Cyfoeth Naturiol Cymru
Natural Resources Wales

Dee Estuary / Aber Dyfrdwy Special Area of Conservation

Indicative site level feature condition assessments 2018

NRW Evidence Report No: 229

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Contents

Summary

This document presents NRW's indicative assessment of the condition of marine features in Dee Estuary Special Area of Conservation (SAC).

Table 1 contains a summary of the indicative condition assessments.

This report is divided into sections as follows:

Section 1: a brief introduction to the importance and need for site level feature condition assessments,

Section 2: a brief description of Dee Estuary SAC,

Section 3: NRW's indicative condition assessments for the features of Dee Estuary SAC, including a comparison with previous assessments for the site,

Section 4: NRW's plans for the future development of site level condition assessments,

Annexes explain in detail the process of producing indicative condition assessments.

Table 1: Summary of indicative condition assessments for Dee Estuary SAC.

Designated Features	Indicative condition assessment	Confidence in assessment
• Mudflats and sandflats not covered by seawater at low tide	Favourable	Low
• *Salicornia* and other annuals colonising mud and sand	Favourable	Medium
• Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Favourable	Medium
• Estuaries	Unfavourable	Low
• River lamprey *Lampetra fluviatilis*	Unfavourable	High
• Sea lamprey *Petromyzon marinus*	Unfavourable	High

More detailed explanations of the rationale behind these conclusions can be found in the full indicative condition assessment reports in section 3.

Crynodeb

Mae'r ddogfen hon yn cyflwyno asesiad dangosol CNC o gyflwr nodweddion Ardal Gadwraeth Arbennig Aber Dyfrdwy (AGA).

Mae Tabl 1 yn cynnwys crynodeb o'r asesiadau dangosol o gyflwr nodweddion.

Rhennir yr adroddiad hwn yn adrannau fel a ganlyn:

Adran 1: cyflwyniad byr i'r pwysigrwydd a'r angen am asesiadau cyflwr ar lefel safle,

Adran 2: disgrifiad byr o AGA Aber Dyfrdwy,

Adran 3: Asesiadau cyflwr dangosol CNC ar gyfer nodweddion *AGA* Aber Dyfrdwy, gan gynnwys cymhariaeth gydag asesiadau blaenorol ar gyfer y safle,

Adran 4: Cynlluniau CNC ar gyfer datblygu asesiadau cyflwr ar lefel safle yn y dyfodol,

Mae **atodiadau'n** egluro'n fanwl y broses o gynhyrchu asesiadau dangosol o gyflwr nodweddion.

Tabl 1: Crynodeb o asesiadau dangosol o gyflwr nodweddion ar gyfer AGA Aber Dyfrdwy.

Nodweddion Dynodedig	Asesiad dangosol o gyflwr y nodwedd	Hyder yn yr asesiad
• Gwastadeddau llaid neu dywod nas gorchuddir gan y môr ar lanw isel	Ffafriol	Isel
• *Salicornia* a phlanhigion unflwydd eraill sy'n cytrefu llaid a thywod	Ffafriol	Canolig
• Dolydd ar forfeydd arfordir y gorllewin (*Glauco-Puccinellietalia maritimae*)	Ffafriol	Canolig
• Aberoedd	Anffafriol	Isel
• Lamprai'r afon (*Lampetra fluviatilis*)	Anffafriol	Uchel
• Lamprai'r môr (*Petromyzon marinus*)	Anffafriol	Uchel

Mae esboniadau manylach o'r rhesymeg y tu ôl i'r casgliadau hyn i'w gweld yn yr adroddiad llawn ar asesu dangosol cyflwr nodweddion.

1. Site level feature condition assessments

Site level feature condition assessments are important for site management. In particular they:

- inform the development of management measures to improve the condition of features
- assist with the prioritisation of resources, and
- help with the assessments of plans and projects.

Marine special areas of conservation (SACs) in Wales cover extensive areas of sea and coast, much of which is challenging and resource intensive to monitor. As a result, assessment of condition can be difficult. It is therefore necessary to use a number of different sources of information and data to inform conclusions. These can vary from, for example, long-term monitoring/surveillance datasets, sampling programs and bathymetric data, to specific data-sets collected primarily for other purposes including Environmental Impact Assessments. For some features, there are very little or no data from which to draw conclusions.

NRW previously undertook preliminary work on full, detailed assessments using all available evidence and assessing all possible attributes. However, this process proved complex and resource intensive. We have therefore concluded that we will not be able to undertake this type of extensive assessment now or in the future, but instead we will develop a new serviceable and streamlined approach that can be embedded in our internal assessment and reporting tools and processes.

As the first stage in developing ongoing streamlined and sustainable site condition assessment and reporting, NRW has undertaken indicative assessments of condition of all marine SAC and Special Protection Area (SPA) sites and features in Wales. During an intensive workshop NRW specialists assessed each feature by using readily available data and information and applying their expert judgement. Further details on the approach taken can be found in Annexes A and B, summary definition in Box 1.

Box 1: Indicative condition assessments - definition and use

The term ‘indicative condition assessment’ describes the use of readily available evidence and expert judgement in an intensive, collective workshop process to provide an indication of feature condition at the site level.

The confidence rating associated with the assessments is an **integral** part of the indicative assessment. Confidence levels for feature assessments should therefore **always** be quoted alongside the indicative condition result, together with NRW’s definition of ‘indicative condition assessment’.

2. Site Description

The Dee Estuary is one of the largest estuaries in the UK, with an area of over 14,000 ha (140 km^2). The Dee Estuary is hyper-tidal with a mean spring tidal range of 7.7 m at the mouth. The estuary historically stretched as far inland as Chester and its form has been modified considerably over the past 300 years as a direct result of human intervention. The intertidal area is currently dominated by mudflats and sandflats with the remainder being largely saltmarsh. At low water spring tides, over 90% of the estuary dries out. The extensive intertidal flats of the Dee Estuary form the fifth largest such area within an estuary in the UK.

The Dee Estuary/Aber Dyfrdwy Special Area of Conservation (SAC) is a multiple interest site[1]. For the qualifying marine habitats and species, the SAC is considered to be one of the best areas in the UK for:

- Mudflats and sandflats not covered by seawater at low tide (intertidal mudflats and sandflats)
- *Salicornia* and other annuals colonising mud and sand
- Atlantic salt meadows

And to support a significant presence of:

- Estuaries
- River lamprey *Lampetra fluviatilis*
- Sea lamprey *Petromyzon marinus*

The features are distributed throughout the SAC with no single feature occupying the entire SAC and with features overlapping in some locations. The conservation advice (including conservation objectives), SAC boundary and the general location of the habitat features can be found in the conservation advice package and feature maps in the designated sites search on the NRW website[2]. The feature maps are indicative as the extent of most features is not known precisely and some, are dynamic and can be highly mobile.

[1] The site is also designated for coastal and terrestrial features e.g. Dune grassland, these features have not been assessed during this process.
[2] http://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/find-protected-areas-of-land-and-seas/designated-sites/?lang=en

3. Feature level indicative condition assessments

3.1 Mudflats and sandflats not covered by seawater at low tide indicative condition assessment

The indicative condition of the feature at this site at the time of assessment

Date	May 2017
Site name	Dee Estuary / Aber Dyfrdwy SAC
Site feature assessed	Mudflats & sandflats not covered by seawater at low tide

Component of habitat feature assessed	**Indicative Assessment** (*Favourable, unfavourable, unknown*)	**Key evidence type used** (*monitoring data, reports or expert judgement*)	**Level of agreement**	**Confidence in evidence**	**Component confidence level**
Distribution & Extent (within site)	Favourable	Casework monitoring (limited), expert judgement	High	Low	Low
Structure & function	Favourable	Casework monitoring (limited), expert judgement	High	Low	Low
Typical species	Favourable	Cockle fishery, WFD assessments	High	Low	Low
Relevant activities (*activities directly impacting condition of the feature on this site*)	No activities identified as having a direct impact on site condition.				

Overall Indicative Assessment	**Overall Confidence Level**
Favourable	Low

Notes section: *Please explain the rationale for the assessment conclusion and explain the level of consensus and confidence.*

Note: The lower River Dee and estuary are in places highly modified, but these works took place before designation and have not been considered as part of this assessment.

Distribution & extent: There is a long-term trend of erosion to the Welsh side and accretion on the English side, the site is losing mudflats and sandflats to Atlantic Saltmeadows and *Salicornia* due to pre-designation constraints and a continued move towards a dynamic equilibrium. No coastal squeeze identified in first epoch (2005 – 2025) in the relevant shore line management plan.
This component has been assessed as **favourable**.

Structure & function: Water Framework Directive (WFD) data was used from the relevant waterbodies (North Wales and Dee (N. Wales). Although both waterbodies had a moderate overall status and a fail for chemical status (driven by failure of mercury and its compounds), the elements driving this waterbody status were not considered particularly relevant for this feature. There is no biological evidence to show that the relevant WFD elements are negatively affecting the mudflat and sandflat feature for this site at this time. The infaunal index for the Dee (N. Wales) waterbody was good. Although both waterbodies were assessed as moderate for DIN (dissolved inorganic nitrogen) however, the results from the macroalgae and fucoid extent elements were good, and there are no known other problems with nuisance algae associated with this feature on this site. The lack of detailed knowledge of the sampling points hampered the full use of the WFD data and influenced the confidence in evidence.
This component has been assessed as **favourable** but low confidence due to the mercury failure.

Typical species: The infaunal index for the Dee (N. Wales) waterbody was good, (it was not assessed for the North Wales waterbody). Although both waterbodies were assessed as moderate for DIN (dissolved inorganic nitrogen) the results from the macroalgae and fucoid extent elements was good for the Dee (N. Wales) waterbody and there are no known other problems with nuisance algae associated with this feature on this site. WFD saltmarsh on the Dee (N. Wales) waterbody was also assessed as good. The lack of detailed knowledge of the sampling points hampered the full use of the WFD data and influenced the confidence in evidence. Cockles are a typical species of this feature. There is a regulated cockle fishery in the site, which has been sustained for nine years and does not adversely affect the feature.
This component has been assessed as **favourable**.

Noted activities:
Pressures on the site were discussed:

- A marine invasive species – mitten crab – is known to be present in the Dee estuary but there is no evidence, currently, that it is affecting the features of the site.
- Inappropriate vehicle use – on the Wirral foreshore – this is now managed and is not causing a significant effect.

- Waste issues: these is an issue with leaching but this is historic, pre-site designation, no new issues. A WFD investigation did not detect leachate.
- Waste disposal – all sites are regulated.
- The cockle fishery is regulated, (a habitats regulation assessment (HRA) is carried out each year), and seems to be sustainable and not apparently affecting the feature. There has been a viable fishery for nine years, further information on this fishery may help with future assessments.
- Port of Mostyn casework monitoring shows no detriment from the dredging that takes place. Sediment remains in the system and dredging is minimal.

Evidence used: *Please outline the evidence used to support the assessment conclusion.*

- Dargie, T. (2001). NVC survey of saltmarsh and other habitats in the Dee and Clwyd estuaries 2000. CCW Contract Science Report no. 450.
- North West England and North Wales Shoreline Management Plan SMP2 (2010): http://www.allerdale.gov.uk/downloads/nw_shoreline_management_plan_2.pdf
- WFD data from sediment surveys and further IQI analysis
- WFD waterbody classifications (2015). 2009-2015 Classification Data: http://waterwatchwales.naturalresourceswales.gov.uk/en/

3.2 *Salicornia* and other annuals colonising mud and sand indicative condition assessment

The indicative condition of the feature at this site at the time of assessment

Date	May 2017
Site name	Dee Estuary / Aber Dyfrdwy SAC
Site feature assessed	*Salicornia* and other annuals colonizing mud and sand

Component of habitat feature assessed	**Indicative Assessment** (*Favourable, unfavourable, unknown*)	**Key evidence type used** (*monitoring data, reports or expert judgement*)	**Level of agreement**	**Confidence in evidence**	**Component confidence level**
Distribution & Extent (within site)	Favourable	Expert judgement.	High	Medium	Medium
Structure & function	Favourable	WFD Assessments & Expert judgement	High	Medium	Medium
Typical species	Favourable	WFD Assessments	High	Medium	Medium
Relevant activities (*activities directly impacting condition of the feature on this site*)	No activities identified as having a direct impact on site condition.				

Overall Indicative Assessment	**Overall Confidence level**
Favourable	Medium

Notes section: *The rationale for the assessment conclusion and confidence.*

Distribution & extent: Likely loss due to natural processes on Welsh side. Assume compensated for by expansion on English side. In parts, particularly from Oakenholt to Greenfield, there is an observed natural erosion of saltmarsh and mudflat, as the channel meanders towards the welsh shore. It is assumed that this erosion is compensated for by a build-up of mudflat and sandflat and saltmarsh on the English side of the estuary. Consequently, it is expected that *Salicornia*, being primarily a pioneer community will be lost to natural erosion on welsh shores therefore this is accepted. No known major disturbance other than natural erosion.

There is a minor accretion of pioneer saltmarsh communities including *Salicornia* at Point of Ayr, where vehicle pressure has been removed from the beach area, this was not considered to be significant enough to fail the feature.
This component has been assessed as **favourable**.

Structure and Function: No known or reported damage to creek structure and function. Two WFD waterbodies overlap with Dee Estuary SAC however only one overlaps with the *Salicornia* feature – Dee North Wales waterbody. This waterbody has an overall status and a fail for chemical status, the chemical status fails for mercury and its compounds – although this would influence the assessments of some features (example estuaries) on balance it was not thought to be relevant enough to fail the *Salicornia* feature as there is no biological evidence that it is negatively affecting the feature. This waterbody was also assessed as moderated for dissolved inorganic nitrogen (DIN) and phytoplankton but good for macroalgae, this feature is thought to be relatively tolerate to nitrates. Saltmarsh was assessed as good and zonation was mapped by Dargie (2001). Monitoring which took place this year (2017, after the assessment) will increase our evidence base.
This component has been assessed as **favourable**.

Typical species: WFD Saltmarsh was assessed as good and zonation was mapped by Dargie (2001).
This component has been assessed as **favourable.**

Noted activities:

- Cockling occurs on the site. This is regulated and a HRA carried out annually for the fishery permit.
- Unsubstantiated previous reports of *Salicornia* gathering.

Evidence used: *The evidence used to support the assessment conclusion.*

- Dargie, T. (2001). *NVC Survey of the saltmarsh and other habitats in the Dee & Clwyd Estuaries 2000*. CCW Science Report No. 450 Bangor: Countryside Council for Wales.
- Personal observations.
- WFD waterbody classifications (2015). 2009-2015 Classification Data: http://waterwatchwales.naturalresourceswales.gov.uk/en/

3.3 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) indicative condition assessment

The indicative condition of the feature at this site at the time of assessment

Date	May 2017
Site name	Dee Estuary / Aber Dyfrdwy SAC
Site feature assessed	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Component of habitat feature assessed	**Indicative Component Assessment** (*Favourable, unfavourable, unknown*)	**Key evidence type used** (*monitoring data, reports or expert judgement*)	**Level of agreement**	**Confidence in evidence**	**Confidence in indicative component assessment**
Distribution & Extent (within site)	Favourable	Monitoring report, WFD assessments & expert judgement.	High	Medium	Medium
Structure & function	Favourable	Monitoring report, WFD assessments & expert judgement.	High	Medium	Medium
Typical species	Favourable	Monitoring report, WFD assessments & expert judgement.	High	Medium	Medium
Relevant activities (*activities directly impacting condition of the feature on this site*)	No activities identified as having a direct impact on site condition				

Overall Indicative Assessment	**Overall Confidence Level**
Favourable	Medium

Notes section: *The rationale for the assessment conclusion and confidence.*

Note: Major historic modification on this site – land reclaim around Shotwick and canalisation of the river up-stream of Connah's Quay, but this was pre-designation so not considered for this assessment.

Distribution & Extent: There is a long-term trend of erosion to the Welsh side and accretion on the English side, the site is losing mudflats and sandflats to Atlantic Saltmeadows and *Salicornia* due to pre-designation constraints and a continued move towards a dynamic equilibrium. No coastal squeeze identified in first epoch (2005 – 2025) in the relevant shore line management plan. National Vegetation classification (NVC) surveys (Dargie, 2001) forms the baseline for the Atlantic salt meadows vegetation communities but it is not thought to have altered significantly at this site since.
This component has been assessed as **favourable**.

Structure & Function: No known or reported damage to creek structure and function. Two WFD waterbodies overlap with Dee Estuary SAC however only one overlaps with the *Salicornia* feature – Dee North Wales waterbody. This waterbody has an overall status and a fail for chemical status, the chemical status fails for mercury and its compounds – although this would influence the assessments of some features (example estuaries) on balance it was not thought to be relevant enough to fail the *Salicornia* feature as there is no biological evidence that it is negatively affecting the feature. This waterbody was also assessed as moderate for dissolved inorganic nitrogen (DIN) and phytoplankton but good for macroalgae, although DIN and phytoplankton are indicators of nutrient enrichment as the macroalgae – particularly the nuisance algae sub-element - was good, the assessors felt, using expert judgement, that there was no evidence that nutrients were currently causing unfavourable condition. WFD saltmarsh for this waterbody was assessed as good and zonation was mapped by Dargie (2001).
This component has been assessed as **favourable**.

Typical species: WFD Saltmarsh for this waterbody was assessed as good and zonation was mapped by Dargie (2001).
This component has been assessed as favourable. This component has been assessed as **favourable**.

Noted activities:

- Grazing: Some heavily grazed areas are accepted to help provide a balance.
- Parking on saltmarsh at Talacre.

Evidence used: *The evidence used to support the assessment conclusion.*
• Dargie, T. (2001). *NVC Survey of the saltmarsh and other habitats in the Dee & Clwyd Estuaries 2000*. CCW Science Report No. 450 Bangor: Countryside Council for Wales. • North West England and North Wales Shoreline Management Plan SMP2 (2010): http://www.allerdale.gov.uk/downloads/nw_shoreline_management_plan_2.pdf • WFD waterbody classifications (2015). 2009-2015 Classification Data: http://waterwatchwales.naturalresourceswales.gov.uk/en/

3.4 Estuaries indicative condition assessment

The indicative condition of the feature at this site at the time of assessment

Date	May 2017
Site name	Dee Estuary/ Aber Dyfrdwy SAC
Site feature assessed	Estuaries

Component of habitat feature assessed	**Indicative Assessment** (*Favourable, unfavourable, unknown*)	**Key evidence type used** (*monitoring data, reports or expert opinion*)	**Level of agreement**	**Confidence in evidence**	**Component confidence level**
Distribution & Extent (within site)	Favourable	Monitoring data, casework monitoring, expert judgement	High	Medium	Medium
Structure & function	Unfavourable	Casework monitoring, expert judgement	Low	Medium	Low
Typical species	Favourable	Cockle fishery, WFD assessments	High	Low	Low
Relevant activities (*activities directly impacting condition of the feature on this site*)	Water quality issues				

Overall Indicative Assessment	**Overall Confidence Level**
Unfavourable	Low

Notes section: *The rationale for the assessment conclusion and confidence.*

Note: The lower River Dee and estuary are, in places, highly modified but these works took place before designation and have not been considered as part of this assessment.

The mudflats and sandflats feature, Atlantic salt meadows and *Salicornia* features are very important nested features within the estuary feature for this site. Therefore, the assessments for these features should be read in conjunction with this assessment. The state of these sub-features has a direct effect on the condition of this feature.

Dee Estuary Indicative Mudflats and sandflats feature assessment 2017: Favourable
Dee Estuary Indicative Atlantic Saltmeadow feature assessment 2017: Favourable
Dee Estuary Indicative *Salicornia* feature assessment 2017: Favourable

Other sub-features of the estuary feature (listed in the Regulation 35 document) were discussed, but were thought to be in favourable condition (these include hard substrata communities, annual vegetative drift lines and *Sabellaria* reefs). Grey seals, a typical species of the estuary are doing very well with a high level of data supporting that assessment.

Distribution & Extent: There is a long-term trend of erosion to the Welsh side and accretion on the English side. The site is losing mudflats and sandflats to Atlantic Saltmeadows and *Salicornia* due to pre-designation constraints and a continued move towards dynamic equilibrium. No coastal squeeze identified in first epoch (2005 – 2025) in the relevant Shoreline management plan (SMP). This component was assessed as **favourable**.

Structure & function: Port of Mostyn casework monitoring shows no detriment as a result of the dredging that takes place. Sediment remains in the system and dredging is minimal. The 11 years monitoring review at Port of Mostyn shows the estuary to be functioning naturally. WFD data was used from the relevant waterbodies (North Wales and Dee (N. Wales). Both waterbodies had a moderate overall status and a fail for chemical status, the chemical status fails in both cases for mercury and its compounds – this is the main reason for failure of the estuary feature as water quality is considered an important aspect of the structure and function of this feature, however, the low level of agreement between assessors was linked to varying views between assessors on the link between the mercury fail and the feature and the mercury standard used (see Annex A). Both waterbodies were also assessed as moderate for DIN (dissolved inorganic nitrogen) another reason to fail the estuary feature. The lack of detailed knowledge of the sampling points hampered the full use of the WFD data. The Mersey Mouth assessment for the English part of the site was not available for the workshop and the lack of this assessment was one of the reasons for the low confidence level on evidence. This component was assessed as **unfavourable**.

Typical species: WFD data was used from the relevant waterbodies (North Wales and Dee (N. Wales), the Mersey Mouth assessment for the English part of the site was not available for the workshop. Angiosperms in the Dee (N. Wales) waterbody were assessed as good with the seagrass sub attribute assessed as high for both waterbodies. The infaunal quality index was assessed as good for both waterbodies. Fish were assessed as good for the Dee (N. Wales) waterbody but was not assessed for the North Wales waterbody. Grey seals, a typical species of the estuary are doing very well with a high level of data supporting that assessment. The Mersey Mouth assessment for the English part of the site was not available for the workshop and the lack of this assessment was one of the reasons for the low confidence level on evidence
This component has been assessed as **favourable**.

Noted activities:

- A marine invasive species – mitten crab – is known to be present in the Dee estuary but there is no evidence, at this time, that it is affecting the features of the site.
- Waste issues: these is an issue with leaching but this is historic, pre-site designation, no new issues. An investigation (WFD) did not detect leachate.
- Waste disposal – all sites are regulated.
- The cockle fishery is regulated, (a habitats regulation assessment (HRA) is carried out each year), and seems to be sustainable and not apparently affecting the feature. There has been a viable fishery for nine years, further information on this fishery may help with future assessments.

Evidence used: *The evidence used to support the assessment conclusion.*

- ABPmer, (2017). *Review of Dredge and Disposal Monitoring, Overview of survey work carried out by the Port in the Dee Estuary from 2005 to 2016,* ABPmer Report No. R.2713. A report produced by ABPmer for Port of Mostyn, March 2017.
- North West England and North Wales Shoreline Management Plan SMP2 (2010): http://www.allerdale.gov.uk/downloads/nw_shoreline_management_plan_2.pdf
- WFD waterbody classifications (2015). 2009-2015 Classification Data: http://waterwatchwales.naturalresourceswales.gov.uk/en/

3.5 River lamprey *Lampetra fluviatilis* indicative condition assessment

The indicative condition of the feature at this site at the time of assessment

Date	May 2017
Site name	Dee Estuary / Aber Dyfrdwy SAC
Site feature assessed	River Lamprey (*Lampetra fluviatilis*)

Component of species feature assessed	**Indicative Assessment** (*Favourable, unfavourable, unknown*)	**Key evidence type used** (*Monitoring data, reports or expert judgement*)	**Level of agreement**	**Confidence in evidence**	**Component confidence level**
Freshwater population variables	Favourable	Monitoring report & expert judgement	High	Medium	Medium
Marine habitat	Unfavourable	WFD waterbody assessments & expert judgement	High	High	High
Relevant activities (*activities directly impacting condition of the feature on this site*)	Water quality issues				

Overall Indicative Assessment	**Overall Confidence level**
Unfavourable	High

Notes section: *The rationale for the assessment conclusion and confidence.*

Freshwater population variables: The supporting datasets are good and based on a specific NRW monitoring programme following relevant Joint Nature Conservation Committee (JNCC) common standards monitoring (CSM) guidance (2005; 2015). As with all migratory fish, the population assessment is based on data from the inflowing river (River Dee), as relevant marine data have not been collected. Lamprey (*Lampetra* spp.) cannot be reliably identified to species at the larval stage, so there is inherent uncertainty in the population assessment. Age Structure: Pass, Distribution: Pass, Larval Density: Pass, Overall: Pass. (Garrett, 2015). It is likely that despite the fact that the population variables pass, river lamprey accessibility is inadequate and most ammocoetes in the middle and upper catchment are brook lampreys.
This component has been assessed as **favourable**.

Marine habitat: WFD data was used from the relevant waterbodies (North Wales and Dee (N. Wales)), both waterbodies had a moderate overall status and a fail for chemical status, the chemical status fails in both cases for mercury and its compounds. Both waterbodies were assessed as moderate for DIN (dissolved inorganic nitrogen). The Dee (N. Wales) was assessed as moderate for phytoplankton.
This component has been assessed as **unfavourable**.

Evidence used: *The evidence used to support the assessment conclusion.*

- Garrett, HM. (2015). *River Dee & Bala lake SAC population condition attribute condition assessment for brook, river and sea lamprey population 2014*. NRW Evidence Report No: 40 31pp, NRW, Dolgellau.
- JNCC (2005). *Common Standards Monitoring Guidance for Freshwater Fauna, Version - August 2015*, ISSN 1743-8160 (Online)
- JNCC (2015). *Common Standards Monitoring Guidance for Freshwater Fauna, Version - October 2015*, ISSN 1743-8160 (Online).
- Thomas, Rh. & Garrett, H. (2013). *2nd reporting Cycle Condition assessments (2007-2012): River Dee & Llyn Tegid SAC*.
- Thomas, Rh., Hatton-Ellis, T.W. & Garrett, H. (2013). *Water Quality Assessments for River Special Areas of Conservation: Second Habitats Directive Reporting Round (2007-2012)*. 12/8/2. 2013. Bangor, Countryside Council for Wales. CCW Staff Science Reports.
- WFD waterbody classifications (2015). 2009-2015 Classification Data: http://waterwatchwales.naturalresourceswales.gov.uk/en/

3.6 Sea lamprey *Petromyzon marinus* indicative condition assessment

The indicative condition of the feature at this site at the time of assessment

Date	May 2017
Site name	Dee Estuary / Aber Dyfrdwy SAC
Site feature assessed	Sea lamprey (*Petromyzon marinus*)

Component of species feature assessed	**Indicative Assessment** (*Favourable, unfavourable, unknown*)	**Key evidence type used** (*Monitoring data, reports or expert judgement*)	**Level of agreement**	**Confidence in evidence**	**Component confidence level**
Freshwater population variables	Unfavourable	Monitoring Report	High	High	High
Marine habitat	Unfavourable	WFD Assessment 2015	High	High	High
Relevant activities (*activities directly impacting condition of the feature on this site*)	Water quality issues				

Overall Indicative Assessment	**Overall Confidence level**
Unfavourable	High

Notes section: *The rationale for the assessment conclusion and confidence.*

The supporting datasets are based on a specific NRW monitoring programme following relevant Joint Nature Conservation Committee (JNCC) common standards monitoring (CSM) guidance (2005; 2015). As with all migratory fish, the assessment is based on data from the inflowing river (River Dee), as relevant marine data have not been collected.

Freshwater population variables: Although sea lamprey ammocoetes are distinct from *Lampetra* (River and Brook lamprey) ammocoetes, they are typically much less frequent in samples and so can be difficult to detect. Therefore, sea lamprey ammocoete data are always poor. The fish trap at Chester Weir provides some additional contextual data, but this method is not considered particularly suited to sea lamprey monitoring. New methods such as eDNA might provide additional insights into the distribution and status of this species in the Dee catchment. A variety of freshwater population variables are measured for the Dee the results were: Ammocoete distribution: Fail, Density: Fail, Adult Run: Fail (see Garret 2015).
This component was assessed as **unfavourable**.

Marine habitat: WFD data was used from the relevant waterbodies (North Wales and Dee (N. Wales)), both waterbodies had a moderate overall status and a fail for chemical status, the chemical status fails in both cases for mercury and its compounds. Both waterbodies were assessed as moderate for DIN (dissolved inorganic nitrogen).
This component was assessed as **unfavourable**.

Noted activities:
- Barriers to upstream migration.

Evidence used: *The evidence used to support the assessment conclusion.*

- Garrett, H.M. (2015). *River Dee & Bala lake SAC population condition attribute condition assessment for brook, river and sea lamprey population 2014*. NRW Evidence Report No: 40 31pp, NRW, Dolgellau.
- JNCC, (2005). *Common Standards Monitoring Guidance for Freshwater Fauna, Version - August 2015*, ISSN 1743-8160 (Online)
- JNCC, (2015). *Common Standards Monitoring Guidance for Freshwater Fauna, Version - October 2015*, ISSN 1743-8160 (Online).
- Thomas, Rh., Garrett H. (2013). *2nd reporting Cycle Condition assessments (2007-2012): River Dee & Llyn Tegid SAC*.

- Thomas, Rh., Hatton-Ellis, T.W., Garrett, H. (2013). *Water Quality Assessments for River Special Areas of Conservation: Second Habitats Directive Reporting Round (2007-2012)*. 12/8/2. Bangor, Countryside Council for Wales. CCW Staff Science Reports.
- WFD waterbody classifications (2015). 2009-2015 Classification Data: http://waterwatchwales.naturalresourceswales.gov.uk/en/

3.7 Comparison with previous assessments

The indicative condition assessments were compared to previous assessments for these features at the site level carried out in 2011 (*Salicornia* and Atlantic salt meadows, other features were not previously assessed). The earlier assessments were carried out in more detail and different data and evidence sources were sometimes used; as a result, current and previous assessments are not directly comparable, although they do both give an indication of the condition of the features at the time of assessment.

Feature	Previous assessment (2011)	2017 indicative assessments
• Mudflats and sandflats not covered by seawater at low tide	Not assessed	Favourable
• Salicornia and other annuals colonising mud and sand	Favourable	Favourable
• Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Favourable	Favourable
• Estuaries	Not assessed	Unfavourable
• River lamprey *Lampetra fluviatilis*	Not assessed	Unfavourable
• Sea lamprey *Petromyzon marinus*	Not assessed	Unfavourable

4. Future development of site level assessments

Following this full round of indicative site condition assessments, we are now developing a permanent, sustainable, site level feature condition reporting process that can be delivered on a regular basis. We are planning a series of projects to work towards this goal. It is unlikely that resources and suitable evidence sources will all be available at any given time to monitor and report on all features, or to report to the same level of confidence. Our aim, however, is to develop, over the coming few years, an assessment and reporting process that is of practical use in informing effective site management for the maintenance or improvement of feature and site condition.

Annex A: Process used to produce indicative condition assessments

The process to produce indicative feature condition assessments at the site level centred around a workshop approach that applied readily available evidence and expert judgement to provide an *indication* of features condition. Figure A1 summarises the process of producing indicative condition assessments, and Figure A2 provides a summary definition of NRW's meaning of indicative site level feature condition assessments and advice on how they should be used.

Figure A1: Summary of the procedure undertaken

Stages undertaken to produce indicative site level condition assessment reports for Welsh European marine sites (EMS)

1. Indicative condition assessment workshop
2. Standardisation of indicative feature assessments across different sites
3. Standardised feature assessments sent out internally for comment
4. Issues with individual assessments resolved
5. Features assessments re-issued to internal staff for final comments.
6. Final draft indicative feature-level condition assessments produced
7. Internal sign-off * - draft indicative feature-level condition assessments
8. External quality assurance of draft indicative feature-level condition assessments
9. Changes made to assessments arising from quality assurance stage
10. Production of site-level reports containing indicative assessments and guidance for interpretation and use of indicative assessments
11. Final Internal sign-off ** - final site-level reports

* 1st internal sign-off by a dedicated task & finish group for the work
** Final internal sign-off by the task & finish group and then the Marine Programme Board

Figure A2: Summary definition of indicative site condition assessment.

Indicative condition assessments: Definition and use

The term 'indicative condition assessment' describes the use of readily available evidence and expert judgement in an intensive, collective workshop process to provide an indication of feature condition at the site level.

The confidence rating associated with the assessments is an **integral** part of the indicative assessment. Confidence levels for feature assessments should therefore **always** be quoted alongside the indicative condition result, together with NRW's definition of 'indicative condition assessment'.

A.1 Indicative condition assessment workshop

Existing readily available data and information was collated and an organisation-wide workshop held with NRW's specialists. By using the evidence available at the workshop and applying expert judgement, staff examined each feature for each site and drew indicative conclusions on condition. A total of 69 assessments were carried out; 66 within the workshop and a further three, for otter, following the workshop, to accommodate staff availability.

A.1.1 Assessment templates

Assessment templates were produced in advance of the workshop. These templates differed slightly depending on the feature type. In all cases the assessments were broken down into different components that were assessed separately. To assist with the workshop assessment process, staff populated the templates with relevant information before the workshop.

The templates included a notes section for providing more information on the component assessments, and an evidence section for listing the information used to inform the assessments – this was not, however, a full reference list.

A.1.2 Confidence levels

Guidance on the confidence levels to use for the assessments was produced before the workshop (Annex B).

A.1.3 Guidelines agreed at the workshop

At the beginning of the workshop the assessment approach was discussed and the following guidelines were agreed:

- 'Baseline' is considered to be the state at the time of designation – unless there is a recovery target in the conservation objectives. This means that significant modifications at the site before designation should not be taken into consideration unless there was a recovery target in the conservation objective for that feature at that site.
- The indicative condition is based on current knowledge and is based on the present i.e. the date of the assessment - but significant future concerns should be noted.
- If one attribute of the condition assessment is unfavourable, then the whole assessment is judged to be unfavourable ('one out, all out') unless there is a good reason to diverge from this. This is standard practice for NRW's Water Framework Directive (WFD) assessment processes as well as for terrestrial sites.
- Small-scale local known impacts should not necessarily result in a conclusion of unfavourable condition, but impacts should be noted.
- Assessments where there are 'unknowns' do not necessarily lead to a conclusion of unfavourable condition.
- There can be an overall 'unknown' conclusion where there is no information available to make the assessment.
- Nested features should be related to each other in the assessments. For example, an estuary feature in a site might encompass other named features. For example, in Pembrokeshire Marine SAC, the estuary feature also encompasses the mudflats and sandflats feature and the Atlantic saltmeadows feature.

- Where there is limited data an assessment should be made but the lack of data should be reflected in the confidence score.
- Any activities, developments or management measures that are having either positive or negative impacts should be noted in the assessments.
- Context on the indicative assessments and confidence ratings should always accompany the release of the conclusions on site level feature condition.

A.1.4 Post workshop processing of indicative assessments.

All 69 assessments were then taken through a process of developing them from the draft assessments agreed at the workshop to finalised indicative assessments contained within site level reports (Figure A1).

A.2 Use of best, readily available evidence

During the collation exercise and the workshop the best readily available evidence was used. Confidence ratings were applied to the evidence used for each component of the assessment (the guidance on these confidence levels can be found in Annex B). Three main sources of evidence were available before and during the workshop:

- Site-level monitoring data
- WFD Waterbody Assessments
- Activities information

In addition, expert judgement was a key part of the assessment process, drawing on the knowledge, expertise and experience that staff have amassed over many years collectively, from: training and research; visiting the sites; monitoring and survey work; and the provision of advice on development planning and activities regulation at the site level.

A.2.1 Site level monitoring data and reports

Monitoring is carried out on features or sub-features of our European marine sites following the UK common standards monitoring guidance. The amount of monitoring NRW carries out is, however, limited to the resources available, and hence the resultant prioritised monitoring programme does not provide monitoring data for all features.

Limitations:

Although the relevant specialists were present, the intensive workshop format did not always allow for full, detailed scrutiny of individual SAC monitoring reports for some features. Some monitoring information was therefore checked or added to after the workshop. A lack of resources to produce analysed reports on all existing monitoring data was highlighted as an issue during the workshop.

A.2.2 Water Framework Directive (WFD) Waterbody Assessments

The latest relevant WFD waterbody assessments (2015[3]) were used during the workshop. Both Transitional and Coastal Water bodies overlap with the SAC boundaries but, in most cases, the boundaries do not match with SAC boundaries. Maps showing the water bodies can be found at the Water Watch Wales web site[4].

[3] Environment Agency. 2015. Classification of Surface Water Bodies for the Water Framework Directive – Method Statement. Version 3.0 updated August 2014.

[4] http://waterwatchwales.naturalresourceswales.gov.uk/en/

Limitations:
Although good use was made of the summary data for the waterbody assessments, and tables had been created linking the relevant waterbodies to the relevant European marine sites, complete datasets were not available for the workshop. In addition, although some mapping data was available, the data points for each monitoring element and how they related to the feature being assessed were not available for all assessments. This was due to time constraints and the number of assessments being carried out. WFD specialists were, however, available to provide expert advice during and after the workshop.

There was some discussion among assessors on the use of some WFD elements and their relevance to individual features. The mercury and brominated diphenylether (BDPE) standard used in the 2015 WFD assessments are new more stringent standards which did not need to be implemented until 2018 but nonetheless were used in the knowledge that new standards will be coming in and to be consistent between England and Wales. These new standards have not been used in the Marine Strategy Framework Directive (MSFD) habitat assessments, which instead used the OSPAR[5] (Oslo and Paris conventions) standards for these elements.

Since the WFD assessments had been used extensively in the NRW indicative condition assessments, the decision was made, for reasons of consistency, to use the new WFD standard. It should be noted that if NRW had used the OSPAR standard some of the component elements of the indicative condition assessments would have been favourable. As part of the next stage of further developing NRW's approach to MPA site level feature condition assessment, further work is planned to assess which standards are the most relevant to apply to the Welsh MPA network.

A.2.3 Activities information

The NRW LIFE Natura 2000 (N2K) Programme[6] focussed on producing Prioritised Improvement Plans (PIPs) for each European site in Wales. These provided information on the pressure and threats for each feature of each site for assessors at the workshop. Staff were also available to discuss any ongoing casework[7] at the site level that may have impacted site condition.

Limitations:
The summary data provided was useful but, due to the number of features, information on the pressures and threats was only provided in a summary form so that detailed site level information for each issue against each feature could not be explored.

However, staff with expert local knowledge were also available to discuss pressures and threats at the site, and hence available activity information and knowledge was sufficient to support the indicative assessment process.

Two types of activity information were reported by assessors in the indicative condition assessments:

[5] Oslo and Paris conventions managed by the OSPAR Commission: https://www.ospar.org/
[6] https://naturalresources.wales/about-us/our-projects/life-n2k-wales/?lang=en
[7] Casework is a term used to encompass the assessments of plans and projects on protected sites

Relevant activities: These were activities agreed during the indicative assessment process as having an impact on the condition of the feature, underpinned by evidence. There was no confidence rating associated with these activities or their associated impacts.

Noted activities: These were activities agreed during the indicative assessment process as occurring in the site, but where there is no evidence that the activity is having a direct impact on condition of the feature at that site. Noted activities may be having, or have the potential to have, an impact on feature condition, and were listed to be kept under review.

Not all activities for a site from the LIFE N2K Programme were listed in the assessments as relevant or noted activities by the assessors. The activities listed are not meant to replace the pressures and threats in the Prioritised Improvement Plans.

Annex B: Confidence level guidance used in the site level indicative condition assessments.

B.1 Assigning confidence to component parts of the feature assessments

An indicative assessment was made for each component part of the assessment (e.g. structure and function, or typical species). These components varied depending on which feature was being assessed.

There were three potential outcomes for the assessment for each component of condition:

- favourable,
- unfavourable or
- unknown

Each outcome was assigned a confidence level.

Use of 'Unknown': The *unknown* category was only used for the condition assessment where the evidence base was extremely low or absent, and as a result it was not possible to reach any conclusion on condition. In this case the confidence level for the evidence part of that assessment was recorded as not applicable (N/A).

Even where a value was given for 'level of agreement', if the overall assessment of the component was unknown, the overall component confidence level was also recorded as not applicable (N/A).

Use of 'Unfavourable': Where any one component was unfavourable, the overall conclusion was unfavourable, (the 'one out, all out' rule), unless there was a good reason to deviate from this. See, for example, the otter assessments.

There were two types of confidence considered during the indicative condition assessment process.

1. The level of consensus between assessors and
2. The confidence in the evidence that the assessment was based on.

A matrix approach was used for this first stage of assigning confidence levels for each component of the indicative assessment.

Figure B1: Matrix used to assign the confidence level for each component of the indicative condition assessment.

Level of agreement ↑				
	High	***Low***	***Medium***	***High***
	Medium	***Low***	***Medium***	***Medium***
	Low	***Low***	***Low***	***Low***
		Low	Medium	High
		Confidence in evidence →		

B.1.1 Level of agreement between assessors

Assessors were required to draw conclusions based on the available evidence in the context of their knowledge of the relevant feature at that site. Where available evidence was contradictory or of only partial benefit in arriving at a condition assessment, this was resolved as far as possible, taking into account the amount, quality and relevance of the data. The resultant conclusion was given a confidence rating for the degree of consensus amongst the assessors, as follows:

- **High:** All assessors agreed with the assessment of the feature condition component;
- **Medium:** The majority of the assessors agreed with the assessment of the feature condition component;
- **Low:** There was no clear consensus on the assessment of the feature condition component.

B.1.2 Level of confidence in the evidence used to make the assessment

The degree of confidence in the assessments of each component was based on the quantity, quality, relevance or consistency of the evidence used. The categories are high, medium and low confidence as described below:

High confidence

- Clear evidence from complete monitoring surveys (high quality data collected to relevant standards with robust analysis of results and appropriate positional data) to support assessment relevant to condition components.

Medium confidence

- Partial survey or one of lower quality (i.e. lacking detail or appropriate positional data);
- Indirectly relevant to condition components but evidence may be from a complete survey, scientifically accurate study, peer-reviewed research or other surveys;
- Site-based, expert knowledge directly relevant to targets, supported by evidence (i.e. records, casework history, photos, positional data).

Low confidence

- Incomplete, old or lower quality survey;
- High quality data but from only a small portion of the component (e.g. data only available for one small area of a habitat on a site where that habitat is extensive and varied);
- Modelled information;
- Site-based, expert knowledge information either indirectly relevant to component condition or lacking sufficient supporting information.

B.2 Assigning confidence levels to the overall indicative condition assessment

The process for assigning the overall confidence level for the indicative assessment of the feature from the component confidence levels used the following rules:

- Where the overall indicative condition assessment was Unknown the confidence level was stated as not applicable.
- Where only one of the assessment components was unfavourable (leading to the overall assessment of unfavourable), the confidence level associated with the unfavourable component was used.
- Where two or more of the assessment components were unfavourable (leading to the overall assessment of unfavourable), the highest confidence level assigned to one of the unfavourable components was used for the overall confidence level.
- In all other circumstances the highest confidence level[8] attained for one of the individual components was used.

B.3 Use of confidence ratings

In all instances, whenever the indicative features and site condition assessments are reproduced or quoted this should be done together with the confidence rating and the definition of indicative assessment provided in this report.

[8] The use of the highest confidence level is one used in WFD assessments – reflecting that the assessment confidence is based on the best evidence available.

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