in the 2024 Good status classification is uncertain (confidence of Good or better classification: 55%, confidence of Moderate or worse classification: 45%). The 2021 and 2024 DIN classifications used different methodologies due to the classification process. There has been an improvement in the DIN values recorded between the classifications, however the confidence of the improvement in class for this waterbody is uncertain. The 2021 WFD investigation report (Jones, 2021) for this waterbody confirmed the DIN failure in the 2021 cycle 3 classification, but found that there has not been a biological response to the elevated nutrients. This waterbody overlaps with a large proportion of the feature (29%). The Braint waterbody was classified with Poor status in the 2024 cycle 3 interim classification. This waterbody overlaps with 18% of the *Salicornia* feature. The Menai Strait waterbody was classified with a High status for DIN, however the sampling locations were not in close proximity to the *Salicornia* feature in the SAC.

The nutrients indicator (DIN only) failed to meet the target due to the issues with DIN in the Cefni and Braint waterbodies. The confidence was reduced to low as the Cefni waterbody was classified as Good status in the 2024 cycle 3 interim classification but with uncertainty in this classification. In addition, because the WFD water quality sampling is not focused on areas within the *Salicornia* feature. The nutrients indicator (DIN only) was also given a tertiary weighting as the effects of high nutrient levels on the *Salicornia* feature are not fully understood.

The opportunistic macroalgae indicator was assessed as failing due to the Moderate status classification for this biological element in the Braint waterbody in the 2024 cycle 3 interim classification. One WFD waterbody was classified with a High status for the opportunistic macroalgae element in the 2024 cycle 3 interim classification. This waterbody, Cefni, overlaps with 29% of the feature. One WFD waterbody, Menai Strait, was not classified for the element. Some WFD waterbodies are not assessed for opportunistic macroalgae as they do not have suitable substratum (i.e. areas of intertidal habitat for opportunistic macroalgal growth). A low confidence was attributed to this failing indicator as the WFD water quality sampling is not focused on areas within the *Salicornia* feature, and because the failing waterbody overlaps with a comparatively small proportion of the feature.

Air quality

High levels of nitrogen (N) deposition from the atmosphere can have detrimental impact on saltmarsh since they are nitrogen limited. The nitrogen deposition within the SAC, where data were available, was under 12 kg N per ha per year for all saltmarshes and therefore did not exceed the critical load of 20 kg N per ha per year (UK air pollution information system (APIS)), resulting in this indicator passing with high confidence.

Vegetation structure

No major grazing issues were identified within the saltmarsh in the SAC. The confidence for the sward height indicator is high as this feature is in a National Nature Reserve and therefore it is well-maintained. In addition, grazing is less likely to occur within the *Salicornia* areas as sheep appear to find *Salicornia* unpalatable

The zonation of vegetation indicator has been assessed as unknown. *Salicornia* is difficult to assess by aerial imagery as its density can be sparse. True extent measurement is unrealistic with this sampling technique. Further investigation with ground truthing evidence will be needed to adequately assess the extent of *Salicornia* in future.

Invasive non-native species

The saline conditions of saltmarshes prevent the common terrestrial non-native species (NNS) in Wales becoming established. There are no known records of NNS within the *Salicornia* feature in the Anglesey Coast: Saltmarsh SAC, resulting in both the primary and tertiary targets for the INNS and NNS indicators to be met.

The red seaweed worm wart *Gracillaria vermiculophylla,* a species native to Vietnam and the West Pacific coast, was recorded for the first time in 2022 in nearby mudflats and sandflats habitat in the Malltraeth estuary. Whether it is present within the *Salicornia* feature is unclear but there is no evidence to suggest that it could negatively impact *Salicornia*. More research is required to understand whether it would be detrimental to *Salicornia*, where present.

Both INNS and NNS targets passed with a medium confidence as there have been no targeted NNS surveys within *Salicornia*, which would be required to fully understand the presence and impacts of any NNS species within the *Salicornia* feature.

Reasons for target failure

The *Salicornia* feature in Anglesey Coast: Saltmarsh SAC has been assessed as being in **favourable** condition. However, one secondary target and one tertiary target failed to be met and need to be kept under review.

Water quality: opportunistic macroalgae

This indicator target has a secondary weighting. The Braint waterbody was classified with a Moderate status for the opportunistic macroalgae biological element in the 2024 cycle 3 interim classification. There are excessive levels of algae in the intertidal area which

suggests that nutrient enrichment is causing elevated growth in these species. The WFD investigation in this waterbody is ongoing.

Water quality: nutrients (DIN only)

This indicator target has a tertiary weighting. One of the WFD waterbodies that overlaps with the feature, the Braint, was classified with a failing status for the DIN element in the 2024 cycle 3 interim classification. The WFD investigation of the failures in this waterbody is ongoing, but has confirmed the failure in the DIN classifications at stage 1 (Borrowdale and Moore, in draft). Stage 2 of the investigations to identify potential reasons for failure have not yet been completed.

The Cefni waterbody, whilst classified as Good in the 2024 cycle 3 interim classification, remained close to the failure threshold. This waterbody was Moderate status in the 2021 cycle 3 classification. Different methodologies were used for the assessment of the DIN in the 2021 and 2024 classification, therefore there is uncertainty that there has been a genuine improvement in class. The 2021 WFD investigation report for the Cefni waterbody confirmed the DIN failure, but found that there has not been a biological response to the elevated nutrients (Jones, 2021). It was concluded that the major input of nutrients is likely to be derived from diffuse sources associated with agriculture and rural land management, and point sources from the water industry (Jones, 2021).

Threats to condition

Part of the condition assessment is to identify threats to the condition of the *Salicornia* feature. A threat is defined as an activity that is currently not impacting condition but has the potential to do so over the next reporting cycle, if activity levels increase or are unmanaged. It is important to identify these threats to be able to put pre-emptive management in place to prevent declines in condition. The threats to the condition of the *Salicornia* feature in Anglesey Coast: Saltmarsh SAC are stated below.

Invasive non-native species

G. vermiculophylla has the capacity to smother *Salicornia* plants, reducing the density of *Salicornia*. At high densities, this red seaweed could block recruitment of *Salicornia* and other angiosperms and turn the sediments anoxic, reducing their capacity to support saltmarsh plants and animals and change the sedimentation regime (increase sedimentation of muds), altering the topography of the sediment flats / saltmarsh. This seaweed has been recorded in nearby mudflat and sandflat habitats. *Salicornia* is likely to be more at risk than the ASM feature. More research is required to understand whether the species would be detrimental to *Salicornia*, and if it is present in areas within the *Salicornia* feature.

Further INNS were identified as potential threats to the UK and were listed in the latest horizon scanning exercise (Roy et al., 2019). There is a high likelihood for some of these species to be found in Wales in the future. This SAC could be at risk since there are a number of possible pathways of introduction. Further information on introduction pathways can be found on the GB non-native species secretariat website.

Water quality: contaminants

There is the potential for unregulated contaminants (such as Per- and polyfluoroalkyl substances (PFAS)) to increase.

Some persistent chemicals are not measured in every WFD waterbody, and some of the relevant WFD waterbodies have not been classified for any chemicals.

Climate change

It is not yet clear what pressures we will see from climate change at the SAC level or how different pressures will counter act each other. However, threats from climate change may include (Gihwala et al., 2024; Oaten et al., 2024):

- Sea level rise, leading to coastal squeeze and loss of extent.
- Changes in air temperature.
- Increases in wave exposure.
- Changes in species distribution.

Evidence gaps

There are gaps in the current evidence that NRW feel are needed to be filled to fully understand condition in this feature.

Listed below (Table 4) are current indicators that were either assessed as unknown, not assessed, or assessed with a lower confidence. This was due to either limited data availability, outdated data, or a lack of information. Some indicators are not currently monitored but should be ideally considered in future condition assessments.

Table 4. Evidence gaps for the *Salicornia* feature in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting (see Section 1.1).

Indicator	Assessed status	Comments
Feature extent (P); distribution of feature (P); vegetation structure: zonation of vegetation (P)	Unknown	• The *Salicornia* mapping is out of date and of poor quality. *Salicornia* is difficult to assess using aerial photography. More detailed mapping, possibly using drones, in combination with ground truthing is required.
Distribution and extent of habitats and communities (P)	Not assessed	• There is a lack of information on the distribution and extent of habitats and communities for *Salicornia*. More detailed mapping, possibly using drones, in combination with ground truthing is required.

Indicator	Assessed status	Comments
Topography of the feature (P)	Medium confidence (proxy data used)	• The topography of the *Salicornia* feature is not well monitored. Repeat Lidar surveys taken at mean low water springs for all saltmarshes within the SAC are required.
Attributes of local distinctiveness (P)	Not assessed	• There is a lack of information on the named distinctive elements of the *Salicornia* feature. Additional fieldwork would be required to assess this indicator. For further information on what is locally distinctive see relevant Regulation 37 advice packages.
Sediment quality: contaminants (T)	Not assessed	• Currently, there is no sediment monitoring within the *Salicornia* feature.
Hydrodynamic and sediment transport processes (T)	Medium confidence (proxy data used)	• The hydrodynamic regime of the *Salicornia* feature is not currently monitored.

3.2. Atlantic salt meadows condition assessment

The Atlantic salt meadows (ASM) feature, also known as saltmarsh, in Anglesey Coast: Saltmarsh SAC includes saltmarshes from the Ffraw, Braint and Cefni estuaries (Figure 3). The ASM feature has been assessed against the performance indicators and an overall condition was assigned for the feature.

Figure 3. Map of the ASM feature in Anglesey Coast: Saltmarsh SAC.
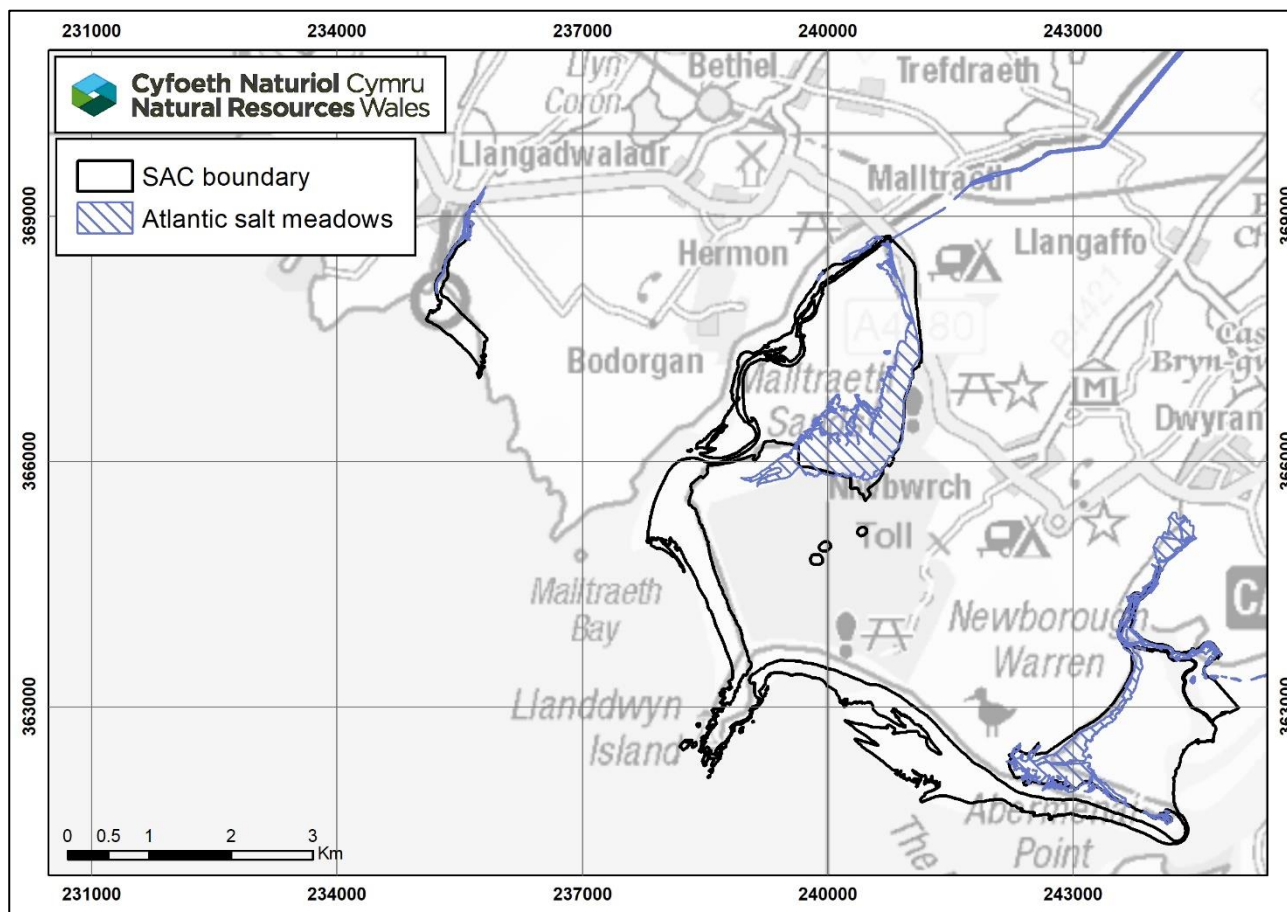
Table 5 has a summary of the assessment outcome against each performance indicator. The outcomes and any reasons for failure are discussed in more detail in the sections below.

Table 5. Condition assessment of the ASM feature in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting (see Section 1.1).

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Feature extent	The extent of the saltmarsh within the SAC should be stable or increasing, allowing for natural change and variation. (P)	• Between 2000 and 2018-2021, there has been a gain of 24.87 ha (16%) of saltmarsh extent. • The mapping is based on high quality imagery, however the changes in extent are indicative only, as there has been no ground truthing. Therefore the confidence associated with the pass is medium.	**Pass**	Medium
Distribution of feature	Maintain the distribution of saltmarsh throughout the SAC, allowing for natural change and variation. No significant loss from any of the defined sectors. Significant is defined as loss from any sector not to exceed 20%. (P)	• There has been no significant loss of saltmarsh extent in any of the defined sectors. • The mapping is based on high quality imagery, however the changes in extent are indicative only, as there has been no ground truthing. Therefore the confidence associated with the pass is medium.	**Pass**	Medium
Distribution and extent of habitats and communities	Maintain the distribution and extent of saltmarsh habitats and communities, allowing for natural change. (P)	• The available NVC maps date from 1998 and are too old to use for an assessment of distribution and extent.	**Unknown**	N/A

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Physical structure: creeks and pans	Maintain the expected patterns of creeks and pans throughout the SAC, allowing for natural change and variation (P). Artificial drainage channels adversely affecting hydrology are absent or rare. (P)	• There are no anthropogenic impacts known to have significantly affected the creeks and pans in the saltmarsh since SAC designation. • There are currently no known artificial drainage channels that would adversely affect the hydrology within the saltmarsh. • As the saltmarsh in the SAC is relatively small, any significant impact would likely be noticed, therefore the confidence in the pass is high.	**Pass**	High
Hydrodynamic and sediment transport processes	Maintain hydrodynamic and sediment transport processes, including connectivity, allowing for natural variation and change. (T)	• There are currently no anthropogenic impacts known to be significantly affecting the hydrodynamic and sediment transport processes. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium
Topography of the feature	No significant anthropogenic impacts to the small or large scale topography of the saltmarsh. (P)	• There are currently no anthropogenic impacts known to be significantly affecting the topography of the saltmarsh. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: contaminants	Water column contaminants not to exceed the EQS. (T)	• Three of the four overlapping WFD waterbodies were not classified as the chemicals have not been assessed within the last six years (Cefni, Braint and Ffraw). Combined, these waterbodies overlap with 23% of the feature. • The other WFD waterbody has a pass for chemicals, however all chemical classifications were rolled forward from the 2018 cycle 2 interim classification (Menai Strait). This waterbody overlaps with 16% of the ASM feature. • Confidence is to low due to the unclassified waterbodies and the rolled forward classifications; and as the WFD water quality sampling is not focused on saltmarshes.	**Pass**	Low
Water quality: nutrients (DIN only)	The WFD classification achieved for winter DIN should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (T)	• One of the four overlapping WFD waterbodies was classified with a High status for the DIN WFD element in the 2024 cycle 3 interim classification (Menai Strait). This waterbody overlaps with 16% of the feature. • One WFD waterbody was classified with a Good status for DIN (Cefni). However, the confidence of the classification was uncertain and it is not certain if there has been a true improvement in DIN since the 2021 cycle 3 classification of Moderate status. This waterbody overlaps with 20% of the feature. • The other two WFD waterbodies were classified with a Poor and Bad status (Braint and Ffraw). Combined, these overlap with 3% of the feature. • Confidence is low as there is uncertainty in the Cefni waterbody classification, and as the WFD water quality sampling is not focused on saltmarshes.	**Fail**	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: opportunistic macroalgae	The WFD classification achieved for opportunistic macroalgae should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (S)	• Two of the four overlapping WFD waterbodies were classified with High status for the opportunistic macroalgae WFD element in the 2024 cycle 3 interim classification (Cefni and Ffraw). These waterbodies overlap with 20% and <1% of the feature respectively. • One WFD waterbody was not classified for the opportunistic macroalgae WFD element (Menai Strait). This waterbody overlaps with 16% of the feature. • The other WFD waterbody was classified with a Moderate status (Braint). It overlaps with 3% of the feature. • Confidence is low as the WFD water quality sampling is not focused on saltmarshes, and because the failing waterbody overlaps with a small proportion of the feature.	**Fail**	Low
Air quality	Nitrogen deposition should not exceed the critical load range of 10-20 kg N per ha^{-1} per year. (S)	• Nitrogen deposition within the SAC (where data were available) was under 12 kg N per ha per year for all saltmarshes and did not exceed the upper range of the critical load on average (APIS). • Confidence is medium as the pass is based on the upper range of the critical load of nitrogen deposition.	**Pass**	Medium
Abundance, distribution and species composition of communities	Maintain the abundance, distribution, structure and diversity of ASM plant communities within the sectors of the SAC, allowing for natural change and variation. (P)	• The limited WFD data available was analysed for the Cefni waterbody. This analysis indicated that the overall species richness of the ASM plant communities was good. • Species richness gives some indication of the condition of the ASM plant communities, but more analysis is required, resulting in a low confidence.	**Pass**	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Vegetation structure: sward height	Maintain the expected structural variation within the sward height, allowing for natural change and variation. The majority of plants should be able to produce flowers and set seed. (P)	• There is no evidence of major grazing impact on the feature therefore the target was met. • Confidence is high as this feature is in a National Nature Reserve and therefore it is well-maintained.	**Pass**	High
Vegetation structure: zonation of vegetation	Maintain the expected range of saltmarsh zonation for the SAC, allowing for natural change and variation. (P)	• The WFD data analysis indicated that all zones were increasing with limited concern. • Confidence is medium as the changes in zonation were estimated by comparing 2011 and 2019 extents for one of the three relevant WFD waterbodies.	**Pass**	Medium
Invasive non-native species (INNS)	Spread and impact of INNS caused by human activities should not adversely affect the condition of the feature. (P)	• There is limited evidence of INNS presence within the ASM feature. • Confidence is medium as the spread and impacts of any INNS present within the SAC are not well understood, and there have been no targeted surveys of NNS within the ASM feature.	**Pass**	Medium
Non-native species (NNS)	No increase in the number of introduced NNS by human activities. (T)	• There are no known records of NNS within the ASM feature. • Confidence is low as there are no targeted surveys for NNS within the feature, and as there is a concern about non-native conifers spreading onto the transition of other semi-natural coastal habitats.	**Pass**	Low

Assessment conclusions

The Atlantic salt meadow (ASM) feature in the Anglesey Coast: Saltmarsh SAC has been assessed as being in **favourable** condition (medium confidence). Overall, the lack of any significant anthropogenic impact on this feature in terms of extent, topography and physical processes, and its associated communities, have contributed to this favourable assessment outcome, and the saltmarsh at this SAC appears to have expanded. There were two indicators with failing targets (Table 6). There were also limited or absent data for two key indicators to inform on the condition of the feature (see evidence gaps). This has reduced the confidence in the assessment conclusion. Further investigation is needed to better understand the indicator failures to be able to identify management options.

A summary of the assessment can be seen in Table 6 with more detail on each performance indicator, and any reasons for failure, provided in the sections below.

Table 6. Summary of the condition assessment for the ASM feature in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting.

Feature	Overall Condition Assessment	Indicator failures	Reason for indicator failure	Threats to condition
Atlantic salt meadows	**Favourable (medium confidence)**	Water quality: opportunistic macroalgae (S) Water quality: nutrients (DIN only) (T)	• There has been opportunistic macroalgae growth in the Braint waterbody. • Nutrient levels are high in the Cefni, Braint and Ffraw waterbodies.	• Unconsented infrastructure • INNS • Shading by the forest • Critical load for nitrogen deposition • Water quality: contaminants • Climate change

Detailed assessment information

Extent and distribution

Saltmarsh extent has been mapped using aerial imagery from 2000 and 2018-2021. The total extent of saltmarsh was measured as 180.5 ha in 2018-2021 compared to 155.63 ha in 2000, indicating a total gain of 24.87 ha (16%). There has been no loss of saltmarsh extent in any of the sectors, with instead a gain in extent in each of the three defined sectors. As a result, both the feature extent and distribution of the feature indicators met their targets. The mapping is based on high quality imagery, however the changes in extent are indicative only, as there has been no ground truthing. Therefore the confidence associated with the pass is medium.

The distribution and extent of habitats and communities, a key indicator to inform on the condition of the feature, was assessed as unknown as the available NVC maps date from 1996 and 1998 (Prosser and Wallace, 1997; 1999). These were deemed too old to be representative of the current situation. The lack of more up to date maps meant change could not be assessed.

Physical structure

There are no anthropogenic activities known to have significantly affected the creeks and pans in the saltmarsh since designation and no known artificial drainage channels that would adversely affect the hydrology within the saltmarsh. The physical structure (creeks and pans) indicator therefore passed its target. As the saltmarsh within the SAC is relatively small, any significant impact to the saltmarsh would likely be noticed. For these reasons, the confidence in the indicator pass is high. The saltmarsh extent in this SAC is smaller compared to other SACs therefore it is possible to be more confident that there have been minimal impacts. The assessment of this indicator was based on expert judgment.

Hydrodynamic processes and topography

The hydrodynamic and sediment transport processes, and the topography of the feature indicators were assessed as passing their targets as there are currently no known anthropogenic activities that would have significantly altered these aspects. These assessments were based on expert judgement and knowledge of assessments of plans and projects within the SAC. The SAC is relatively small which allows for changes to been seen more easily than a larger SAC. However, hydrodynamic processes are not well understood and could involve effects from further away. It is also difficult to be certain of impacts on the condition of the feature in the absence of data. This has reduced the confidence in the assessment to medium. In future, Lidar data could potentially be used to quantify changes in topography.

Water and air quality

It has been estimated that approximately 39% of the ASM feature within the SAC falls within four WFD waterbodies. The upper marsh areas are above the high-water mark and are therefore outside of the WFD waterbody boundary. However, marine water input to the upper marsh will be from these waterbodies therefore these waterbodies are likely to be a good reflection of the overall effect of water quality on the feature. However, as the WFD water quality sampling is not focused on saltmarshes, the confidence has been reduced in all of the relevant water quality assessments.

Contaminants

The contaminants indicator met the target as one WFD waterbody has a pass for chemicals in the 2024 cycle 3 interim classification. This waterbody, Menai Strait, overlaps with 16% of the ASM feature. The chemical classifications for this waterbody were rolled forward from the 2018 cycle 2 interim classification. This reduced the confidence in the pass. The confidence was further reduced to low as the other three WFD waterbodies were not classified as the chemicals have not been assessed within the last six years. Combined, these waterbodies overlap with 23% of the feature. The impact of any contaminants on the feature are not fully understood. The target weighting of the indicator is tertiary to reflect this.

Nutrients (DIN only) and opportunistic macroalgae

The Cefni waterbody was classified with a Good status for the DIN element in the 2024 cycle 3 interim classification. This is an improvement from Moderate status in all cycles since the 2015 cycle 2 classification. However, the confidence in the 2024 Good status classification is uncertain (confidence of Good or better classification: 55%, confidence of Moderate or worse classification: 45%). The 2021 cycle 3 and 2024 cycle 3 interim DIN classifications used different methodologies due to changes in the classification process. There has been an improvement in the DIN values recorded between the classifications, however the confidence of the improvement in class for this waterbody is uncertain. The 2021 WFD investigation report (Jones, 2021) for this waterbody confirmed the DIN failure in the 2021 cycle 3 classification, but found that there has not been a biological response to the elevated nutrients. This waterbody overlaps with the largest proportion of the feature (20%).

Two WFD waterbodies, Braint and Ffraw, were classified with Poor and Bad statuses for DIN in the 2024 cycle 3 interim classification. The Ffraw waterbody classification has deteriorated from Poor status in the 2021 cycle 3 classification to Bad status in the 2024 cycle 3 interim classification. However, the confidence of the deterioration is uncertain (52%). While the overlap of these waterbodies is small (3%), they do not include the areas of the feature which are at the limit of the waterbodies. These areas may have elevated DIN as well but it has not been sampled. The Menai Strait waterbody was classified with a High status for DIN, however the sampling locations were not in close proximity to the ASM feature in the SAC.

The nutrients indicator (DIN only) failed to meet the target due to the issues with DIN in the Cefni, Braint and Ffraw waterbodies. The confidence was reduced to low as the Cefni waterbody was classified as Good status in the 2024 cycle 3 interim classification but with uncertainty in this classification. In addition, because the WFD water quality sampling is

not focused on saltmarshes. The nutrients indicator (DIN only) was also given a tertiary weighting as the effects of high nutrient levels on the ASM feature are not fully understood.

The opportunistic macroalgae indicator was assessed as failing due to the Moderate status classification for this biological element in the Braint waterbody in the 2024 cycle 3 interim classification. There are excessive levels of algae in the intertidal area which suggests that nutrient enrichment is causing elevated growth in these species. This waterbody overlaps with a small proportion of the feature (3%). Two WFD waterbodies were classified with a High status for the opportunistic macroalgae element in the 2024 cycle 3 interim classification. These waterbodies, Cefni and Ffraw, overlap with 20% and <1% of the feature. One WFD waterbody, Menai Strait, was not classified for the element. Some WFD waterbodies are not assessed for opportunistic macroalgae as they do not have suitable substratum (i.e. areas of intertidal habitat for opportunistic macroalgal growth). The confidence in the failure of this indicator was reduced to low as the WFD water quality sampling is not focused on saltmarshes, and because the failing waterbody overlaps with a small proportion of the mapped feature.

Air quality

High levels of nitrogen deposition from the atmosphere can have detrimental impact on saltmarshes since they are nitrogen limited. The nitrogen deposition within the SAC, where data were available, was under 12 kg N per ha per year for all saltmarshes and therefore did not exceed the upper range of the critical load (20 kg N per ha per year, APIS). If the assessment was based on the lower range of the critical load (10 kg N per ha per year), the indicator would fail to meet its target. For this reason, confidence was reduced to medium.

Species and communities

The analysis of transect data from WFD Regulations monitoring showed that overall, ASM plant species richness was good for the Cefni waterbody. While there is no WFD sampling for the two other saltmarshes within the Ffraw and the Braint waterbodies, data from the Cefni waterbody alone was deemed sufficient to pass the abundance, distribution and species composition of communities indicator. As more analysis is required to effectively assess the condition of saltmarsh communities across the feature, the confidence in the pass has been reduced to low.

Vegetation structure

Both the sward height and zonation of vegetation indicators met their targets. No major grazing issues were identified. The confidence for the sward height indicator is high as this feature is in a National Nature Reserve and therefore it is well-maintained. The WFD data analysis showed a small change in zonation pattern, but this is likely to be natural and is of limited concern. The confidence in the zonation of vegetation indicator was reduced to medium as the changes in zonation were estimated by comparing 2011 and 2019 extents for one out of three WFD waterbodies. Further data and ground truthing investigations would be needed to increase confidence.

Invasive non-native species

The saline conditions of saltmarshes prevent the common terrestrial non-native species (NNS) in Wales becoming established. There are no known records of NNS within the ASM feature, resulting in both the primary and tertiary targets for the INNS and NNS indicators to be met.

The primary INNS target passed with a medium confidence as there have been no targeted NNS surveys on saltmarshes, which would be required to fully understand the presence and impacts of any NNS species within the ASM feature.

There were, however, some notable records of NNS within the SAC. The red seaweed worm wart weed *Gracilaria vermiculophylla* has been recorded since 2022 in nearby mudflats and sandflats habitat in the Malltraeth estuary. However, there is no known record of the species in the saltmarsh habitat. There are some concerns about the non-native coniferous trees in the Cefni saltmarshes encroaching the transition of other semi-natural coastal habitats. Therefore, confidence in the pass for the tertiary NNS target was reduced to low to reflect this, and for the same reason as the primary INNS target.

Reasons for target failure

The ASM feature in Anglesey Coast: Saltmarsh SAC has been assessed as being in **favourable** condition. However, one secondary target and one tertiary target failed to be met and need to be kept under review.

Water quality: opportunistic macroalgae

This indicator target has a secondary weighting. The Braint waterbody was classified with a Moderate status for the opportunistic macroalgae biological element in the 2024 cycle 3 interim classification. There are excessive levels of algae in the intertidal area which suggests that nutrient enrichment is causing elevated growth in these species. The WFD investigation in this waterbody is ongoing.

Water quality: nutrients (DIN only)

This indicator target has a tertiary weighting. Two of the WFD waterbodies that overlap with the feature, the Braint and Ffraw waterbodies, were classified with a failing status for the DIN element in the 2024 cycle 3 interim classification. The WFD investigations of the failures in these waterbodies are ongoing, but both have confirmed the failures in the DIN classifications at stage 1 (Borrowdale and Moore, in draft; Burton, in draft). Stage 2 of the investigations to identify potential reasons for failure have not yet been completed.

A third WFD waterbody, Cefni, whilst classified as Good in the 2024 cycle 3 interim classification, remained close to the failure threshold. This waterbody was Moderate status in the 2021 cycle 3 classification. Different methodologies were used for the assessment of the DIN in the 2021 and 2024 classification, therefore there is uncertainty that there has been a genuine improvement in class. The 2021 WFD investigation report for the Cefni waterbody confirmed the DIN failure, but found that there has not been a biological response to the elevated nutrients in the WFD waterbody (Jones, 2021). It was concluded that the major input of nutrients is likely to be derived from diffuse sources associated with

agriculture and rural land management, and point sources from the water industry (Jones, 2021).

Threats to condition

Part of the condition assessment is to identify threats to the condition of the ASM feature. A threat is defined as an activity that is currently not impacting condition but has the potential to do so over the next reporting cycle, if activity levels increase or are unmanaged. It is important to identify these threats to be able to put pre-emptive management in place to prevent declines in condition. The threats to the condition of the ASM feature in Anglesey Coast: Saltmarsh SAC are stated below.

Unconsented infrastructure

New unconsented infrastructure such as private slipways and coastal defences, modify the coastal environment through changes to micro-topography and hydrodynamics and can lead to loss of the feature extent, and impacts to the flora and fauna associated with it.

Invasive non-native species

G. vermiculophylla has the capacity to turn saltmarsh pools anoxic, destroying the pool fauna and flora (Maggs and Magill, 2014). At high densities, this red seaweed could turn the sediments anoxic, reducing their capacity to support saltmarsh plants and animals and change the sedimentation regime (increase sedimentation of muds), and could alter the habitat in the long-term if it is in high density (Maggs and Magill, 2014).

The non-native conifers and broadleaves trees in Cefni can encroach the sand dune and saltmarsh, and could have a detrimental effect on the natural transition of the saltmarsh.

Further INNS were identified as potential threats to the UK and were listed in the latest horizon scanning exercise (Roy et al., 2019). There is a high likelihood for some of these species to be found in Wales in the future. This SAC could be at risk since there are a number of possible pathways of introduction. Further information on introduction pathways can be found on the GB non-native species secretariat website.

Shading by the forest

Shading by taller vegetation is likely to impact the saltmarsh vegetation by changing vegetation communities. This is a concern for some areas in Cefni where the natural transition of saltmarsh has been replaced by hard coniferous species with a greater potential to shade the saltmarsh communities.

Critical load for nitrogen deposition

The saltmarsh habitat is sensitive to nitrogen deposition from the atmosphere, so it is important that the current level of nitrogen deposition does not exceed the critical load of 10-20 kg N per ha per year. Although current critical load levels of nitrogen deposition were not exceeded for the ASM feature in the Anglesey Coast: Saltmarsh SAC, the air quality indicator would fail if it was assessed against the lower range of the critical load (e.g. 10 kg N per ha per year).

Water quality: contaminants

There is the potential for unregulated contaminants (such as PFAS) to increase. This could affect some of the biota of the ASM feature as PFAS has been shown to bioaccumulate in marine species, increasing up the trophic levels (Khan et al., 2023). However, the biological impact of PFAS on marine species is not well understood.

Some persistent chemicals are not measured in every WFD waterbody, and some of the relevant WFD waterbodies have not been classified for any chemicals.

Climate change

It is not yet clear what pressures we will see from climate change at the SAC level or how different pressures will counter act each other. However, threats from climate change may include (Gihwala et al., 2024; Oaten et al., 2024):

- Sea level rise, leading to coastal squeeze and loss of extent.
- Changes in air temperature.
- Increases in wave exposure.
- Changes in species distribution.

Evidence gaps

There are gaps in the current evidence that NRW feel are needed to be filled to fully understand condition in this feature.

Listed below (Table 7) are current indicators that were either assessed as unknown, not assessed, or assessed with a lower confidence. This was due to either limited data availability, outdated data, or a lack of information. Some indicators are not currently monitored but should be ideally considered in future condition assessments.

Table 7. Evidence gaps for the ASM feature in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting (see Section 1.1).

Indicator	Assessed status	Comments
Distribution and extent of habitats and communities (P)	Unknown	• There are no recent NVC surveys or monitoring aimed at assessing this target for ASM. Additional fieldwork would be required to assess this indicator.
Topography of the feature (P)	Medium confidence (proxy data used)	• The topography of the ASM feature is not well monitored. Repeat Lidar surveys taken at mean low water springs for all saltmarshes within the SAC are required.

Indicator	Assessed status	Comments
Abundance, distribution and species composition of communities (P)	Low confidence	• Plant communities are not currently monitored in the saltmarsh in the SAC. Therefore there is a lack of information on the abundance and distribution of plant communities of the ASM feature. • WFD Regulations data could potentially be used further in future assessments, however, additional analysis will be required.
Attributes of local distinctiveness (P)	Not assessed	• There is a lack of information on the named distinctive elements of the ASM feature. Additional fieldwork would be required to assess this indicator in all SACs. For further information on what is locally distinctive see relevant Regulation 37 advice packages.
Sediment quality: contaminants (T)	Not assessed	• Currently, there is no sediment monitoring within the ASM feature.
Hydrodynamic and sediment transport processes (T)	Medium confidence (proxy data used)	• The hydrodynamic regime of the ASM feature is not currently monitored.

3.3. Estuaries condition assessment

The estuaries feature in the Anglesey Coast: Saltmarsh SAC comprises three estuaries, Braint, Ffraw, and Cefni (also known as Malltraeth) (Figure 4). The condition assessment was completed using information specific to estuaries in combination with any available data on the nested designated features contained within the estuaries feature.

Figure 4. Map of the estuaries feature in Anglesey Coast: Saltmarsh SAC.
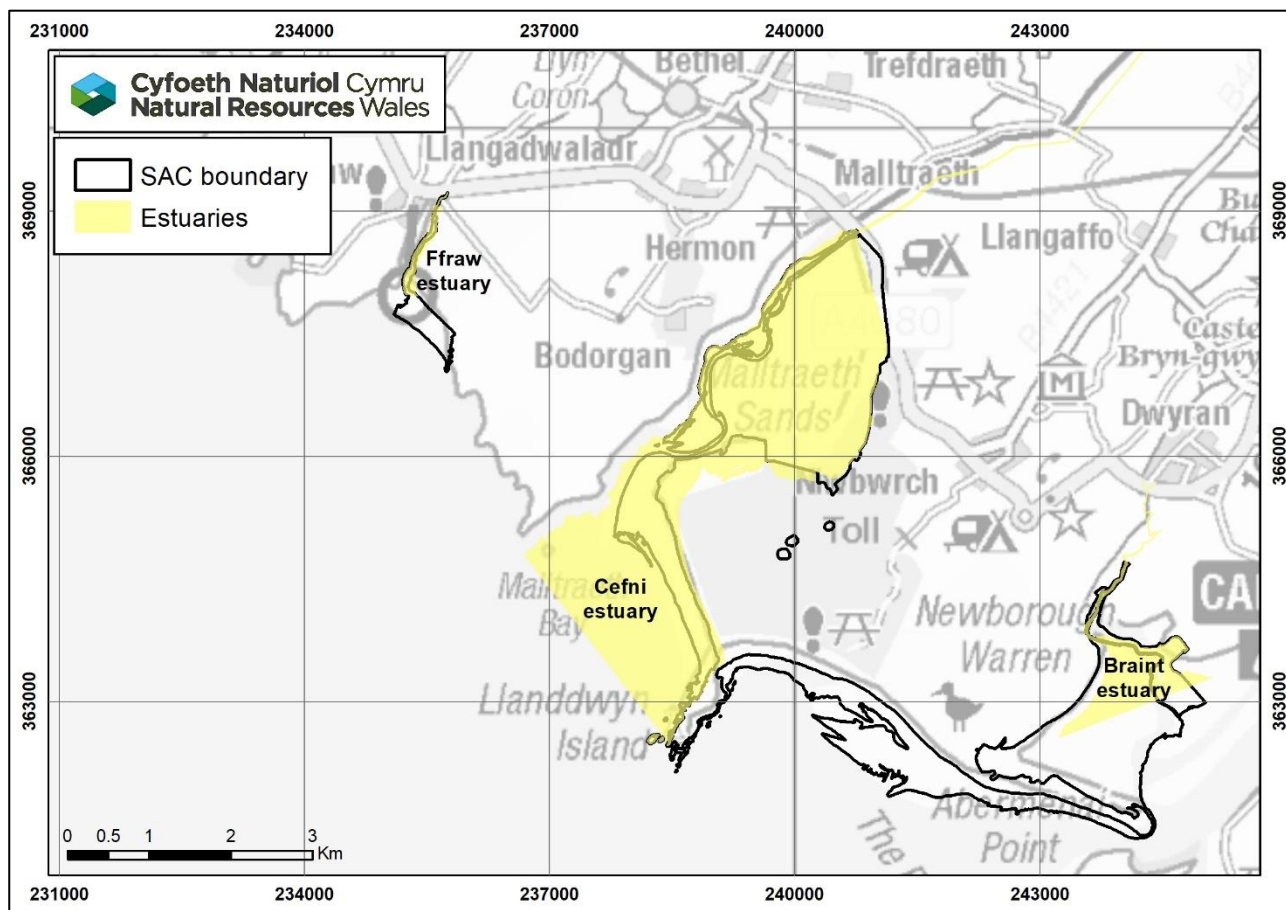
The estuaries feature in the SAC includes the nested features: mudflats and sandflats, Atlantic salt meadows (ASM) and *Salicornia.* The areas within the estuaries (mainly the estuary channels) that are not covered by the nested features have not been monitored and therefore expert judgment was used in the assessment. Estuarine fish communities were only broadly considered due to resource limitations but there is some information included in the detailed assessment section. Each estuary has been assessed separately for each indicator and then combined to produce a single target assessment outcome for the indicator. Table 8 has a summary of the assessment outcome. This outcome and reasons for failure are discussed in more detail in the sections below.

Table 8. Condition assessment of estuaries in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting (see Section 1.1).

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Feature extent	No significant decrease in extent of estuaries within the SAC, allowing for natural change. (P)	• Since designation in 2004, there are no anthropogenic impacts known to have significantly affected the extent of estuaries in the Anglesey Coast: Saltmarsh SAC. • Confidence is medium as the assessment has not been based on comparison mapping of the feature and expert judgment was used.	**Pass**	Medium
Distribution of the feature	Maintain the distribution of the estuaries within the SAC, allowing for natural change and variation. (P)	• Since designation in 2004, there are no anthropogenic impacts known to have significantly affected the distribution of estuaries in the Anglesey Coast: Saltmarsh SAC. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium
Distribution and extent of habitats and communities	Maintain the distribution and extent of estuarine habitats and communities, allowing for natural change and variation. (P)	• Since designation in 2004, there are no anthropogenic impacts known to have significantly affected the distribution and extent of habitats and communities of estuaries and its nested features in the Anglesey Coast: Saltmarsh SAC. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium
Morphological equilibrium	Maintain the characteristic physical form and flow of the estuary, allowing for natural change and variation. (P)	• Since designation in 2004, there are no anthropogenic impacts known to have significantly affected the morphological equilibrium of estuaries in the Anglesey Coast: Saltmarsh SAC. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Topography of the feature	No significant anthropogenic impacts to the small or large scale topography of the estuaries. (S)	• Since designation in 2004, there are no anthropogenic impacts known to have significantly affected the topography of estuaries in the Anglesey Coast: Saltmarsh SAC. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium
Hydrodynamic and sediment transport processes	Maintain hydrodynamic and sediment transport processes, including connectivity, allowing for natural variation and change. (P)	• Since designation in 2004, there are no anthropogenic impacts known to have significantly affected the hydrodynamic and sediment transport processes of the feature. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence

Water quality: nutrients (DIN only)	The WFD classification achieved for winter DIN should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (P)	Within the SAC, Cefni estuary comprises 86% of the feature, Braint estuary 13% and Ffraw 1%.
		
		• Two WFD waterbodies overlap with the Cefni estuary.
		   o The Cefni waterbody was classified as Good status for DIN in the 2024 cycle 3 interim classification, but with an uncertain confidence. It has improved from Moderate status in the 2021 cycle 3 classification, but this may be due to different methodologies used for classification. It is therefore not certain if there has been a true improvement. It overlaps with 83% of the Cefni estuary (71% of the whole feature).
		   o The Caernarfon Bay North waterbody was classified with a High status for DIN. This waterbody overlaps with <1% of the Cefni estuary.
		• Two WFD waterbodies overlap with the Braint estuary.
		   o The Menai Strait waterbody was classified as High status for DIN. This waterbody overlaps with 85% of the Braint estuary (11% of the whole estuaries feature).
		   o The Braint waterbody was classified as Poor status. It overlaps with 10% of the Braint estuary (1% of the whole estuaries feature).
		• One WFD waterbody overlaps with the Ffraw estuary. The Ffraw waterbody was classified as Bad status in the 2024 cycle 3 interim classification. This overlaps with 82% of the Ffraw estuary (1% of the whole feature).
		• Confidence is medium as there is uncertainty in the Cefni waterbody classification, however all three estuaries are considered to fail this indicator.
			Fail	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: phytoplankton	The WFD classification achieved for phytoplankton should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (S)	Within the SAC, Cefni estuary comprises 86% of the feature, Braint estuary 13% and Ffraw 1%. • The Menai Strait waterbody was classified as High status for phytoplankton in the 2024 cycle 3 interim classification. This waterbody overlaps with 86% of the Braint estuary (11% of the whole feature). • The other four waterbodies that overlap with the estuaries have not been classified for phytoplankton in any cycles. • The indicator was assessed as unknown as phytoplankton has not been classified in two of the three estuaries.	**Unknown**	N/A
Water quality: opportunistic macroalgae	The WFD classification achieved for opportunistic macroalgae should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (S)	Within the SAC, Cefni estuary comprises 86% of the feature, Braint estuary 13% and Ffraw 1%. • Two WFD waterbodies overlap with the Braint estuary. The Menai Strait waterbody was not classified for opportunistic macroalgae. The Braint waterbody was classified with a Moderate status in the 2024 cycle 3 interim classification. This waterbody overlaps with 10% of the Braint estuary (1% of the whole feature). • Two waterbodies that overlap with the Cefni and Ffraw estuaries (Cefni and Ffraw) were classified with High status in the 2024 cycle 3 interim classification. One waterbody (Caernarfon Bay North) was not classified for opportunistic macroalgae. • Confidence is low as the opportunistic macroalgae issues are within only one of the smaller estuaries within the SAC.	**Fail**	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: dissolved oxygen	The WFD classification achieved for dissolved oxygen should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (P)	Within the SAC, Cefni estuary comprises 86% of the feature, Braint estuary 13% and Ffraw 1%. • All five of the WFD waterbodies that overlap with the feature were classified with a High status for dissolved oxygen in the 2024 cycle 3 interim classification. • Confidence is medium due to samples being taken from the surface of the waterbody which may not detect issues for more demersal habitats within the estuaries feature.	**Pass**	Medium
Water quality: contaminants	Water column contaminants not to exceed the EQS. (S)	Within the SAC, Cefni estuary comprises 86% of the feature, Braint estuary 13% and Ffraw 1%. • Four of the five WFD waterbodies were not classified as the chemicals have not been assessed within the last six years (Cefni, Caernarfon Bay North, Braint and Ffraw). Combined, these waterbodies represent 74% of the whole feature. • The other waterbody has a pass for chemicals, however all chemical classifications were rolled forward from the 2018 cycle 2 interim classification (Menai Strait). This waterbody overlaps with 85% of the Braint estuary (11% of whole feature). • Confidence is low due to the unclassified waterbodies, and the rolled forward classifications.	**Pass**	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: turbidity	Maintain expected levels of turbidity, allowing for natural change and variation. (P)	• There are limited data on turbidity for the estuaries feature in the Anglesey Coast: Saltmarsh SAC, therefore this target was assessed as unknown.	**Unknown**	N/A
Abundance, distribution and species composition of communities	Maintain the abundance, distribution, and diversity of species within communities and component habitats, allowing for natural change and variation. (P)	• There are no data available for infaunal communities in the estuaries feature in the Anglesey Coast: Saltmarsh SAC; there is currently no Habitats Regulation monitoring for this SAC. • There are also limited data on the nested features within the estuaries feature. • One of the three relevant WFD waterbodies that overlap with the estuaries feature, Caernarfon Bay North, was classified as Moderate status for the Infaunal Quality Index (IQI) WFD element in the 2024 cycle 3 interim classification. This waterbody represents 0.2% of the feature. The other two WFD waterbodies were not classified for this WFD element. • The data are insufficient to use for this assessment, resulting in an unknown result.	**Unknown**	N/A
Invasive non-native species (INNS)	Spread and impact of INNS caused by human activities should not adversely affect the condition of the feature. (P)	• There is limited evidence to suggest that INNS (e.g. the American slipper limpet *Crepidula fornicata*) are currently impacting the condition of estuaries in the SAC. • Confidence is low as the spread and impacts of the INNS present within the feature are not well understood.	**Pass**	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Non-native species (INNS)	No increase in the number of introduced NNS by human activities. (T)	• Recent records of *C. fornicata* have been identified in the SAC, including within the estuaries feature for the first time in 2020. • *Gracilaria vermiculophylla* has been recorded within the last six years within the SAC and covers a large area in the Cefni estuary. • Other records of NNS have been recorded previously including the Pacific oyster *Magallana gigas* in seagrass in the Braint estuary within the estuaries feature. • Confidence is high due to the arrival of NNS within the last six years, and good availability of records.	**Fail**	High

Assessment conclusions

The estuaries feature in Anglesey Coast: Saltmarsh SAC has been assessed as being in **unfavourable** condition (low confidence). There were three indicators with failing targets (Table 9). There were also limited or absent data for six key indicators to inform on the condition of the feature (see evidence gaps). This has reduced the confidence in the assessment conclusion. Further investigation is needed to better understand all of the failures to be able to identify management options that can bring the feature back into favourable condition.

A summary of the assessment can be seen in Table 9 with more detail on each performance indicator, and any reasons for failure, provided in the sections below.

Table 9. Summary of the condition assessment for estuaries in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting.

Feature	Overall Condition Assessment	Indicator failures	Reason for indicator failure	Threats to condition
Estuaries	**Unfavourable (low confidence)**	Water quality: nutrients (DIN only) (P) Water quality: opportunistic macroalgae (S) Non-native species (T)	• There are high nutrient levels in the Cefni, Braint and Ffraw waterbodies. There are also issues with opportunistic macroalgae in the Braint waterbody. • There has been an increase in the number of NNS in the feature SAC, including *C. fornicata, M. gigas* and *G. vermiculophylla*.	• Unconsented infrastructure • INNS • Water quality: contaminants • Climate change

Detailed assessment information

Extent and distribution

The feature extent and the distribution indicators in the Anglesey Coast: Saltmarsh SAC passed their target as since designation in 2004, there are no known anthropogenic impacts that have significantly affected the extent of the estuaries feature. The distribution and extent of habitats and communities indicator also met its target for this reason, and because there are currently no known impacts to the distribution and extent of the nested features. Comparison mapping has not been used to assess the extent and only expert judgment was used to assess communities distribution in the absence of recent data. This has reduced the confidence to medium.

Sediments

There is no sediment monitoring within the SAC therefore the indicators relevant to sediment composition and quality could not be assessed.

Morphological equilibrium, topography and hydrodynamic and sediment transport processes

The morphological equilibrium, topography and hydrodynamic and sediment transport processes are not well researched. These targets passed with medium confidence based on the knowledge that there are currently no anthropogenic activities that are known to have significantly impacted the feature and its nested features since designation in 2004. The freshwater flow indicator could not be assessed due to limited resource.

Water quality

It has been estimated that 85% of the estuaries feature falls within five WFD waterbodies (Table 10, Figure 5). These are likely to be a good reflection of the overall effect of water quality on the feature. The Cefni estuary is the largest of the three estuaries within the SAC (85.9% of the estuaries feature). The two smaller estuaries are the Braint and Ffraw (13.0% and 1.0% of the estuaries feature respectively).

Table 10. Designated estuaries within Anglesey Coast: Saltmarsh SAC and the WFD waterbodies that overlap.

Estuary	WFD waterbody	Degree of overlap across indv. estuary (%)	Degree of overlap across estuaries feature (%)
Cefni	Cefni	82.63	71.46
Cefni	Caernarfon Bay North	0.23	0.20
Braint	Menai Strait	85.48	11.22
Braint	Braint	9.51	1.25
Ffraw	Ffraw	81.57	0.86

Figure 5. Map of the WFD waterbodies that overlap with the estuaries feature within Anglesey Coast: Saltmarsh SAC.
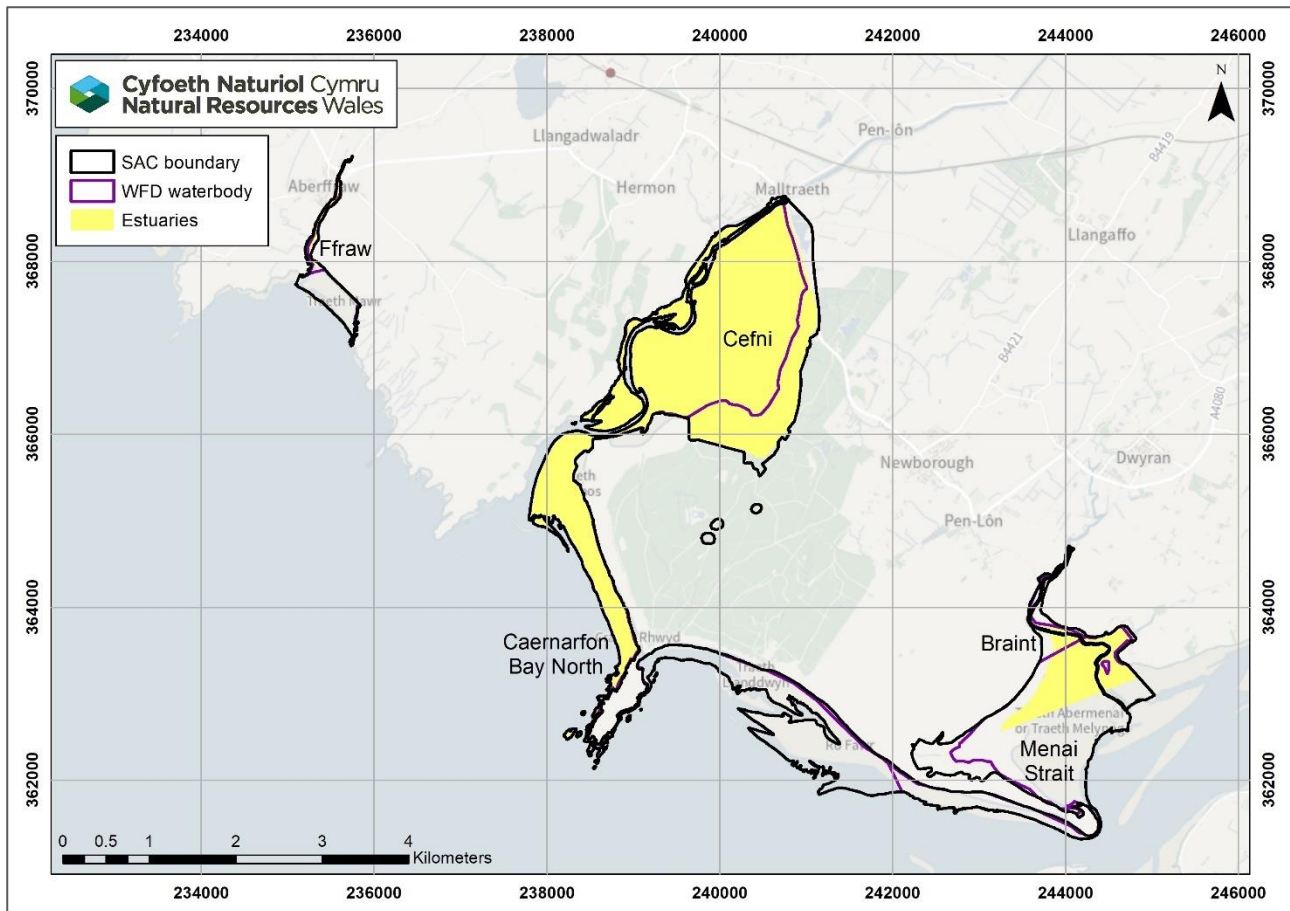
Nutrients (DIN only)

The Cefni estuary comprises two WFD waterbodies: the Cefni waterbody and the Caernarfon Bay North waterbody (Table 10). The Cefni waterbody overlaps with a large proportion of the estuary, and it was classified as Good status in the 2024 cycle 3 interim classification. This is an improvement from Moderate status in all cycles since the 2015 cycle 2 classification. However, the confidence of the 2024 Good status is uncertain (confidence of Good or better classification: 55%, confidence of Moderate or worse classification: 45%). The 2021 and 2024 DIN classifications used different methodologies due to changes in the classification process. There has been an improvement in the DIN values recorded between the classifications, however the confidence of the improvement in class for this waterbody is uncertain (54%). The WFD investigation report (Jones, 2021) for this waterbody confirmed the DIN failure in the 2021 cycle 3 classification, but found that there has not been a biological response to the elevated nutrients. The Caernarfon Bay North waterbody was classified with a High status for DIN, however it has not been considered further in the condition assessment due to the small spatial overlap with the feature.

The Braint estuary comprises two WFD waterbodies: the Menai Strait waterbody and the Braint waterbody (Table 10). The Menai Strait waterbody was classified with a High status for DIN in the 2024 cycle 3 interim classification, however the sampling stations were on the other side of the Strait. The Braint waterbody was classified with a Poor status for DIN. The WFD investigation report has confirmed the failure of the DIN classification at stage 1

(Borrowdale and Moore, in draft). This waterbody also failed for the supporting water quality element, opportunistic macroalgae.

The Ffraw estuary comprises one WFD waterbody: the Ffraw waterbody (Table 10). This waterbody was classified with a Bad status in the 2024 cycle 3 interim classification. This classification has deteriorated from Poor status in the 2021 cycle 3 classification to Bad status in the 2024 cycle 3 interim classification. However, the confidence of the deterioration is uncertain (52%). The in draft WFD investigation report confirmed the failure of DIN in the 2021 classification, however there has been no evidence of associated biological failures (Burton, in draft).

Overall, the nutrients indicator (DIN only) was assessed as a fail due to high DIN levels recorded in some of the WFD waterbodies that overlap with all three estuaries. The confidence in the fail was reduced to medium due to the uncertainty of the recorded improvement of the DIN classification in the Cefni waterbody.

Phytoplankton

Only one of the five waterbodies that overlap with the feature in the SAC was classified for the phytoplankton element in the 2024 cycle 3 interim classification. This was the Menai Strait waterbody, which overlaps with the Braint estuary (Table 10). It was classified with a High status, however this classification was rolled forward from the 2018 cycle 2 classification.

All other WFD waterbodies have not been classified for phytoplankton in any WFD cycles. Classification of some WFD waterbodies is not suitable or possible for this element due to WFD classification methodology, or due to the nature of the waterbodies (e.g. turbidity levels). Overall, the phytoplankton indicator was assessed as unknown because waterbodies that overlap with a large proportion of the feature (75% across the whole SAC) were not classified for this element.

Opportunistic macroalgae

One of the two WFD waterbodies within the Cefni estuary was classified for the opportunistic macroalgae element in the 2024 cycle 3 interim classification. This was the Cefni waterbody, which overlaps with a large proportion of the estuary (Table 10), and it was classified with a High status. The other waterbody that overlaps with the Cefni estuary, Caernarfon Bay North, has not been classified for this element in any cycles. Some WFD waterbodies are not assessed for opportunistic macroalgae as they do not have suitable substratum (i.e. areas of intertidal habitat for opportunistic macroalgal growth).

Within the Braint estuary, one waterbody, the Braint, was classified with a Moderate status for opportunistic macroalgae in the 2024 cycle 3 interim classification. There are excessive levels of algae in the intertidal area which suggests that nutrient enrichment is causing elevated growth in these species. The other waterbody that overlaps with the Braint estuary, Menai Strait, has not been classified for this element in any cycles.

The one waterbody within the Ffraw estuary (Ffraw) was classified as High status for this element in the 2024 cycle 3 interim classification.

The opportunistic macroalgae indicator was assessed as failing its target due to the Moderate status classification in the Braint waterbody. A low confidence was attributed to this fail as the opportunistic macroalgae issues were only in one of the smaller estuaries of the three within the SAC.

Dissolved oxygen

The dissolved oxygen indicator met its target as all five WFD waterbodies that overlap with the feature were classified with a High status for dissolved oxygen in the 2024 cycle 3 interim classification. The dissolved oxygen samples are taken at the water's surface. By the time oxygen depletion at the surface is recorded, oxygen throughout the water column could have been depleted for some time, especially as hypoxia or low oxygen levels, when present, typically occur in bottom water and sediments. Therefore surface sampling of dissolved oxygen may not detect issues for more demersal habitats within the estuaries feature. This reduced the confidence in the pass to medium.

Contaminants

The contaminants indicator met the target as one of the WFD waterbodies that overlaps with the estuaries feature, Menai Strait, has a pass for chemicals in the 2024 cycle 3 interim classification. However, the chemical classifications in the Menai Strait waterbody were rolled forward from the 2018 cycle 2 interim classification. This waterbody overlaps with the Braint estuary. The other four WFD waterbodies were not classified as the chemicals have not been assessed within the last six years. These were the Cefni, Caernarfon Bay North, Braint and Ffraw waterbodies, which combined, represent 74% of the estuaries feature. The confidence in the pass was reduced to low because of this, and due to the rolled forward classification in the Menai Strait waterbody. In addition, the impact of the failing contaminants on the feature are not fully understood.

Turbidity and physicochemical properties

The turbidity indicator was assessed as unknown due to insufficient data. There were some data available from WFD Regulations sampling of suspended particulate matter. However, this is limited to only a few samples per year and therefore cannot be used to adequately assess the turbidity. The physicochemical indicator could not be assessed due to a lack of data.

Species and communities

Apart from the Infaunal Quality Index (IQI) for Caernafon Bay North waterbody, no data for infaunal communities or estuarine fish are available for Anglesey Coast estuaries and most of its nested features. As a result, the performance indicator for abundance, distribution and species composition of communities have been assessed as unknown.

The Atlantic salt meadows (ASM) feature was assessed as meeting its target with a low confidence as analysis of WFD Regulations monitoring in the Cefni saltmarsh showed that overall plant species richness was good (Section 3.2). This was not enough to assess the estuaries feature of the SAC as it is relevant to a small part of the feature. The mudflats and sandflats feature overlaps with the largest proportion of the estuaries feature (approximately 80%), and there were no data available on this feature.

One of the three relevant WFD waterbodies that overlaps with the estuaries feature, Caernarfon Bay North, was classified as Moderate status for the IQI element in the 2024 cycle 3 interim classification. The WFD investigation report for this waterbody (Moore and Green, 2025) concluded that the Moderate classification did not adequately represent the whole waterbody however there are currently insufficient data to state that the remainder of the waterbody is in a Good ecological status. This waterbody represents only 0.2% of the feature and the other two WFD waterbodies were not classified for this element. None of the WFD waterbodies that overlap with the estuaries feature in the SAC have been assessed using the fish tool in the 2024 cycle 3 interim classification.

Invasive non-native species

Gracilaria vermiculophylla was recorded in the Cefni estuary within the last six years, but only at a single location (Mercer and Brazier, 2023). Despite being in one location, this species now covers a large area. This is concerning and will be something to pay close attention to in the next assessment. This species forms algal mats, and in a high biomass can alter the topography of sediments, and therefore has the potential to change the ecology of estuary ecosystems. Furthermore, once the species is established, it can spread to other areas rapidly. Targeted surveys of *G. vermiculophylla* are needed to assess its spread and possible impact on the feature. In addition, there has been a minor increase in the number of records for the American slipper limpet *Crepidula fornicata* identified in the SAC. The species was recorded within the feature in the Cefni Estuary for the first time in 2020 and again in 2021 and 2023. Therefore, the tertiary target of the non-native species (NNS) indicator failed with high confidence due to the new NNS recorded in the estuaries feature within the last reporting cycle.

There have also been recent records of the Pacific oyster *Magallana gigas* found in seagrass in Traeth Melynog in the Braint estuary, therefore there is potential for this NNS to spread to other regions in the SAC, including estuaries.

There have been no targeted surveys of these NNS. It is not fully understood how some of these species may spread and impact the condition of estuaries and the nested habitat features within the feature, and effects on the species diversity and composition have not yet been observed. As there is no current impact from the INNS present the primary target of the INNS indicator passed. Confidence is low as the impacts of the INNS present within the feature are not well understood. In addition, further work is required to investigate the impact of *G. vermiculophylla* on the estuaries feature.

Reasons for target failure

The assessment of the estuaries feature in the Anglesey Coast SAC failed one primary target, one secondary target, and one tertiary target. This resulted in the feature to be assessed as being in **unfavourable** condition. The failing indicators and reasons for failure, if known, are stated below.

Water quality: nutrients (DIN only)

This indicator target has a primary weighting. Two of the WFD waterbodies that overlap with the feature in the Braint and Ffraw estuaries, the Braint and Ffraw waterbodies, were classified with a failing status for the DIN element in the 2024 cycle 3 interim classification.

The WFD investigations of the failures in these waterbodies are ongoing, but both have confirmed the failures in the DIN classifications at stage 1 (Borrowdale and Moore, in draft; Burton, in draft). Stage 2 of the investigations to identify potential reasons for failure have not yet been completed.

A third WFD waterbody, Cefni, whilst classified as Good in the 2024 cycle 3 interim classification, remained close to the failure threshold. This waterbody was previously Moderate status in the 2021 cycle 3 classification. Different methodologies were used for the assessment of DIN in the 2021 and 2024 classification, therefore there is uncertainty that there has been a genuine improvement in class. The 2021 WFD investigation report for the Cefni waterbody confirmed the DIN failure, but found that there has not been a biological response to the elevated nutrients (Jones, 2021). It was concluded that the major input of nutrients is likely to be derived from diffuse sources associated with agriculture and rural land management, and point sources from the water industry (Jones, 2021).

Water quality: opportunistic macroalgae

This indicator target has a secondary weighting. The Braint waterbody was classified as Moderate status for the opportunistic macroalgae element in the 2024 cycle 3 interim classification. There are excessive levels of algae in the intertidal area which suggests that nutrient enrichment is causing elevated growth in these species. The WFD investigation in this waterbody is ongoing. This failure is localised to the Braint waterbody.

Non-native species

This indicator failed to meet its tertiary target of no increase in the number of introduced NNS by human activities. This is due to an increase in records of NNS within the last six years in the estuaries feature, including *G. vermiculophylla, C. fornicata* and *M. gigas*. There is particular concern about *G. vermiculophylla* as it covers a large part of the Cefni estuary, and as the impacts of the species are not fully understood, however it has a potentially high ecological impact (see further detail in Threats to condition section). Investigation into the management of spread of this species has not been done widely (Maggs and Magill, 2014). Targeted surveys of the species and investigation into its impact are required.

The full extent of the impact that these species, along with other NNS present within the SAC, may have on the condition of the feature is currently unknown. For this reason it did not fail the primary target of the INNS indicator. A biosecurity plan for INNS has been developed for the SAC. The objective is to manage the key pathways by which marine INNS are introduced and spread at the SAC level through the use of good biosecurity.

Threats to condition

Part of the condition assessment is to identify threats to the condition of estuaries. A threat is defined as an activity that is currently not impacting condition but has the potential to do so over the next reporting cycle, if activity levels increase or are unmanaged. It is important to identify these threats to be able to put pre-emptive management in place to prevent declines in condition.

Activities that go through licencing and permission processes whereby the impact of the activity on the feature would be assessed have not been included. The threats to the estuaries feature condition in the Anglesey Coast: Saltmarsh SAC are stated below.

Invasive non-native species

G. vermiculophylla has been found in the SAC in 2020 and 2023 but only in Cefni estuary. This species has the potential to establish quickly in shallow soft-bottomed bays and estuaries as it has broad environmental tolerances (Maggs and Magill, 2014). *G. vermiculophylla* can have a detrimental impact on the feature as seen in the Carmarthen Bay and Estuaries SAC. *G. vermiculophylla* can alter the sedimentation and topography of estuaries and their associated nested habitat features and could alter the habitat in the long-term if it is in high density (Maggs and Magill, 2014).

There have been recent records of *C. fornicata* in the SAC. This species is commonly found in areas of muddy habitat. At high density, this species could cause an impact on the feature as it and has been shown to alter habitats if it settles in large numbers (Blanchard, 2009). It can also compete with native species for space and food (Frésard and Boncoeur, 2006; Mineur et al., 2012). It may therefore pose a threat to the estuaries feature. However, the spread and impact of this species on the feature are not fully understood.

Future increases in air and water temperatures that are expected with climate change may result in increased occurrence of conditions suitable for spawning and settlement of *M. gigas*. Northward recruitment may be expected (Smyth et al., 2022).

Further INNS were identified as potential threats to the UK and were listed in the latest horizon scanning exercise (Roy et al., 2019). There is a high likelihood for some of these species to be found in Wales in the future. This SAC could be at risk since there are a number of possible pathways of introduction. Further information on introduction pathways can be found on the GB non-native species secretariat website.

Water quality: contaminants

There is the potential for unregulated contaminants (such as PFAS) to increase. This could affect some of the biota of the estuaries feature as PFAS has been shown to bioaccumulate in marine species, increasing up the trophic levels (Khan et al., 2023). However, the biological impact of PFAS on marine species is not well understood.

Some persistent chemicals are not measured in every WFD waterbody, and some of the relevant WFD waterbodies have not been classified for any chemicals.

Climate change

It is not yet clear what pressures we will see from climate change at the SAC level or how different pressures will counter act each other. However, threats from climate change may include (Kendon et al., 2023; Kendon et al., 2024; Gihwala et al., 2024; Oaten et al., 2024):

- Sea level rise.
- Changes to wave climate, especially storm frequency and intensity, which may change the topography.
- Changes to freshwater input and flow (i.e. from changes in rainfall).

- Changes in air and sea temperature.
- Changes in ocean acidification.
- Changes in species distribution.

Evidence gaps

There are gaps in the current evidence that NRW feel are needed to be filled to fully understand condition in this feature.

Listed below (Table 11) are current indicators that were either assessed as unknown, not assessed, or assessed with a lower confidence. This was due to either limited data availability, outdated data, or a lack of information. Some indicators are not currently monitored but should be ideally considered in future condition assessments. There are additional evidence gaps concerning the nested features, which can be found in the relevant sections of this report.

Table 11. Evidence gaps for the estuaries feature in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting (see Section 1.1).

Indicator	Assessed status	Comments
Freshwater inputs (P)	Not assessed	• The freshwater flow indicator could not be assessed due to limited resource. There are data available on abstractions and flow levels in estuaries therefore this is something that should be used in future condition assessments.
Sediment composition and distribution (P)	Not assessed	• There is no sediment monitoring within the Anglesey Coast: Saltmarsh SAC.
Sediment quality: organic carbon content (P); contaminants (P)	Not assessed	• Currently, there is no sediment monitoring within the Anglesey Coast SAC.
Abundance, distribution and species composition of communities (P)	Not assessed	• There is currently no NRW Habitats Regulation monitoring in the estuaries of Anglesey Coast: Saltmarsh SAC. Some information can be derived from the IQI WFD element in the 2024 cycle 3 interim classification but currently there are insufficient data to use for this assessment.

Indicator	Assessed status	Comments
Invasive non-native species (P)	Low confidence (limited data)	• The spread and impact of the NNS currently present on the estuaries feature are not fully understood. More targeted surveys and investigation on the impact of NNS on estuaries are needed. • Investigation into the use of satellite and or aerial imagery for assessing the extent of *G. vermiculophylla* may be beneficial.
Sediment quality: oxidation-reduction profile (redox layer) (S)	Not assessed	• Currently, there is no sediment monitoring within Anglesey Coast: Saltmarsh SAC.
Water quality: phytoplankton (S)	Unknown	• A large proportion of WFD waterbodies that overlap with the estuaries feature in the SAC have not been classified for phytoplankton WFD element in the 2024 cycle 3 interim classification, leading to an unknown assessment. Some WFD waterbodies are not assessed for phytoplankton due to the nature of the waterbodies.
Water quality: turbidity (S)	Unknown	• Turbidity is measured in WFD sampling. As this is limited to only a few samples per year it cannot be used to adequately assess the turbidity. • Investigation of the use of remote sensing data to assess turbidity could be carried out in the future. External data from other organisations could also be used.
Water quality: physicochemical properties (S)	Not assessed	• There were no temperature, salinity or pH loggers within the Anglesey Coast: Saltmarsh SAC. • Remote sensing data on temperature, salinity and pH could be used in future.

3.4. Mudflats and sandflats condition assessment

The mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC is comprised of several mudflats and sandflats (Figure 6). No Habitats Regulations monitoring survey for the mudflats and sandflats feature is currently undertaken in this SAC but there are seagrass and cockle surveys periodically undertaken at Traeth Mylenog and Malltraeth which were used for the assessment.

Figure 6. Map of the mudflats and sandflats feature in Anglesey Coast: Saltmarsh SAC.
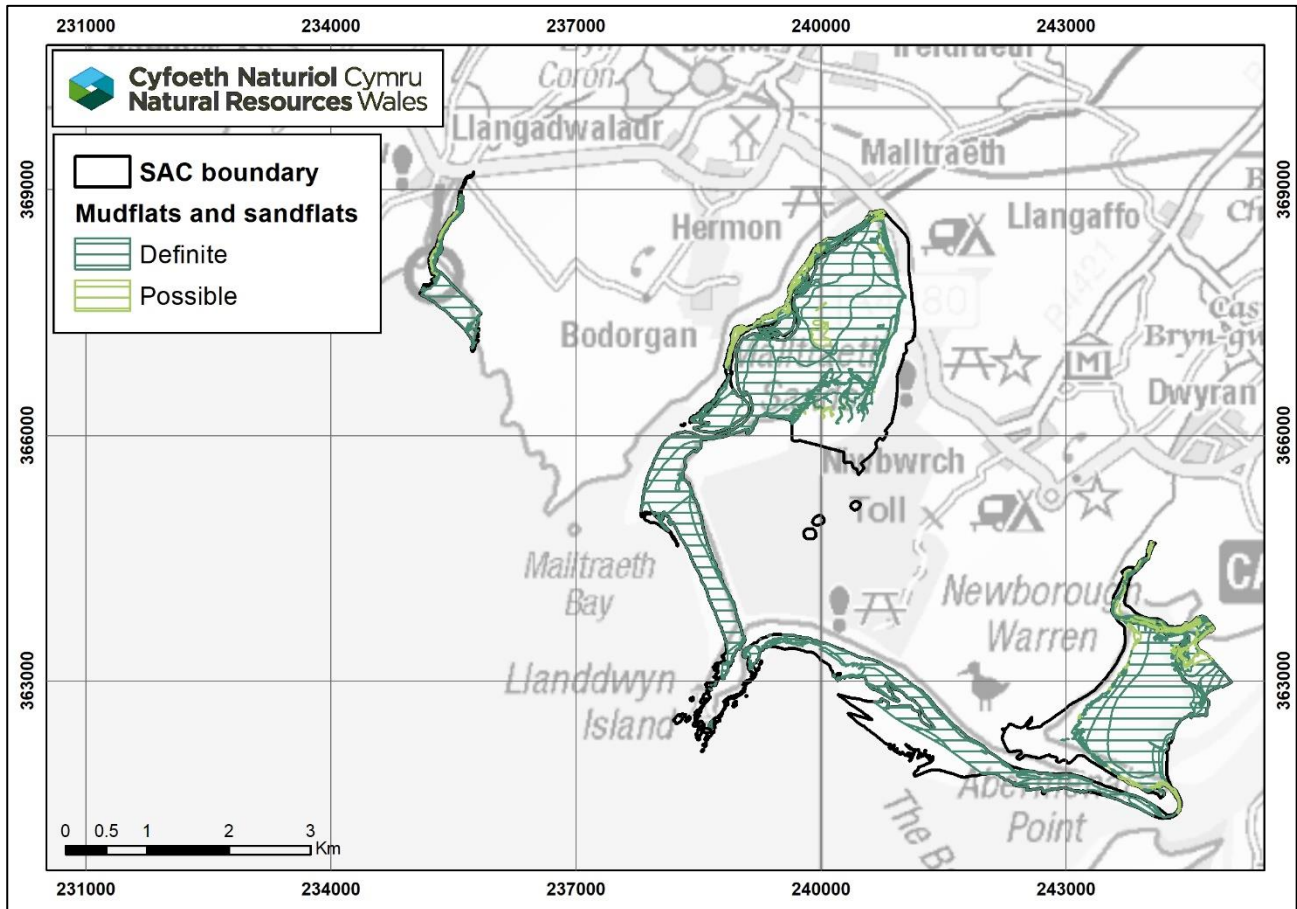

Table 12 has a summary of the assessment outcome. The assessment outcome and any reasons for failure are discussed in more detail in the sections below.

Table 12. Condition assessment of mudflats and sandflats in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting (see Section 1.1).

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Feature extent	No significant decrease in the extent of mudflats and sandflats within the SAC, allowing for natural change and variation. (P)	• There are currently no anthropogenic impacts known to be significantly affecting the extent of the mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC. • Confidence is medium as the assessment has not been based on comparison mapping of the feature and expert judgment was used.	**Pass**	Medium
Distribution and extent of habitats and communities	Maintain the distribution and extent of mudflats and sandflats habitats and communities, allowing for natural change and variation. (P)	• There are currently no anthropogenic impacts known to be significantly affecting the distribution and extent of habitats and communities of the mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC. • Confidence is medium as expert judgement has been used to assess this indicator in the absence of recent data.	**Pass**	Medium
Topography of the feature	No significant anthropogenic impacts to the small or large scale topography of the mudflats and sandflats. (S)	• There are currently no anthropogenic impacts known to be significantly affecting the topography of the mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Hydrodynamic and sediment transport processes	Maintain hydrodynamic and sediment transport processes, including connectivity, allowing for natural variation and change. (P)	• There are currently no anthropogenic impacts known to be significantly affecting the hydrodynamic and sediment transport processes of the mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC. • Confidence is medium as the assessment has been based on expert judgment.	**Pass**	Medium
Water quality: nutrients (DIN only)	The WFD classification achieved for winter DIN should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (P)	• Two of the five overlapping WFD waterbodies were classified with a High status for DIN in the 2024 cycle 3 interim classification (Menai Strait and Caernarfon Bay Noth). Combined, these overlap with 42% of the feature. • One WFD waterbody was classified as Good status (Cefni). However, the confidence of the classification was uncertain. This waterbody was Moderate status for DIN in the 2021 cycle 3 classification. The reported improvement may be due to the different methodologies used for DIN classification. It is not certain if there has been a true improvement in the DIN levels. This waterbody overlaps with 54% of the feature. • The other two WFD waterbodies were classified with a Poor and Bad status (Braint and Ffraw). Combined, these overlap with 1% of the feature. • Confidence is low as there is uncertainty in the Cefni waterbody classification.	**Fail**	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: phytoplankton	The WFD classification achieved for phytoplankton should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (S)	• Four of the five WFD waterbodies were not classified for phytoplankton in the 2024 cycle 3 interim classification (Cefni, Caernarfon Bay North, Braint and Ffraw). Combined, these waterbodies overlap with 68% of the feature. • The other WFD waterbody was classified as High status for phytoplankton (Menai Strait). The classification was rolled forward from the 2018 cycle 2 interim classification. This waterbody overlaps with 30% of the feature. • The confidence is low as a large proportion of the feature overlap with waterbodies that have not been classified for phytoplankton, and as the ecological relationships between phytoplankton and the mudflats and sandflats feature are not fully understood.	**Pass**	Low
Water quality: opportunistic macroalgae	The WFD classification achieved for opportunistic macroalgae should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (S)	• Two of the five overlapping WFD waterbodies were not classified for the opportunistic macroalgae WFD element in the 2024 cycle 3 interim classification (Menai Strait and Caernarfon bay North). Combined, these overlap with 42% of the feature. • One WFD waterbody was classified as Moderate status (Braint), however it overlaps with <1% of the feature. • The other two WFD waterbodies were classified with High status (Cefni and Ffraw). These waterbodies overlap with 54% and <1% of the feature respectively. • Confidence is medium as some of the overlapping waterbodies were not classified for the relevant WFD element.	**Pass**	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water quality: dissolved oxygen	The WFD classification achieved for dissolved oxygen should be Good or High status in WFD waterbodies that overlap with the feature, and there should be no deterioration between status classes. (S)	• All five WFD waterbodies were classified with a High status for dissolved oxygen in the 2024 cycle 3 interim classification (Cefni, Menai Strait, Caernarfon Bay North, Braint and Ffraw). • Confidence is medium due to samples being taken from the surface of the waterbodies.	**Pass**	Medium
Water quality: contaminants	Water column contaminants not to exceed the EQS. (S)	• Four of the five WFD waterbodies were not classified as the chemicals have not been assessed within the last six years (Cefni, Caernarfon Bay North, Braint and Ffraw). Combined, these waterbodies overlap with 68% of the feature. • The other WFD waterbody has a pass for chemicals, however all chemical classifications were rolled forward from the 2018 cycle 2 interim classification (Menai Strait). This waterbody overlaps with 30% of the mudflats and sandflats feature. • Confidence is low due to the unclassified waterbodies, and the rolled forward classifications.	**Pass**	Low
Water quality: turbidity	Maintain expected levels of turbidity, allowing for natural change and variation. (S)	• There are limited data on turbidity for the mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC, therefore this target was assessed as unknown.	**Unknown**	N/A

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Abundance, distribution and species composition of communities	Maintain the abundance, distribution, and diversity of species within communities and component habitats, allowing for natural change and variation. (P)	• One of the five WFD waterbodies that overlap with the mudflats and sandflats feature, Caernarfon Bay North, was classified as Moderate status for the IQI WFD element in the 2024 cycle 3 interim classification. This waterbody overlaps with 12% of the feature. One WFD waterbody was classified with a High status, and the other three WFD waterbodies were not classified for this WFD element. • The 2023 survey indicated an increase in the seagrass *Zostera noltei* extent at Traeth Melynog. • Cockle *Cerastoderma edule* stocks appeared to be stable. The data were insufficient to use for this assessment. • No data for infaunal communities are available for the mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC as there is currently no Habitats Regulation monitoring for this SAC. • The limited data available on species composition of communities resulted in an unknown assessment.	**Unknown**	N/A
Invasive non-native species (INNS)	Spread and impact of INNS caused by human activities is not adversely altering ecosystems. (P)	• There is limited evidence to suggest that INNS (e.g. *Crepidula fornicata*) are currently impacting the condition of the mudflats and sandflats in the SAC. • Confidence is low as the spread and impacts of the INNS present within the feature are not well understood.	**Pass**	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Non-native species (INNS)	No increase in the number of introduced NNS by human activities. (T)	• Recent records of *C. fornicata* have been identified in the feature (2023-2024). • *Gracilaria vermiculophylla* has been recorded within the last six years in the Malltraeth estuary (one station only), which is within the feature. • There is also further evidence that there are low numbers of *Magallana gigas* in Traeth Melynog, which is within the feature. • Confidence is high due to the arrival of NNS within the last six years, and good availability of records.	**Fail**	High

Assessment conclusions

The mudflats and sandflats feature in Anglesey Coast: Saltmarsh SAC has been assessed as being in **unfavourable** condition (low confidence). There were a couple of failing indicators (Table 13). There were also limited or absent data for four key indicators to inform on the condition of the feature (see the evidence gaps). This has reduced the confidence in the assessment conclusion. Further investigation is needed to better understand all of the failures to be able to identify management options that can bring the feature back into favourable condition.

A summary of the assessment can be seen in Table 13 with more detail on each performance indicator, and any reasons for failure, provided in the sections below.

Table 13. Summary of the condition assessment for mudflats and sandflats in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting.

Feature	Overall Condition Assessment	Indicator failures	Reason for indicator failure	Threats to condition
Mudflats and sandflats	**Unfavourable (low confidence)**	Water quality: nutrients (DIN only) (P) Non-native species (T)	• There are high nutrient levels in the Cefni, Braint and Ffraw waterbodies. • There has been an increase in the number of NNS in the feature SAC, including *C. fornicata* and *G. vermiculophylla*.	• Unconsented infrastructure • INNS • Water quality: contaminants • Management of coastal defences • Climate change

Detailed assessment information

Extent and distribution

The feature extent and the distribution and extent of habitats and communities indicators in the Anglesey Coast: Saltmarsh SAC passed their target as there are currently no known anthropogenic impacts that would negatively affect the mudflats and sandflats feature. Comparison mapping has not been used to assess the extent and expert judgment was used to assess communities distribution in the absence of recent data. This has reduced the confidence to medium.

Sediment quality; topography; and hydrodynamic and sediment transport processes

There is no monitoring of sediments within the SAC, resulting in all the sediment indicators to not be assessed. A macroalgae layer has been reported in Traeth Melynog and in the Braint estuary. As no measurements were taken, it is not possible to know if the sediment layers were anoxic underneath. These sites, however, are quite sandy and macroalgae move around with wave action, reducing the likelihood that sediments will be anoxic.

The topography and hydrodynamic and sediment transport processes are not well researched for intertidal mudflats and sandflats. These targets passed with medium confidence based on the knowledge that there are currently no anthropogenic activities that are known to have a significant impact on the feature.

Water quality

It has been estimated that approximately 98% of the mudflats and sandflats feature within the SAC falls within five WFD waterbodies. These are therefore likely to be a good reflection of the overall effect of water quality on the feature. The Cefni and Menai Strait waterbodies overlap with the largest proportion of the feature (54% and 30% respectively).

Nutrients (DIN only), phytoplankton and opportunistic macroalgae

The Cefni waterbody was classified with a Good status for the DIN element in the 2024 cycle 3 interim classification. This is an improvement from Moderate status in all cycles since the 2015 cycle 2 classification. However, the confidence in the 2024 Good status classification is uncertain (confidence of Good or better classification: 55%, confidence of Moderate or worse classification: 45%). The 2021 and 2024 DIN classifications used different methodologies due to changes in the classification process. There has been an improvement in the DIN values recorded between the classifications, however the confidence of the improvement in class for this waterbody is uncertain (54%). The 2021 WFD investigation report (Jones, 2021) for this waterbody confirmed the DIN failure in the 2021 cycle 3 classification, but found that there has not been a biological response to the elevated nutrients. Most of the sampling locations for this waterbody overlap with the feature. Two WFD waterbodies, Braint and Ffraw, were classified with Poor and Bad status in the 2024 cycle 3 interim classification. The Ffraw waterbody classification has

deteriorated from Poor status in the 2021 cycle 3 classification to Bad status in the 2024 cycle 3 interim classification. However, the confidence of the deterioration is uncertain (52%). These waterbodies overlap with a very small proportion of the feature (1%). The Caernarfon Bay North and Menai Strait waterbodies were classified as High status for DIN, however the sampling locations were not in close proximity to the mudflats and sandflats feature in the SAC. The nutrients indicator (DIN only) failed to meet its target due to the issues with DIN in the Cefni, Braint and Ffraw waterbodies. The confidence was reduced to low as the Cefni waterbody was classified as Good status in the 2024 cycle 3 interim classification but with uncertainty in this classification.

The indicators for phytoplankton and opportunistic macroalgae met their targets. Low confidence was associated to the pass for the phytoplankton indicator as only one WFD waterbody was classified for this element. The Menai Strait waterbody was classified with a High status in the 2024 cycle 3 interim classification but this was rolled forward from the 2018 cycle 2 classification. This waterbody overlaps with 30% of the mudflats and sandflats feature. The remaining WFD waterbodies, which, combined, overlap with approximately 68% of the feature, were not classified for this element in the 2024 cycle 3 interim classification. Classification of some WFD waterbodies may not be suitable or possible for this element due to WFD classification methodology, or due to the nature of the waterbodies (e.g. turbidity levels). The ecological relationships between phytoplankton and the mudflats and sandflats feature are not fully understood. This also contributed to the low confidence.

For the opportunistic macroalgae indicator, medium confidence was associated to the pass due to two WFD waterbodies not being classified for the relevant opportunistic macroalgae WFD element. Some WFD waterbodies are not assessed for opportunistic macroalgae as they do not have suitable substratum (i.e. areas of intertidal habitat for opportunistic macroalgal growth). In addition, there was one waterbody which was classified with a Moderate status in the 2024 cycle 3 interim classification (Braint). However, as this waterbody overlaps with a very small proportion of the feature (< 1%), it was deemed that the failure was unlikely to have a significant effect on the whole feature.

Dissolved oxygen

The dissolved oxygen indicator met its target. The dissolved oxygen samples were taken at the water's surface. By the time oxygen depletion at the surface is recorded, oxygen throughout the water column could have been depleted for some time, especially as hypoxia or low oxygen levels, when present, typically occur in bottom water and sediments. Therefore, surface sampling of dissolved oxygen may not detect issues for more demersal features. This reduced the confidence in the pass to medium.

Contaminants

The contaminants indicator met its target as one WFD waterbody passed for chemicals in the 2024 cycle 3 interim classification. This waterbody, Menai Strait, overlaps with 30% of the mudflats and sandflats feature. The chemical classifications for this waterbody were rolled forward from the 2018 cycle 2 interim classification. This reduced the confidence in the pass. The confidence was further reduced to low as the other four WFD waterbodies were not classified as the chemicals have not been assessed within the last six years. Combined, these waterbodies overlap with 68% of the feature.

Turbidity and physicochemical properties

The turbidity indicator was assessed as unknown due to insufficient data. There were some data available from WFD Regulations sampling of suspended particulate matter. However, this is limited to only a few samples per year and therefore cannot be used to adequately assess the turbidity. The physicochemical indicator could not be assessed due to a lack of data.

Species and communities

One of the five relevant WFD waterbodies that overlap with the mudflats and sandflats feature, Caernarfon Bay North, was classified as Moderate status for the IQI element in the 2024 cycle 3 interim classification. This waterbody overlaps with 12% of the feature. The WFD investigation report for this waterbody (Moore, 2023) concluded that the Moderate classification did not adequately represent the whole waterbody. However, there are currently insufficient data to state that the remainder of the waterbody is in a Good ecological status. One WFD waterbody was classified as High status for the IQI element in the 2024 cycle 3 interim classification (Menai Strait). This waterbody overlaps with 30% of the feature. The other three WFD waterbodies were not classified for this element. Combined, these overlap with 56% of the mudflats and sandflats feature.

Recent searches for the common cockle *Cerastoderma edule* in August 2023 indicated that the cockle stock appears abundant with plenty of *C. edule* within the sediments and *C. edule* were moving toward the seagrass *Zostera noltei* area. There are, however, some concerns about mussel spats settling on cockle bed. In addition, a recent survey in 2023 indicated that *Z. noltei* in Traeth Melynog has been expanding since 1999 (Phase 1 habitat survey).

Apart from the IQI, no data for infaunal communities and limited data on specific species were available for the mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC. As a result, the performance indicator for abundance, distribution and species composition of communities has been assessed as unknown, while species richness and diversity and taxonomic spread of species have not been assessed.

Invasive non-native species

Gracilaria vermiculophylla has been recorded within the last six years in the Malltraeth estuary but only at a single location (Mercer and Brazier, 2023). Despite being in one location, this species now covers a large area, and is within the mudflats and sandflats feature. This is concerning and will be something to pay close attention to in the next assessment. This species forms algal mats, and in a high biomass can alter the topography of sediments, and therefore has the potential to change the ecology of mudflats and sandflats. Furthermore, once the species is established, it can spread to other areas rapidly. Targeted surveys of *G. vermiculophylla* are needed to assess its spread and possible impact on the feature. In addition, records of *Crepidula fornicata* were found within the last six years including in the SAC within the mudflats and sandflats feature. There have also been recent records of *Magallana gigas* at Traeth Melynog. This NNS has the potential to spread to other regions in the SAC. The presence of these species in the mudflats and sandflats feature within the last reporting cycle have resulted in a fail with high confidence for tertiary target of the non-native species (NNS) indicator.

It is not fully understood how some of these species may impact the condition of the mudflats and sandflats feature and effects on the species diversity and composition have not yet been observed. As there is no current impact from the INNS present the primary target of the INNS indicator passed. Confidence is low as the spread and impacts of the INNS present within the feature are not well understood. There have been no targeted surveys of these NNS, therefore this is required to fully understand the spread of these species within the SAC. In addition, further work is required to investigate the impact of *G. vermiculophylla* on the mudflats and sandflats feature.

Reasons for target failure

The assessment of the mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC failed one primary target and one tertiary target. This resulted in the feature to be assessed as being in **unfavourable** condition. The failing indicators and reasons for failure, if known, are stated below.

Water quality: nutrients (DIN only)

This indicator target has a primary weighting. Two of the WFD waterbodies that overlap with the feature, the Braint and Ffraw waterbodies, were classified with a failing status for the DIN element in the 2024 cycle 3 interim classification. The WFD investigations of the failures for these waterbodies are ongoing, but both have confirmed the failures in the DIN classifications at stage 1 (Borrowdale and Moore, in draft; Burton, in draft). Stage 2 of the investigations to identify potential reasons for failure have not yet been completed.

A third WFD waterbody, Cefni, whilst classified as Good in the 2024 cycle 3 interim classification, remained close to the failure threshold. This waterbody was Moderate status in the 2021 cycle 3 classification. Different methodologies were used for the assessment of the DIN in the 2021 and 2024 classification, therefore there is uncertainty that there has been a genuine improvement in class. The 2021 WFD investigation report for the Cefni waterbody confirmed the DIN failure, but found that there has not been a biological response to the elevated nutrients (Jones, 2021). It was concluded that the major input of nutrients is likely to be derived from diffuse sources associated with agriculture and rural land management, and point sources from the water industry (Jones, 2021).

Non-native species

This indicator failed to meet its tertiary target of no increase in the number of introduced NNS by human activities. This is due to an increase in records of NNS in the mudflats and sandflats feature, including *C. fornicata, G. vermiculophylla* and *M. gigas* within the last six years. Investigation into the management of spread of *G. vermiculophylla* has not been done widely (Maggs and Magill, 2014). Targeted surveys of the species and investigation into its impact are required.

The spread and full extent of the impact that these species, along with other NNS present within the SAC, may have on the condition of the feature is currently unknown. For this reason it did not fail the primary target of the INNS indicator. A biosecurity plan for INNS has been developed for the SAC. The objective is to manage the key pathways by which marine INNS are introduced and spread at the SAC level through the use of good biosecurity.

Threats to condition

Part of the condition assessment is to identify threats to the condition of the mudflats and sandflats feature. A threat is defined as an activity that is currently not impacting condition but has the potential to do so over the next reporting cycle, if activity levels increase or are unmanaged. It is important to identify these threats to be able to put pre-emptive management in place to prevent declines in condition.

Activities that go through licencing and permission processes whereby the impact of the activity on the feature would be assessed have not been included. The threats to the mudflats and sandflats feature condition in the Anglesey Coast: Saltmarsh SAC are stated below.

Unconsented infrastructure

New unconsented infrastructures especially such as private slipways and coastal defences modify the coastal environment through changes to micro-topography and hydrodynamics and can lead to loss of the feature extent, and impact to the flora and fauna associated with it.

Invasive non-native species

There have been concerns about the recent records of *C. fornicata* in the SAC. At high density, this species could cause an impact on the feature (see further detail in Section 3.3). However, the spread and impact of the species on the feature is not fully understood.

G. vermiculophylla has also been found at one station in the mudflats and sandflats feature. This species has the potential to establish quickly in shallow soft-bottomed bays and can have detrimental impact on the feature (see further detail in Section 3.3).

Further INNS were identified as potential threats to the UK and were listed in the latest horizon scanning exercise (Roy et al., 2019). There is a high likelihood for some of these species to be found in Wales in the future. This SAC could be at risk since there are a number of possible pathways of introduction. Further information on introduction pathways can be found on the GB non-native species secretariat website.

Water quality: contaminants

There is the potential for unregulated contaminants (such as PFAS) to increase. This could affect some of the biota of the mudflats and sandflats feature as PFAS has been shown to bioaccumulate in marine species, increasing up the trophic levels (Khan et al., 2023). However, the biological impact of PFAS on marine species is not well understood.

Some persistent chemicals are not measured in every WFD waterbody, and some of the relevant WFD waterbodies have not been classified for any chemicals.

Management of coastal defences

The State of the UK Climate 2023 Report highlights an observed acceleration in rates of climate induced sea-level rise which, along with storm surges can cause coastal erosion and flooding (Kendon et al., 2024). Shoreline Management Plans identify the preferred

approach to coastal management in light of climate change, which includes maintaining or upgrading defences in some areas and adapting the approach to management in others. Where defences continue to be maintained, there are potential impacts on coastal processes and associated habitats and species. Intertidal habitats may also be lost as a result of coastal squeeze (Oaten et al., 2024).

Climate change

It is not yet clear what pressures we will see from climate change at the SAC level or how different pressures will counteract each other. However, threats from climate change to this feature on this SAC may include (Gihwala et al., 2024):

- Sea level rise.
- Changes to wave climate, especially storm frequency and intensity, which may change the topography.
- Changes in air and sea temperature.
- Changes in species distribution.

Evidence gaps

There are gaps in the current evidence that NRW feel are needed to be filled to fully understand condition in this feature.

Listed below (Table 14) are current indicators that were either assessed as unknown, not assessed, or assessed with a lower confidence. This was due to either limited data availability, outdated data, or a lack of information. Some indicators are not currently monitored but should be ideally considered in future condition assessments.

Table 14. Evidence gaps for the mudflats and sandflats feature in Anglesey Coast: Saltmarsh SAC. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting (see Section 1.1).

Indicator	Assessed status	Comments
Extent (P)	Medium confidence (proxy data used)	• Currently, the extent of mudflats and sandflat is not accurately measured and there is no repeated measure taken.
Distribution and extent of habitats and communities (P)	Medium confidence (proxy data used)	• Without any recent biotope surveys undertaken, assessing changes in mudflats and sandflats within the SAC is difficult. A new survey is required.

Indicator	Assessed status	Comments
Topography of the feature (P); hydrodynamic and sediment transport processes (P)	Medium confidence (proxy data used)	• The topography and hydrodynamic regime of mudflats and sandflats is not currently monitored. • The Wales Coastal Monitoring Centre monitor some sites and are working on a dashboard that will flag up locations with changes outside of natural variability. This could help in assessing in the next cycle of condition assessment.
Sediment composition and distribution (P); sediment quality: organic carbon content (P); contaminants (P); sediment quality: oxidation-reduction profile (redox layer) (S)	Not assessed	• Currently, there is no sediment monitoring within the Anglesey Coast: Saltmarsh SAC.
Abundance, distribution and species composition of communities (P); species richness and diversity (S); taxonomic spread of species (S)	Unknown	• The mudflats and sandflats feature in the Anglesey Coast: Saltmarsh SAC are not currently monitored for infaunal communities with no Habitats Regulations monitoring program taking place. There is currently insufficient data from other sources (e.g. IQI) to use for this assessment.
Invasive non-native species (P))	Low confidence (limited data)	• The spread and impact of the NNS currently present at the SAC on the mudflats and sandflats feature is not fully understood. More targeted surveys and investigation on the impact of NNS on mudflats and sandflats are needed. • Investigation into the use of satellite and or aerial imagery for assessing the extent of *G. vermiculophylla* may be beneficial.
Sediment quality: dissolved oxygen (S)	Not assessed	• Dissolved oxygen in sediments is not currently monitored in the mudflats and sandflats feature across Welsh SACs, but there is potential for this to be incorporated into granulometric analysis in future.

Indicator	Assessed status	Comments
Water quality: turbidity (S)	Unknown	• Turbidity is measured in WFD sampling. As this is limited to only a few samples per year it cannot be used to adequately assess the turbidity. • Investigation of the use of remote sensing data to assess turbidity could be carried out in the future. External data from other organisations could also be used.
Water quality: physicochemical properties (S)	Not assessed	• There were no temperature, salinity or pH loggers within the Anglesey Coast: Saltmarsh SAC. • Remote sensing data on temperature, salinity and pH could be used in future.

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