



Condition Assessments for Grey Seal *Halichoerus grypus* in Welsh Special Areas of Conservation

Report No: 896

Authors: S. Cuthbertson, T. Stringell, K. Lock, H. Self, E. Wynter, M. Jackson-Bué and M. Hatton-Ellis.

Authors Affiliation: Natural Resources Wales



Resting grey seal. © Tracey Dunford.

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Report series:	NRW Evidence Report
Report number:	896
Publication date:	June 2025
Title:	Condition Assessments for Grey Seal <i>Halichoerus grypus</i> in Welsh Special Areas of Conservation.
Author(s):	Cuthbertson, S., Stringell, T., Wynter, E., Lock, K., Self, H., Jackson- Bué, M. and Hatton-Ellis, M.
Technical Editor:	Hatton-Ellis, M.
Quality assurance:	Tier 3
Peer Reviewer(s):	Alverez, M., Butterill, G., Camplin, M., Davies, S., Ellis, T., Gjerlov, C., Haines, L., Moon, J., Pauls, L., Ramsay, K., and Sharp, J.
Approved By:	Winterton, A.
Restrictions:	None

Distribution List

NRW Library	2
National Library of Wales	1
British Library	1
Welsh Government Library	1
Scottish Natural Heritage Library	1
Natural England Library (Electronic Only)	1

Recommended citation for this volume:

Cuthbertson, S., Stringell, T., Wynter, E., Lock, K., Self, H., Jackson-Bué, M. and Hatton-Ellis, M. 2025. Condition Assessments for Grey Seal *Halichoerus grypus* in Welsh Special Areas of Conservation. NRW Evidence Report No: 896, 52pp, NRW, Cardiff.

Contents

About Natural Resources Wales	2
Evidence at Natural Resources Wales	2
Distribution List	3
Recommended citation for this volume:	3
Contents	4
List of Figures	5
List of Tables	5
Crynodeb Gweithredol	6
Executive summary	7
1. Introduction	8
1.1. Assessment process	8
2. Feature description	10
3. Grey seal <i>Halichoerus grypus</i> condition assessments	11
3.1. Pembrokeshire Marine SAC condition assessment	13
3.2. Pen Llŷn a'r Sarnau SAC condition assessment	27
3.3. Cardigan Bay SAC condition assessment	37
4. Threats to grey seal condition	45
5. Evidence gaps for grey seal	46
6. References	48

List of Figures

Figure 1. Location of SACs assessed for the grey seal feature.	.12
Figure 2. Seal pup production at Marloes Peninsula in Pembrokeshire Marine SAC	.21
Figure 3. Total observed pup production across the North Wales region from surveys conducted in 2001, 2002, 2004 and 2017	.33
Figure 4. Pup production on Bardsey Island between 1998 and 2023	.34

List of Tables

Table 1.	The main steps of the marine feature condition assessment process	9
Table 2.	Condition assessment of grey seal in Pembrokeshire Marine SAC1	3
Table 3. SAC	Summary of the condition assessment for grey seal in Pembrokeshire Marine	8
Table 4.	Condition assessment of grey seal in Pen Llŷn a`r Sarnau SAC2	27
Table 5. SAC	Summary of the condition assessment for grey seal in the Pen Llŷn a`r Sarnau 	12
Table 6.	Condition assessment of grey seal in Cardigan Bay SAC	7
Table 7.	Summary of the condition assessment for grey seal in the Cardigan Bay SAC4	1
Table 8.	Evidence gaps for grey seal in Welsh SACs4	6

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 morlo llwyd *Halichoerus grypus* o fewn ardaloedd cadwraeth arbennig dynodedig (ACA) ledled Cymru. Mae Adran 1 yn rhoi trosolwg o'r broses asesu ac mae Adran 2 yn darparu disgrifiad a lleoliad y nodwedd(ion).

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 yr IMCA.

Lleoliad y nodwedd ACA	Asesiad cyflwr	Hyder yn yr asesiad
Sir Benfro Forol	Ffafriol	Canolig
Pen Llŷn a'r Sarnau	Ffafriol	Canolig
Bae Ceredigion	Ffafriol	lsel

Crynodeb o asesiadau cyflwr ar gyfer morlo llwyd mewn ACAau ledled Cymru

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 grey seal *Halichoerus grypus* within designated special areas of conservation (SACs) across Wales. Section 1 gives an overview of the assessment process and Section 2 provides a description and location of the feature.

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 <u>IMCA final report</u>.

Name of SAC	Condition assessment	Confidence in assessment
Pembrokeshire Marine	Favourable	Medium
Lleyn Peninsula and the Sarnau	Favourable	Medium
Cardigan Bay	Favourable	Low

Summary of condition assessments for grey seal in SACs across Wales.

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 <u>2018 indicative assessments</u> 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 <u>IMCA final report</u>.

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., an estuary 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.

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

2. Feature description

Grey seals *Halichoerus grypus* have a cold temperate to sub-Arctic distribution in North Atlantic waters. There are three centres of grey seal abundance in eastern Canada and the USA, the UK and the Baltic Sea (SCOS 2022).

Approximately 35% of the world's grey seal population resides in the UK, comprising between 146,700 - 178,500 adult seals (SCOS, 2022). Wales hosts around 3-4% of the UK population of grey seals. Population size can be estimated from pup production and/or counts of hauled out seals at non-pupping times (see Thomas et al., 2019; SCOS 2022). Seals haul out along most of the Welsh coast (Thompson 2024 in prep) but the majority of pupping occurs along the north Pembrokeshire coastline and its offshore islands, with other notable pupping sites being found in North Wales, on the Llŷn Peninsula and Anglesey.

Male grey seals may live for over 20 years and begin to breed from about age 10. Females often live for over 30 years and begin to breed at about age five (SCOS, 2022). Grey seals form breeding groups made up of a single male and multiple females and breeding site fidelity is relatively high (Pomeroy et al., 2000; Langley et al., 2020). The grey seal pupping season in Wales typically runs from August to December, peaking in September and October (Bull et al., 2017, Westcott and Stringell, 2004). Lactation lasts around 17 - 23 days on average, and weaning is short as females become fertile towards the end of lactation and mating occurs (SCOS, 2022).

Grey seals breed at sites varying in topography and habitat, ranging from open shingle beaches to rocky shores and sea caves. In Wales, seals in some sites regularly use sea caves as pupping sites, with previous work having shown that more than 50% of pups are born in cryptic habitats such as sea caves (Baines et al., 1995, Stringell et al., 2014).

Grey seals spend most of the year at sea and may range widely in search of prey. They frequently travel over 100km between haul out sites while foraging trips can last anywhere between 1 and 30 days and can cover over 400km (Carter et al., 2022; SCOS, 2022). Typically, grey seal foraging trips start and end at the same haul out site, but many seals travel to other haul out sites, sometimes moving from haul out site to haul out site on long distance trips, and seals may use different areas for foraging and breeding (McConnell et al. 1999; Russell et al., 2013). Compared with other times of the year, grey seals in the UK spend longer hauled out during their annual moult (between December and April) and during their breeding season (between August and December).

More information on grey seal be can be found on the JNCC website.

3. Grey seal *Halichoerus grypus* condition assessments

This section contains assessments for grey seal *Halichoerus grypus* in Welsh only special areas of conservation (SAC). The feature is designated in three SACs in Wales (Figure 1):

- Sir Benfro Forol / Pembrokeshire Marine
- Bae Ceredigion / Cardigan Bay
- Pen Llŷn a'r Sarnau / Lleyn Peninsula and the Sarnau

Grey seal condition has been assessed against the chosen performance indicators. Any gaps in evidence that would improve the assessment of condition have been identified for each SAC.

The indicators were assessed using a combination of information from NRW monitoring, Water Framework Directive (WFD) Regulations 2017 (WFD Regulations) monitoring, commissioned evidence reports, scientific literature, plan and project assessments, site knowledge and expert judgement. The outcome and any reasons for failure for each SAC are discussed in more detail in the sections below.

Each grey seal condition assessment is a standalone report that can be read independently. However, as grey seal are a mobile species and move between the sites there is some repetition across the assessments, as in some cases the same sources of data have been used to assess each site. To avoid too much repetition, where the assessment is the same across all sites, reference will be made to the first site assessment.

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.

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Figure 1. Location of SACs assessed for the grey seal feature.

3.1. Pembrokeshire Marine SAC condition assessment

Monitoring of the grey seal *Halichoerus grypus* population in Pembrokeshire Marine SAC began in 1974. Monitoring is carried out by a variety of organisations including NRW, the Royal Society for the Protection of Birds (RSPB), the Wildlife Trust of South and West Wales and the Pembrokeshire Coast National Park. A summary of the condition assessment for grey seal in Pembrokeshire Marine SAC can be seen in Table 2. The overall feature condition, a detailed summary of the assessment and threats to condition can be found in the assessment conclusions.

Table 2. Condition assessment of grey seal in Pembrokeshire Marine 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
Grey seal population size relevant to the	The wider seal population relevant to the SAC is stable or increasing. (P)	 The population relevant to the SAC encompasses all of Wales and the wider Irish and Celtic seas. A census of grey seals in south-west Britain (including the 	Pass	Medium
SAC		entire coast of Wales) was done via aerial survey in August 2023.		
		• The population of grey seals in Wales was estimated to be 5,284 seals at the time of the survey. This is a minimum estimate due to cryptic haul outs (e.g. caves).		
		 Pup production models estimate the adult (1 year +) population of Wales to be approximately 5,300. 		
		 The population relevant to the SAC was judged to be doing well and assumed to be increasing. 		
		• Confidence is medium as updated methods and survey areas in the latest aerial survey make comparisons to previous surveys difficult. The lack of systematic monitoring of seals at the all-Wales scale also lowered the confidence.		

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Colony pup production A st pup colo sup pop for r and	A stable or increasing pup production at the colony level, that support the SAC population, allowing for natural change and variation. (P)	 Data from 1992-2023 showed an increased trend of pup production from all monitored areas in the SAC: Pup production from 1992 to 2008 was stable in the Skomer MCZ with an increasing trend from 2008 to 2023. The MCZ includes both Marloes and Skomer. The pup production on Ramsey has been showing an increasing trend between 2010-2023 compared to 1992-2002 	Pass	High
		 (no surveys completed for 2003-2009). The highest pup production from all monitoring sites was recorded over in the 2023 breeding season. 		
		 In south Pembrokeshire the Castlemartin Range site of special scientific interest (SSSI) has pupping data available for 2004-2023 that show an increase in the number of pups born over this period. 		
		• Confidence in the pass is high given the long term monitoring of colonies in the SAC.		

Indicator	Target	Assessment rationale	Target assessment	Target confidence
SAC pup production	A stable or increasing pup production within the SAC that	• All monitored colonies in Pembrokeshire Marine SAC have continued to do well since 2005 and have seen an increase in pup production.	Pass	Medium
	population, allowing	 There has also been a trend across the UK for increases in the grey seal populations in all regions. 		
	and variation. (S)	 For these reasons it is accepted that production across the SAC has likely remained stable or increasing. 		
		• The pups produced in Pembrokeshire Marine SAC represent around 89% of Wales' pup production. This makes the SAC vital in maintaining the wider population.		
		 Confidence in the pass is medium due to the lack of recent data available for the north of Pembrokeshire 		
Distribution of grey seal pupping sites within the SAC	The distribution and extent of pupping sites in the SAC is stable or increasing, allowing for natural change and variation. (P)	 Monitored areas in the Skomer MCZ have continued to support pupping with a stable distribution. 	Pass	Medium
		• South Pembrokeshire has seen an increase in pupping sites from 6 in 2004 to 10 in 2023 (peaking at 12 in 2021).		
		 Data from Ramsey island suggest pupping distribution has been stable for the last 10 years. 		
		• There are no recent systematic pupping survey data that apply across the whole SAC and no recent data for north Pembrokeshire. However, anecdotal evidence from north Pembrokeshire suggests that pups are being found in higher numbers in small sites.		
		 Confidence in the pass is medium due to lack of monitoring across the whole SAC. 		

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Accessibility to habitat used by seals	No evidence of significant constraints on grey seal access to habitat within or associated with the SAC. (P)	 There was no knowledge of 'barriers' that would be a concern. Seal numbers are stable or increasing at regularly monitored sites in the SAC suggesting no significant constraints on seals' access to habitat required to support them. Confidence is high due to in depth site knowledge and high numbers of seals throughout the SAC. 	Pass	High
Anthropogenic disturbance	No significant anthropogenic disturbance affecting the grey seal population associated with the SAC. (P)	 Evidence suggests current levels of anthropogenic disturbance are not significantly impacting the seal population associated with the SAC. Population is known to be doing well in monitored sites. The confidence in the pass is medium, as while the population is increasing, activity monitoring is only done in the Skomer MCZ. 	Pass	Medium
Prey availability	Maintain the quality, abundance and diversity of prey species needed to support the grey seal population. (S)	 There is no reason to believe grey seals are prey-limited, that prey availability is limiting the grey seal population, or that there has been a reduction in diversity of available prey species. Grey seal population is expanding in Wales which strongly suggests prey is abundant enough to support the population. Confidence in the pass is medium as the assessment is based on proxy data (seal numbers and fisheries data). 	Pass	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water, sediment and prey contaminants	Ensure water, sediment and prey contaminants are at levels not detrimental to the grey seal	• One WFD waterbody has a pass for chemicals in the 2024 cycle 3 interim classification (Milford Haven Outer). However, some of the chemical classifications were rolled forward from the 2021 cycle 3 classification. This waterbody has improved since previous cycles.	Pass	Low
	population. (S)	• One WFD waterbody has a fail for chemicals (Milford Haven Inner), due to polybrominated diphenyl ethers (PBDE) and polycyclic aromatic hydrocarbons (PAH). This waterbody is not used by seals as it is high up the estuary.		
		 High concentrations of some heavy metals and PAHs have been identified from sediment sampling in the Milford Haven Waterway and Skomer MCZ in 2022 and 2023. 		
		 OSPAR report mercury and lead are above ecological guidelines in the North-East Atlantic region, as is one congener of PCB. 		
		• A study of marine mammals from around the UK found grey seals had the lowest mean concentrations of persistent organic pollutants of all 11 species studied, with only 17% above toxicity thresholds. However, the sample size was small.		
		• Seal numbers in the SAC have been increasing since 2008.		
		• Contaminants are deemed not to be having a detrimental impact on seals at present, but confidence is low due to lack of sampling in seals and lack of understanding of the impact contaminants have at the population level.		

Assessment conclusions

The condition of the grey seal feature in the Pembrokeshire Marine SAC has been assessed as being in **favourable condition** (medium confidence). All performance indicators targets were met. The wider population and pup production data all suggest grey seal numbers have been increasing in recent years. While contaminants are present, they are not thought to be impacting grey seals at a population level at present; however, they remain a threat to future condition. There is significant bycatch of grey seals in net fisheries in the Celtic Seas of the south-west UK and Ireland (SCOS 2022; Taylor et al., 2022). While seal bycatch is likely to be minimal inside Pembrokeshire Marine SAC, bycatch outside of the SAC affects the wider population, of which the SAC is part. For further information on threats see <u>Section 4</u>.

Table 3. Summary of the condition assessment for grey seal in Pembrokeshire Marine SAC.

SAC	Overall Condition Assessment	Indicator failures	Reason for indicator failure	Threats to condition
Pembrokeshire Marine	Favourable (medium confidence)	None	• None	DisturbanceContaminantsFisheries bycatch

Detailed assessment information

Grey seal population

Based on pup production, it is estimated that approximately 3-4% of the UK's grey seal population resides in Wales (SCOS, 2022). An estimated 2250 pups are born per year in Wales, of which around 89% (approx. 2000) are born in Pembrokeshire marine SAC (Russell and Morris 2020). However, there is uncertainty around this estimate given the age and sporadic nature of most of its underlying data (e.g. Baines et al., 1995; Westcott 2002; Westcott and Stringell 2003). This makes Pembrokeshire Marine SAC vital in maintaining the wider population of grey seal in Wales. Pup production at regularly monitored sites in Wales has increased markedly since monitoring began (Bull et al., 2017; Morgan et al., 2018; Strong et al., 2015; Robinson et al., 2023).

While grey seals show fidelity to their chosen breeding sites (Pomeroy et al., 2000; Langley et al., 2020), they have been shown to range widely within Wales, southwest England, and Ireland as demonstrated by satellite tracking studies (SCOS, 2013; Thompson, 2011; Russell et al., 2017) and photographic identification (photo ID) (Langley et al., 2020; Pomeroy, et al., 2014; 2015). Females have been shown to range between Skomer in the south and Bardsey in the north within the 8–10-week breeding season. This suggests some females are moving away from breeding sites after pups are reared (approx. 20 days), or that non-breeding females are coming in and out of the breeding areas from around Wales (Langley et al., 2020).

Outside of the breeding season, satellite telemetry has shown that animals (weaned pups/yearlings and adults) also move large distances and seals tagged in Wales have been tracked hauling out around the Irish and Celtic Seas (see Carter et al., 2022 for synopsis).

For these reasons, the population of seals relevant to the SAC can be said to be part of the wider seal population inhabiting the UK, particularly within the Irish and Celtic Seas region. Within this area there are several Seal Monitoring Units (SMUs)(SCOS 2022), of which SMU 12 is the whole of Wales.

An aerial survey in August 2023 counted 1,313 grey seals across Wales. As approximately only 25% of the population are hauled out and visible at any one time, this equates to a population estimate of around 5,284 individuals (95% confidence intervals 4571- 6195) (Thompson, in prep). This represents a minimum estimate due to the use of cryptic haul outs not visible to aerial photography e.g. in caves (Stringell et al, 2014). Ground counts of some haul out sites taken at the same time as aerial surveys, were higher than aerial counts, suggesting a further 10% could also be added to the estimate (Thompson, in prep).

The aerial survey estimated a 64% increase in the number of hauled-out seals, based on the difference since the last summer composite estimate of 800 hauled-out seals that represented data from 2002-2020 (Thompson, in prep). This increase is likely due to more extensive coverage of mainland and offshore island sites in the aerial survey which were not included in the previous estimate (probably a large under estimation) and the apparent increase in numbers of hauled-out seals at previously included sites (Thompson, in prep). Seals hauled-out at cryptic coastal sites, e.g. caves and overhanging cliffs, however, were not counted by the aerial survey and represent an unknown but possibly large bias. Due to

the differences in the way these estimates were produced it is hard to tell how large the increase has been with certainty. The fact that a similar 65% increase is estimated at directly comparable North Wales sites from surveys in August 2002, supports the suggestion of a population increase in Wales (Thompson, in prep).

Pup production is typically used to estimate the size of the overall population (Russell et al., 2019; Thomas et al., 2019). The most recent Welsh pup production estimate, based on pup production between 2016-2019 from sites across Wales, is 2,250 pups (Russell and Morris, 2020). This pup production estimate is used to give an estimate of total population size (1+ year old). Pup production is multiplied by a scaling factor of 2.31, which represents a ratio of pups to adults from systematically monitored pup colonies in Scotland and east England. Based on pup production, the Welsh population is estimated to be approximately 5,200, which is, perhaps coincidentally, very close to the total population estimated from hauled-out seals in summer (Thompson, in prep).

The population of grey seals relevant to the SAC was judged to be doing well and assumed to be increasing, meeting the indicator target. The confidence in the pass was reduced to medium, however, to reflect the caveats on the aerial survey results, the conservative estimates of pup production and the fact that comparisons between the latest aerial survey of summer population and previous ground-based survey results are challenging and potentially unreliable. This makes it harder to say with certainty that the estimated increase is a true increase, but our judgement is that an increase has occurred.

Colony pup production

Female grey seals are assumed to give birth to one pup in a breeding season, meaning pup production can be used as a suitable proxy for breeding female abundance and a good indicator of the health of the population (JNCC, 2005).

Annual pup production data are available from monitored pupping sites within Pembrokeshire Marine SAC. The most detailed data are from the Skomer Marine Conservation Zone (MCZ), where pups are counted at all Skomer Island and mainland (Marloes Peninsula) sites and each pup is tracked up to the point they moult for the first time (Büche and Bond, 2024). Other monitored sites in the SAC are Ramsey Island where pups are counted at nine survey sites and then pup production is modelled for the whole island (Stephens, 2023), and Castlemartin Range site of special scientific interest (SSSI) in South Pembrokeshire where every pup is counted (NRW unpublished data).

Despite declines on Skomer Island between 1992 to 2008, the pup production for the whole Skomer MCZ was stable due to increases in the Marloes peninsula and averaged 208 pups per year (Bull et al., 2021). This highlights the variability that can exist between neighbouring pupping sites and the importance of scale when monitoring (Engbo et al., 2020). Since 2008 there has been an increasing trend at both island and mainland colonies, though this increasing trend is showing signs of levelling off (Büche and Bond, 2024). There were 425 pups born in the MCZ in 2023. This was less than the record years of 2021 and 2022 (446 and 447 births), but in line with 2020 (422 births) (Büche and Bond, 2024).

On Ramsey Island the RSPB has monitored seal pupping in nine sites using consistent methodology since 1992. There was a break in surveying between 2003-2009. The mean pup production for years 1992-1996 was 217 (Morgan et al, 2018). This rose to a mean

production of 330 between 2010-2019 (Stephens, 2023). Pupping has continued this increasing trend with a peak pup production in 2023 of 429 pups across the nine monitored sites (Stephens, 2023).

In the Castlemartin Range SSSI, pupping data are available from 2004 to 2023 (NRW unpublished data). There has been a progressive increase in the number of pups born up to 2022, ranging from 21 pups in 2004 to 78 pups in 2022. There were slightly fewer pups born in 2023 (65 births) but this is considered to be within the bounds of natural variation.

There are some breeding sites in North Pembrokeshire that have previously been monitored. Up to 2014, pupping showed an 80% increase in production between 1992 to 2014 (Strong et al. NRW unpublished data), but there has been no monitoring since. However, there is anecdotal evidence that pupping sites in North Pembrokeshire have increased (Pers comm, Pembrokeshire Coast National Park ranger). This allows the assumption that the colonies in the north are following the same increasing trend as those in the south.

The data show that pup production at monitored colonies in Pembrokeshire is healthy. There was an upward trend at Skomer Island up to 2017 but data now show a levelling off. However, grey seals seem to be expanding into the Marloes Peninsula with a steady increase since 1992 (Bull et al., 2017). Mean pup production from 2008-2015 was 119. This has increased to 169 between 2016-2023, peaking at 192 in 2022 (Figure 2).



Figure 2. Seal pup production at Marloes Peninsula in Pembrokeshire Marine SAC. From Stephens, 2023.

The high levels of pup production at each monitored colony meant the indicator passed its target. The up-to-date monitoring and long-term nature of the data sets allowed the indicator to pass with high confidence.

SAC pup production and distribution

In 2005, a SAC wide census found pup production across the SAC had increased compared to production between 1992 and 2000 (Strong et al., 2006). While the authors were confident that the increase was real, it was above any predicted increase based on trends seen in the data. There has not been a SAC wide census on pup production since 2005. However, all monitored colonies in Pembrokeshire Marine have continued to do well since then and have seen a continued upward trend in pup production, with signs of stabilising at some sites. There has also been a trend across the UK for increases in the grey seal populations in all regions. The seal population in the UK has increased steadily since the 1960s, though this increase is now slowing (1.4% per year over the last survey interval) (SCOS, 2022).

For these reasons it is accepted that production across the whole SAC is likely to have followed that of monitored colonies and remained stable or increasing. Confidence in this pass is lowered to medium as there can be high variation in pup production between sites, even those near each other (Engbo et al., 2020). There has also been a lack of monitoring in the north of the SAC since 2005.

The distribution of breeding across the SAC can reflect factors impacting on seals, both positive and negative. Monitoring seal pupping distribution can identify areas that are important to breeding seals (JNCC, 2005). These areas can then be managed for anthropogenic impacts. If the distribution of breeding seals changed across the SAC, it could be indicative of disturbance or reduction in habitat quality.

Evidence suggests the distribution of monitored breeding colonies in the Skomer MCZ and Ramsey Island within Pembrokeshire Marine SAC are broadly stable. On Ramsey Island there has been a shift in pupping distribution between 2000-2003. In 2000, pup births were fairly evenly distributed across the 9 monitored sites on the island. By 2023 almost half of all pups were born in one site. However, over the last 10 years the distribution in pupping has been stable (Stephens, 2023).

In South Pembrokeshire (Castlemartin Range SSSI) data show the numbers of sites are growing. The 6 pupping sites recorded in 2004 have grown to 10 sites in 2023, peaking at 12 sites in 2021 (Pers comm, K. Lock (NRW)). However, it is hard to say if this increase in pupping sites applies elsewhere in the SAC as there are limited data for North Pembrokeshire. There is anecdotal evidence from the mainland in the north of the SAC which suggests pups are being found in higher numbers in small sites (Pers comm, Pembrokeshire Coast National Park ranger).

The increase in distribution of pupping sites across the south of the SAC and the stable distribution of sites in other monitored areas, together with evidence that activities occurring in the region are not currently limiting pupping distribution, meant the indicator passed. The confidence was reduced to medium due to lack of recent monitoring of the north mainland coast of the SAC.

Habitat accessibility and disturbance

Grey seals require suitable coastal habitat with which to haul out onto to rest after foraging, to give birth and rear their pups and to moult. In general haul out and breeding sites are undisturbed areas of rock, sandbank or beach with good access to the open sea (JNCC, 2005). In Wales, seals show a strong preference for breeding in sea caves (Baines et al., 1995; Stringell et al., 2014). Seals also require suitable foraging habitat that supports sufficient prey to maintain the population. Seal numbers are stable or increasing at regularly monitored sites in the SAC suggesting no significant constraints on seals' access to habitat required to support them. The habitat accessibility indicator, therefore, met its target with high confidence, supported by good knowledge of the site and high numbers of grey seals.

Disturbance on land mainly comes in the form of recreational disturbance (e.g. dog walkers, kayakers, coasteering, wildlife watching boats, drones etc) or from airborne noise such as from construction, military exercises and recreation e.g. fireworks. Disturbance can lead to seals escaping into the water to avoid the perceived threat. This can stress seals and comes with an energetic cost. It is also a danger to new pups and can result in pup death through physical harm as adults flee to the water or starvation as the mother abandons the breeding site and pup altogether (SCOS 2013). Changes in the distribution of breeding seals could be indicative of disturbance.

The inaccessibility of many breeding and haul out sites in Pembrokeshire Marine SAC contributes to minimising some types of human disturbance. Airborne noise is known to occur in the SAC from ongoing activity within Castlemartin Range SSSI. The current activity within the SSSI does not appear to be inhibiting increases in pup production or pupping site use, which have occurred alongside these activities since before the designation of the SSSI. There is potential however, for non-routine activities to create greater disturbance, which may result in a detrimental impact on the seals.

Disturbance to seals at sea comes largely from underwater noise associated with construction of industrial developments e.g. windfarms. There is concern that loud underwater noise can lead to hearing damage, cause animals to flee from or avoid their natural habitat, reduce foraging, and cause physiological stress (Southall et al., 2019; Hastie et al., 2015; Russell et al., 2016; Whyte et al., 2020). Behavioural changes have energetic and fitness costs and may have consequences on populations (e.g. Chudzińska et al., 2024).

The Pembrokeshire Coast National Park Authority has published <u>a code of conduct</u> for sea users as have the Skomer Marine Conservation team, to help minimise recreational disturbance. Disturbance in the Skomer MCZ is further controlled through careful management. Industry best practices also help to manage or mitigate disturbance from developments which are robustly assessed when applying for the appropriate permissions.

It is vital that seals have unconstrained access to sufficient suitable habitat both on land and at sea. There is a lack of understanding of the availability of suitable habitat in Pembrokeshire Marine SAC. While disturbance is occurring in the SAC (Castlemartin range SSSI), continued increases in pupping at monitored colonies is evidence that disturbance is currently not adversely affecting the seal population. Therefore the population has been assessed as not being detrimentally affected by significant anthropogenic disturbance. The indicator passed with medium confidence as, with the exception of Skomer MCZ, there is limited monitoring in the SAC of activities that may cause disturbance.

Prey availability

Grey seals are generalist predators and their diet varies depending on their location and the time of year, taking whatever food source is locally abundant (Bowen et al., 2006; Brown et al., 2012; Hammond and Prime, 1990). A study on grey seal diet in Pembrokeshire between 1992 and 1994 found seals ate a wide range of fish species, most of which are not commercially fished, reflecting their opportunistic feeding behaviours. Gadoids and flatfish dominated seal diet (70%) over 3 years in Pembrokeshire (Strong, 1996). Similar results were seen from a more recent comprehensive study of grey seal diet in Wexford Harbour, Southeast Ireland (Gosch et al., 2019) and in small seal diet study on Skomer Island (Lofthouse, 2017). Some commercial species are potentially depleted in the Irish / Celtic Seas (cod, whiting, seabass, herring and plaice which made up 33% of seal diet by weight in the Strong (1996) Pembrokeshire study). However, other commercial species like sole remain abundant, and herring and seabass appear to be making slow recoveries following cessation or restrictions on fishing.

There is no reason to believe that prey is limited or has reduced diversity in the areas of Pembrokeshire Marine that grey seal are using to forage. The grey seal population in Wales has been expanding and pupping has an increasing trend in the SAC. This strongly suggests prey is abundant enough to support a growing population and allowed the indicator target to pass. As there is no targeted surveying of prey abundance or recent seal diet studies, however, the confidence in the pass was reduced to medium.

Contaminants

Grey seals, like all marine mammals, are exposed to a variety of anthropogenic contaminants. The main route of exposure is through ingestion of prey, as these mammals are top predators, making them at risk from contaminant biomagnification through the food chain (Hammond et al., 2005). This is particularly the case for persistent organic pollutants (POPs) like polychlorinated biphenyls (PCBs) and heavy metals (e.g. mercury), which are lipid soluble. The toxic effects of these contaminants are well studied with impacts such as reduced reproduction and high susceptibility to disease (Hammond et al., 2005).

The Milford Haven Inner waterbody has a fail for chemicals in the 2024 cycle 3 interim classification, where polybrominated diphenyl ethers (PBDE) and polycyclic aromatic hydrocarbons (PAH) failed. PBDE has failed in this waterbody in all previous cycles. The human health protection goal that is used for PBDE may be considered as over precautionary as the effect of contaminants on grey seals are not fully understood. The Milford Haven waterbody is not regularly used by seals as it is high up the estuary, therefore the failure of this waterbody was not considered in the condition assessment. The Milford Haven Outer waterbody previously failed for mercury and TBT in previous cycles. This waterbody now passes for chemicals in the 2024 cycle 3 interim classification, however TBT, which was previously a failing chemical, is no longer assessed. In addition, mercury was not classified in the 2024 cycle 3 interim classification. The four other WFD waterbodies in the SAC were not classified as the chemicals have not been assessed within the last six years (Pembrokeshire South, Cardigan Bay South, Grassholm Island and the Smalls, and Solfach Estuary).

Sediment sampling at Skomer Island found high levels of chromium and lead, which on average were above the more stringent ecological guidelines in 2022 and have increased since earlier years. Arsenic levels were also high and were above the less stringent ecological guideline in 2022. NRW monitors sediment contaminants as part of the Clean Seas Environment Monitoring Programme (CSEMP). Sediment sampling in Milford Haven Waterway found that the average concentration of one PAH compound was above its most stringent ecological guideline in 2023. Other PAH compounds were below their more stringent guidelines but above their less stringent guidelines in 2023. Other contaminants (including PCBs and heavy metals) were typically below the most stringent ecological guidelines in 2023. Additional sediment sampling in the Milford Haven Waterway found that most stations had contaminant levels below guidelines, however there were a small number of stations with high concentrations of mercury or PAHs. Due to the industrial nature of the Milford Haven Waterway, there is a history of contamination.

The Convention for the Protection of the Marine Environment of the North-East Atlantic or OSPAR, assess the state of the seas in the region. The latest quality report published in 2023 states that hazardous substances are still a cause for concern across the region, including the Irish Sea. Both mercury and lead are above ecological guidelines in the North-East Atlantic region, as is the most toxic congener (CB118) of PCB when measured in sediments and biota (fish, shellfish, birds and mammals) (Larsen and Hjermann, 2022; Webster and Fryer, 2022). Overall, PCBs in 2010-2020 were lower than the 1980s, but concentrations in some areas are still at levels that may cause adverse effect to marine life (Webster and Fryer, 2022).

While concentrations of POPs in marine mammals have declined over the last 30 years a recent study found a substantial proportion of individuals across 11 species sampled around the UK had POPs above toxicity thresholds (Williams et al., 2023). It should be noted that grey seals had the lowest mean concentrations of all 11 species studied and only 17% of studied grey seals (21 individuals) were above the threshold for PCBs and DDTs (0% above PBDEs), though the sample size was very small (Williams et al., 2023).

Marine litter is also a concern for seals in the waters around Wales. Litter impacts on seals are monitored at the Skomer MCZ every year. The most obvious marine litter impacts are consistently from monofilament line and netting from fishing activity. In 2023, 29 individual seals were photographed with obvious signs of damage from entanglement with fishing nets. The most common injury is a deep scar on the neck, often with the net still embedded (Lock et al., 2024). Microplastics have also been found in seal stomachs and scat (Hernandez-Milian et al., 2019; Lofthouse, 2017). It is not clear if the microplastics are ingested directly or are present inside their prey (Lofthouse, 2017). Marine litter and microplastics are not currently having an impact on seals at population level but are a threat to future condition if they were to increase significantly. Individual seals entangled with fishing line and net is a welfare issue at the SAC level.

Contaminants are still a threat to all marine mammals around Wales, not just grey seals. Despite bans and strict controls on mercury, PBDE, and PCBs, there is still a risk of historical deposits being released into the environment from sediments. Novel contaminants are also emerging and management is yet to be put in place for PAHs. However, at the time of this assessment, contaminants are not considered to be having a detrimental impact on grey seal at the population level, given the long-term increase in seal pupping in the SAC and increasing UK population. Therefore the water, sediment and prey contaminants indicator met its target. The confidence in the pass was low because there is a lack of monitoring of contaminants in grey seals, some WFD waterbodies have not been assessed and there is a lack of understanding around the impacts contaminants have at a population level.

Reasons for target failure

The grey seal feature in the Pembrokeshire Marine SAC has been assessed as being in **favourable** condition as none of the targets failed.

3.2. Pen Llŷn a'r Sarnau SAC condition assessment

The grey seal *Halichoerus grypus* population in Pen Llŷn a'r Sarnau SAC has been monitored sporadically since 2001. A summary of the condition assessment for grey seal in Pen Llŷn a'r Sarnau SAC can be seen in Table 4 which contains a summary of the assessment against the performance indicators. The overall feature condition, a detailed summary of the assessment and threats to condition can be found in the assessment conclusions.

Table 4. Condition assessment of grey seal in Pen Llŷn a`r Sarnau SAC. Indicator targets have a primary (P) or secondary (S) target (see Section 1.1).

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Seal population size relevant to the SAC	The wider seal population relevant to	 The population relevant to the SAC encompasses all of Wales and the wider Irish and Celtic seas. 	Pass	Medium
	the SAC is stable or increasing. (P)	• A census of grey seals in south-west Britain (including the entire coast of Wales) was done via aerial survey in August 2023.		
		• The population of grey seals in Wales was estimated to be 5,284 seals at the time of the survey. This is a minimum estimate due to cryptic haul outs (e.g. caves).		
		 Pup production models estimate the adult (1 year +) population of Wales to be approximately 5,300. 		
		• The population relevant to the SAC was judged to be doing well and assumed to be increasing.		
		• Confidence is medium as updated methods and survey areas in the latest aerial survey make comparisons to previous surveys difficult. The lack of systematic monitoring of seals at the all-Wales scale also lowered the confidence.		

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Colony pup production	A stable or increasing pup production at the colony level, that support the SAC population, allowing	 There is one monitored colony in Pen Llŷn a'r Sarnau – Bardsey Island. NRW monitoring stopped after 2019. There is some monitoring available from the Bardsey Bird and Field Observatory up to 2023. 	Pass	Medium
	for natural change and variation. (P)	 52 pups were born on Bardsey in 2023. There has been generally increasing trend in pup production on the island with peaks and troughs throughout. 		
		• Bardsey Island appears to be the key pupping colony in North Wales and the SAC, supporting almost 80% of all pups born within the SAC in 2017.		
		 Seal pup production at Bardsey is considered to be increasing up to 2023 but showing signs of stabilising. 		
		 Confidence is medium as monitoring is only on Bardsey Island. 		
SAC pup production	A stable or increasing pup production within the SAC that supports the SAC population allowing for natural change and variation. (S)	• Surveys of pup production between 2002-2017 in Pen Llŷn a'r Sarnau showed the number of pups born almost doubled over the survey period where comparisons were possible (Robinson et al., 2023).	Pass	Low
		 In 2017, pup production in the SAC represented 57% of all pups produced within the North Wales region. 		
		 The pup production estimates from 2017 suggest that the SAC contributes approximately 10% of all pup births in Wales. 		
		• This highlights the importance of the SAC as a source of new recruits to the population.		
		 Confidence is low due to the age of the pup production data for the SAC as a whole and as monitoring is only at a single colony on Bardsey Island. 		

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Distribution of grey seal pupping sites within the SAC	The distribution and extent of pupping sites in the SAC is stable or increasing, allowing for natural change and variation. (P)	 There was an increase of 145% in the number of pupping sites in the 2017 North Wales census compared with the 2002 to 2004 censuses. As there have been no reports of pupping sites decreasing post 2017 and there is a general increasing trend in pup production in Wales and the UK, possibly associated with expansion of pupping site distribution, the indicator passes. Monitoring of pupping by the Bardsey Island Field Observatory have not noted any changes to pupping distribution in the island as of 2023. Confidence is medium as monitoring is only on Bardsey Island due to the age of the cancus data. 	Pass	Medium
Accessibility to habitat used by seals	No evidence of significant constraints on grey seal access to habitat within or associated with the SAC. (P)	 There is currently no knowledge of 'barriers' that would be a concern. Seal numbers are stable or increasing across the SAC suggesting no significant constraints on seals' access to habitat required to support them. Confidence is medium as the data on seal numbers are mainly from Bardsey island. 	Pass	Medium
Anthropogenic disturbance	No significant anthropogenic disturbance affecting the grey seal population associated with the SAC. (P)	 There is currently no evidence of significant anthropogenic disturbance impacting the seal population associated with the SAC. The confidence in the pass is medium as while the population is increasing there is no activity monitoring in the SAC. 	Pass	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Prey availability	Maintain the quality, abundance and diversity of prey species needed to support the grey seal population. (S)	 There is no reason to believe that grey seals are prey limited, or prey availability is limiting the grey seal population, or there has been a reduction in diversity of available prey species. Grey seal population is expanding in Wales which strongly suggests prey is abundant enough to support the population. Confidence in the pass is medium as the assessment is based on proxy data (seal numbers and fisheries data). 	Pass	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water, sediment and prey contaminants	Ensure water, sediment and prey contaminants are at levels not detrimental	• Six of the nine WFD waterbodies in the SAC were not classified as the chemicals have not been assessed within the last six years (Caernarfon Bay South, Tremadog Bay, Artro, Dwyfor, Dysynni and Glaslyn).	Pass	Low
	to the grey seal population. (S)	• One WFD waterbody has a pass for chemicals in the 2024 cycle 3 interim classification (Dyfi / Leri). However, the chemical classifications were rolled forward from the 2021 cycle 3 classification.		
		 Two waterbodies have a fail for chemicals (Cardigan Bay North and Mawddach), due to PBDE and mercury. 		
		 OSPAR report mercury and lead are above ecological guidelines in the North East Atlantic region, as is one congener of PCB. 		
		• OSPAR report the PCB range in 2010-2020 was lower than the 1980s but still above marine mammal toxicity thresholds.		
		• A study of marine mammals from around the UK found grey seals had the lowest mean concentrations of persistent organic pollutants of all 11 species studied, with only 17% above toxicity thresholds. However, the sample size was small.		
		• Contaminants are deemed not to be having a detrimental impact on seals at present, but confidence is low due to lack of sampling in seals and lack of understanding of the impact contaminants have at the population level.		

Assessment conclusions

The condition of the grey seal feature in the Pen Llŷn a'r Sarnau SAC has been assessed as being in **favourable condition** (medium confidence). All performance indicators met their targets. The wider population and pup production data all suggest grey seal numbers have been increasing in recent years. While contaminants are present, they are not thought to be impacting grey seals at a population level at present but remain a threat to condition. There is significant bycatch of grey seals in net fisheries in the Celtic Seas of the southwest UK and Ireland (SCOS 2022; Taylor et al., 2022). While seal bycatch is likely to be minimal inside Pen Llŷn a'r Sarnau SAC, bycatch outside of the SAC affects the wider population, of which the SAC is part. For further information on threats see <u>Section 4</u>.

Table 5. Summary of the condition assessment for grey seal in the Pen Llŷn a`r Sarnau SAC.

SAC	Overall Condition Assessment	Indicator failures	Reason for indicator failure	Threats to condition
Pen Llŷn a'r Sarnau	Favourable (medium confidence)	None	• None	DisturbanceContaminantsFisheries bycatch

Detailed assessment information

Grey seal population

As the wider population relevant to this SAC is the same for all grey seals SACs in Wales the assessment of this indicator was the same for each SAC. The population of grey seals relevant to the SAC was judged to be doing well and assumed to be increasing, meeting the indicator target with medium confidence. For details see the <u>Pembrokeshire Marine SAC assessment</u>.

Colony pup production

Female grey seals are assumed to give birth to one pup in a breeding season meaning pup production can be used as a suitable proxy for breeding female abundance and a good indicator of the health of the population (JNCC, 2005).

In 2017, a census of seals in North Wales was undertaken (Robinson et al., 2023). This followed on from previous censuses between 2001-2004 (Westcott 2002; Westcott and Stringell 2003; Westcott and Stringell 2004; Stringell et al., 2014). The results of the 2017 census suggest that the number of grey seal births across North Wales has increased significantly since 2004 (Figure 3). Almost half of the pups born in 2017 came from Bardsey Island, located in the SAC (Robinson et al., 2023). The south of the Llŷn peninsula, the Skerries and Carmel Head on Anglesey were also identified in the 2017 survey as important pupping sites. However, Bardsey had almost twice as many pups as the Skerries, the second most productive area in North Wales (Robinson et al., 2023).





Bardsey is considered a key breeding site in North Wales and has been monitored regularly up to 2019 by NRW. Monitoring is also undertaken by the Bardsey Bird and Field Observatory (BBFO) with counts up to 2023 available. Their data showed pupping has over been increasing on Bardsey over all since 1998, though the data show peaks and troughs (BBFO, 2024).

As Bardsey is the main colony in the SAC and the North Wales region and pup production at this site has been increasing, the colony pup production indicator passed. Confidence in the pass, however, was medium because the latest census is seven years old at the time of assessment and only Bardsey Island is monitored.

Figure 4. Pup production on Bardsey Island between 1998 and 2023. Reproduced from BBFO, 2024.



SAC pup production and distribution

The 2017 census of grey seals in North Wales estimated that production within the Pen Llŷn a'r Sarnau SAC was 159 pups (all classes). This represented 57% of all pups born in North Wales that year. The minimum-maximum estimate for the whole of North Wales was 207-351 pups (Robinson et al., 2023). Pup production in the SAC almost doubled between 2002-2017 where comparisons were possible. Of the pups counted within the boundary of the SAC, 80% were born on Bardsey Island. This suggests that the Pen Llŷn a'r Sarnau SAC contributes approximately 10% of the pups born in Wales (Robinson et al., 2023).

There has also been a trend across the UK for increases in the grey seal populations in all regions. The seal population in the UK has increased steadily since the 1960s, though this increase is now slowing (1.4% per year over the last survey interval) (SCOS, 2022).

With the 2017 census showing pup production across the whole SAC (and North Wales region) increased up to 2017, which mirrored the UK national trend, the SAC pup production target is judged to have been met. Confidence in this pass is low due to the age of the census data and only a single site in the SAC has monitoring data.

The distribution of breeding across the SAC can reflect factors impacting on seals, both positive and negative. Monitoring seal pupping distribution can identify areas that are important to breeding seals (JNCC, 2005). These areas can then be managed for anthropogenic impacts. If the distribution of breeding seals changed across the SAC it could be indicative of disturbance or reduction in habitat quality.

The breeding colony at Bardsey Island has been a key pupping site since at least 2002, when monitoring began. While the Island has seen significant increases in pup production in more recent years, there is no evidence to suggest the increase at this site is a result of females shifting from other areas within the region; the increase in pup production over time appears consistent at several other survey areas (Robinson et al., 2023). Monitoring data from the BBFO found no change in the distribution of pupping sites on Bardsey Island up to 2023 (BBFO, 2024). In 2017 the number of sites used for pupping across the North Wales region has increased by 145% compared to 2004. However, increased survey effort should be kept in mind when interpreting these results (Robinson et al., 2023).

The evidence of a large increase in the number of pupping sites, increasing pup production and no evidence of activities that would disrupt seal pupping distribution, has meant the indicator has met its target. The confidence in the pass, however, was reduced to medium due to the age of the census data and the fact monitoring is only done at a single colony on Bardsey Island.

Habitat accessibility and disturbance

There is a lack of understanding of the availability of suitable habitat in Pen Llŷn a'r Sarnau SAC. However, the number of grey seals and number of pupping sites in the SAC have been increasing (Robinson et al., 2023). Further to this, the wider population is assumed stable or increasing (SCOS 2022), and there is no evidence of constraints to their movements. For these reasons, it is assumed that grey seals have access to the habitats needed to support them and the indicator passed with medium confidence. Confidence was lowered as the data on seal numbers are mainly from Bardsey island.

There is also currently no evidence of significant disturbance to seals in the SAC so the indicator passed with medium confidence. Confidence was lowered due to a lack of regular seal monitoring in the SAC, no activity monitoring across the SAC and no data on disturbance of seals outside monitored colonies in the SAC.

The issues surrounding habitat access and disturbance are similar in all three SACs. So for more information see the <u>habitat accessibility and disturbance in the Pembrokeshire</u> <u>Marine assessment</u>.

Prey availability

There is no reason to believe that prey is limited or has reduced diversity in the areas of Pen Llŷn a'r Sarnau SAC that grey seal are using to forage. The indicator passed with

medium confidence. See the <u>prey availability indicator in the Pembrokeshire Marine SAC</u> assessment for further detail, as the assessment applies across all SACs.

Contaminants

Grey seals, like all marine mammals, are exposed to a variety of anthropogenic contaminants. The main route of exposure is through ingestion of prey, as these mammals are top predators, making them at risk from contaminant biomagnification through the food chain (Hammond et al., 2005). This is particularly the case for persistent organic pollutants (POPs) like polychlorinated biphenyls (PCBs) and heavy metals (e.g. mercury), which are lipid soluble. The toxic effects of these contaminants are well studied with impacts such as reduced reproduction and high susceptibility to disease (Hammond et al., 2005).

Two of the WFD waterbodies in the Pen Llŷn a'r Sarnau SAC have a fail for chemicals in the 2024 cycle 3 interim classification. These are Cardigan Bay North, which fails for PBDE and mercury, and the Mawddach, which fails for PBDE. The human health protection goal that is used for PBDE may be considered as over precautionary as the effect of contaminants on grey seals are not fully understood. The EQS for mercury is based on the secondary poisoning protection goal (for wildlife), which may be more relevant to grey seals and is sampled from biota they may eat.

The Dyfi / Leri waterbody passes for chemicals in the 2024 cycle 3 interim classification, however the chemical classifications were rolled forward from the 2021 cycle 3 classification. In addition, there have been failures for PBDE in this waterbody in previous cycles, but it has not been assessed in the cycle 3 classifications. All of the other waterbodies within the SAC were not classified as the chemicals have not been assessed within the last six years.

CSEMP sediment sampling has been carried out in the Mawddach and Dyfi estuaries; however, this ceased in 2015. The data were not used in the assessment as they were deemed to be too old.

Contaminants are still a threat to all marine mammals around Wales, not just grey seals. Despite bans and strict controls on mercury, PBDE and PCBs, there is still risk of historical deposits being released into the environment from sediments. Novel contaminants are also emerging and management is yet to be put in place for PAHs. However, at the time of this assessment, contaminants are not considered to be having a detrimental impact on grey seal at the population level, given the long-term increase in seal pupping in the SAC and increasing UK population. Therefore the water, sediment and prey contaminants indicator met its target. The confidence in the pass was low because there is a lack of monitoring of contaminants in grey seals and a lack of understanding around the impacts contaminants have at a population level. For more detail on contaminants in the wider area see the <u>Pembrokeshire Marine assessment</u>.

Reasons for target failure

The grey seal feature in the Pen Llŷn a'r Sarnau SAC has been assessed as being in **favourable** condition as none of the targets failed.

3.3. Cardigan Bay SAC condition assessment

The grey seal *Halichoerus grypus* population in Cardigan Bay SAC has no active monitoring so the assessment has been carried out using information from surrounding SACs as proxy data. A summary of the condition assessment for grey seal in the Cardigan Bay SAC can be seen in Table 6. Due to the lack of monitoring in Cardigan Bay SAC the indicator 'colony pup production' could not be assessed. The overall feature condition, a detailed summary of the assessment and threats to condition can be found in the assessment conclusions.

Table 6. Condition assessment of grey seal in Cardigan Bay 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
Seal population size relevant to the SAC	The wider seal population relevant to	 The population relevant to the SAC encompasses all of Wales and the wider Irish and Celtic seas. 	Pass	Medium
	the SAC is stable or increasing. (P)	• A census of grey seals in south-west Britain (including the entire coast of Wales) was done via aerial survey in August 2023.		
		• The population of grey seals in Wales was estimated to be 5,284 seals at the time of the survey. This is a minimum estimate due to cryptic haul outs (e.g. caves).		
		 Pup production models estimate the adult (1 year +) population of Wales to be approximately 5,300. 		
		 The population relevant to the SAC was judged to be doing well and assumed to be increasing. 		
		• Confidence is medium as updated methods and survey areas in the latest aerial survey make comparisons to previous surveys difficult. The lack of systematic monitoring of seals at the all-Wales scale also lowered the confidence.		

Indicator	Target	Assessment rationale	Target assessment	Target confidence
SAC pup production	A stable or increasing pup production within the SAC that continues to support the population, allowing for natural change and variation. (S)	 While there are no recent pup production data for the SAC there is proxy information available to assess this indicator, the increasing pup production trends in the SACs to the north and south, the UK wide increasing population, no knowledge of impacts to seals in the SAC. The use of expert judgement along with the proxy data mean it can be concluded that the same pattern of increasing pup production seen in Pembrokeshire Marine SAC and Pen Llyn a'r Sarnau SAC is likely to be occurring in Cardigan Bay SAC. Confidence is low due to the use of proxy data, expert judgement and lack of pupping data from seals inside the SAC. 	Pass	Low
Distribution of grey seal pupping sites within the SAC	The distribution and extent of pupping sites in the SAC is stable or increasing and continues to support pupping, allowing for natural change and variation. (P)	 There is no seal monitoring in Cardigan Bay SAC. However, given the increasing pup production trends and increase of pupping seen in the other neighbouring SACs it is assumed Cardigan Bay is following the same pattern. There is currently no evidence of activities occurring that would constrain seal pupping. Confidence in the pass is low as there is no monitoring of seals in the SAC. Expert judgement and proxy data have been used. 	Pass	Low

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Accessibility to habitat used by seals	No evidence of significant constraints on grey seal access to habitat within or associated with the SAC. (P)	 There is currently no knowledge of 'barriers' that would be a concern. Seal numbers are thought to have remained stable or increased across the SAC, based on proxy information from neighbouring SACs. This suggests no significant constraints on seals' access to habitat required to support them. Confidence is low as there is no monitoring of seals in the SAC and proxy data had to be used. 	Pass	Low
Anthropogenic disturbance	No significant anthropogenic disturbance affecting the grey seal population associated with the SAC. (P)	 There is currently no evidence of anthropogenic disturbance likely to be impacting the seal population associated with the SAC. The confidence in the pass is low as there is no activity monitoring in the SAC and numbers in the SAC are based on proxy data and a single aerial survey. 	Pass	Low
Prey availability	Maintain the quality, abundance and diversity of prey species needed to support the grey seal population. (S)	 There is no reason to believe grey seals are prey limited, or prey availability is limiting the grey seal population, or there has been a reduction in diversity of available prey species. Grey seal population is expanding in Wales which strongly suggests prey is abundant enough to support the population. Confidence in the pass is medium as the assessment is based on proxy data (seal numbers and fisheries data). 	Pass	Medium

Indicator	Target	Assessment rationale	Target assessment	Target confidence
Water, sediment and prey contaminants	Ensure water, sediment and prey contaminants are at levels not detrimental to the grey seal	• One of the three WFD waterbodies within the SAC was not classified in the 2024 cycle 3 interim classification as the chemicals have not been assessed within the last six years (Cardigan Bay South).	Pass	Low
	population. (S)	 One WFD waterbody has a pass for chemicals, however the chemical classifications were rolled forward from the 2018 cycle 2 interim classification (Teifi Estuary). 		
		 The other WFD waterbody has a fail for chemicals in the 2024 cycle 3 interim classification (Cardigan Bay Central). This waterbody failed for mercury and PBDE. 		
		 OSPAR report mercury and lead are above ecological guidelines in the North East Atlantic region, as is one congener of PCB. 		
		• OSPAR report the PCB range in 2010-2020 was lower than the 1980s but still above marine mammal toxicity thresholds.		
		• A study of marine mammals from around the UK found grey seals had the lowest mean concentrations of persistent organic pollutants of all 11 species studied, with only 17% above toxicity thresholds. However, the sample size was small.		
		• Contaminants are deemed not to be having a detrimental impact on seals at present, but confidence is low due to lack of sampling in seals and lack of understanding of the impact contaminants have at the population level.		

Assessment conclusions

The condition of the grey seal feature in the Cardigan Bay SAC has been assessed as being in **favourable condition** (low confidence). All performance indicators met their targets. The wider population and pup production data in adjacent SACs to the north and south suggest grey seal numbers have been increasing in recent years. There is no evidence to suggest this is not the case in Cardigan Bay. While contaminants are present they are not thought to be impacting grey seals at a population level at present. There is significant bycatch of grey seals in net fisheries in the Celtic Seas of the south-west UK and Ireland (SCOS 2022; Taylor et al., 2022). While seal bycatch is likely to be minimal inside Cardigan Bay SAC, bycatch outside of the SAC affects the wider population, of which the SAC is part. For further information on threats see <u>Section 4</u>.

Table 7. Summary of the condition assessment for grey seal in the Cardigan Bay SAC.

SAC	Overall Condition Assessment	Indicator failures	Reason for indicator failure	Threats to condition
Cardigan Bay	Favourable (low confidence)	None	• None	DisturbanceContaminantsFisheries bycatch

Detailed assessment information

Grey seal population

As the wider population relevant to this SAC is the same as all SACs in Wales the assessment of this indicator was the same for each SAC. The population of grey seals relevant to the SAC was judged to be doing well and assumed to be increasing, meeting the indicator target with medium confidence. For details see the <u>Pembrokeshire Marine SAC assessment</u>.

Pup production and distribution

Due to the lack of monitoring in Cardigan Bay SAC the indicator 'colony pup production' could not be assessed. While there are certainly established breeding sites in Cardigan Bay there is no recent information on the pup production at these sites.

The monitored colonies in Pembrokeshire Marine and Pen Llŷn a'r Sarnau SACs have continued to do well since 2005 and have seen a continued upward trend in pup production. There has also been a trend across the UK for increases in the grey seal populations in most regions. The seal population in the UK has increased steadily since the 1960s, though this increase is now slowing (1.4% per year over the last survey interval) (SCOS, 2022). There is also no evidence on activities occurring that would impact seal pupping in the SAC.

For these reasons, it is assumed that pup production across Cardigan Bay SAC is likely to have followed the same pattern as Pembrokeshire Marine and Pen Llŷn a'r Sarnau SACs and is stable or increasing. Confidence in this pass is low as the indicator assessment is based on proxy data and expert judgement.

The distribution of breeding across the SAC can reflect factors impacting on seals, both positive and negative. Monitoring seal pupping distribution can identify areas that are important to breeding seals (JNCC, 2005). These areas can then be managed for anthropogenic impacts. If the distribution of breeding seals changed across the SAC it could be indicative of disturbance or reduction in habitat quality. While there is no monitoring of seals in the SAC, we can look to what is happening in the SACs to the north and south. Pembrokeshire Marine was assessed as having increased pupping distribution in some areas with stable pupping distribution in Skomer MCZ. The North Wales region, which includes the Pen Llŷn a'r Sarnau SAC, has seen an increase of 145% in pupping sites between 2004 to 2017, though some of this increase may be attributed to increased survey effort (Robinson et al., 2023).

As there is no evidence of activities currently occurring that would impact seal distribution, it is assumed Cardigan Bay is following the same pattern as the other two SACs and distribution is at least stable and possibly increasing, leading to the indicator passing. Confidence in this pass, however, is low as the indicator assessment is based on proxy data and expert judgement.

Habitat accessibility and disturbance

There is a lack of understanding of the availability of suitable habitat in Cardigan Bay SAC. However, the number of grey seals and number of pupping sites in the sites adjacent to the SAC have been increasing (Robinson et al., 2023). Further to this, the wider population is assumed stable or increasing (SCOS 2022), and there is no evidence of constraints to their movements. For these reasons, it is assumed that grey seals have access to the habitats needed to support them and the indicator passed with low confidence. Confidence was lowered due to the use of proxy data since there is no regular seal monitoring in the SAC.

There is also no evidence of significant disturbance to seals in the SAC so the indicator passed with low confidence. Confidence was lowered due to a lack of regular seal monitoring in the SAC, no activity monitoring across the SAC and no data on disturbance of seals outside monitored colonies in the SAC.

The issues surrounding habitat access and disturbance are similar in all three SACs. So for more information see the <u>habitat accessibility and disturbance in the Pembrokeshire</u> <u>Marine assessment</u>.

Prey availability

There is no reason to believe that prey is limited or has reduced diversity in the areas of Cardigan Bay that grey seals are using to forage. The indicator passed with medium confidence. See the prey availability indicator in the Pembrokeshire Marine SAC assessment for further detail, as the assessment applies across all SACs.

Contaminants

Grey seals, like all marine mammals, are exposed to a variety of anthropogenic contaminants. The main route of exposure is through ingestion of prey, as these mammals are top predators, making them at risk from contaminant biomagnification through the food chain (Hammond et al., 2005). This is particularly the case for persistent organic pollutants (POPs) like polychlorinated biphenyls (PCBs) and heavy metals (e.g. mercury), which are lipid soluble. The toxic effects of these contaminants are well studied with impacts such as reduced reproduction and high susceptibility to disease (Hammond et al., 2005).

The coastal Cardigan Bay Central waterbody has a fail for chemicals in the 2024 cycle 3 interim classification, where mercury and PBDE failed. The human health protection goal that is used for PBDE may be considered as over precautionary as the effect of contaminants on grey seals are not fully understood. The EQS for mercury is based on the secondary poisoning protection goal (for wildlife), which may be more relevant to grey seals and is sampled from biota they may eat. Of the other two relevant WFD waterbodies within the SAC, one was not classified as the chemicals have not been assessed within the last six years. The other WFD waterbody has a pass for chemicals, however the chemical classifications were rolled forward from the 2018 cycle 2 interim classification.

Contaminants are still a threat to all marine mammals around Wales, not just grey seals. Despite bans and strict controls on mercury, PBDE, and PCBs, there is still risk of historical deposits being released into the environment from sediments. Novel

contaminants are also emerging and management is yet to be put in place for PAHs. However, at the time of this assessment, contaminants are not considered to be having a detrimental impact on grey seal at the population level, given the long-term increase in seal pupping in the SAC and increasing UK population. Therefore the water, sediment and prey contaminants indicator met its target. The confidence in the pass was low because there is a lack of monitoring of contaminants in grey seals and a lack of understanding around the impacts contaminants have at a population level. For more detail on contaminants in the wider area see the <u>Pembrokeshire Marine assessment</u>.

Reasons for target failure

The grey seal feature in the Cardigan Bay SAC has been assessed as being in **favourable** condition as none of the targets failed.

4. Threats to grey seal condition

Part of the condition assessment is to identify threats to the condition of grey seal. 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 e.g. dredging whereby the impact of the activity on the feature would be assessed have not been included. The threats to the grey seal feature condition in the Welsh SACs are stated below. As the threats to grey seals are the same across all three SACs they have been listed here once to avoid repetition.

Disturbance

While there is some evidence that seals can tolerate human presence in areas close to easily accessible coast, they are still vulnerable to disturbance, especially for seals that haul out in remote places where they are less likely to encounter regular anthropogenic activity. Increases in recreation to more remote areas via watercraft, the use of drones, noise or physical barriers from industrial development and increases in ongoing military activity in the area all have the potential to significantly disturb seals.

Contaminants

At the time of the assessment, grey seals are thought not to be adversely impacted by contaminants at the population level. However, the high levels of some contaminants within the SAC are cause for concern. While some contaminants like mercury and PBDE are being managed and it is hoped that these levels will reduce in time, there is the potential for unregulated contaminants (such as Per- and polyfluoroalkyl substances) (PFAS) and pharmaceuticals) to potentially increase in the future. This could affect grey seals as PFAS has been shown to bioaccumulate in marine species, increasing up the trophic levels (Khan et al., 2023). Even though mercury levels are decreasing and the 2024 WFD classification passes for mercury in Milford Haven Outer waterbody, this classification was based on concentrations of mercury in mussels. Due to the bioaccumulation potential of mercury, the levels in top predators such as seals, may still be of some concern. Many contaminants have been shown to have a detrimental impact on reproductive success and can be passed to pups through their mother's milk (Hammond et al., 2005; Nyman et al., 2003; Robinson et al., 2018b). Some persistent chemicals are not measured in every WFD waterbody, and some of the relevant waterbodies have not been classified for any chemicals.

Fisheries bycatch

There is significant bycatch of grey seals in net fisheries in the Celtic Seas of the southwest UK and Ireland (SCOS 2022; Taylor et al., 2022). The estimated total annual bycatch of grey seals in the Celtic Sea Assessment Unit was 1632 in 2020 (Taylor et al., 2022). Despite this, the population of grey seals is thought to be growing and models suggest the amount of bycatch is below the threshold the population in the wider Celtic Seas can support. While seal bycatch is likely to be minimal inside the SACs, bycatch outside of the SACs affects the wider population, of which the SACs are part.

5. Evidence gaps for grey seal

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

Listed below 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. Not all evidence gaps apply to every SAC, see Table 8 for details.

Table 8. Evidence gaps for grey seal in Welsh SACs. Each indicator target has a primary (P), secondary (S) or tertiary (T) weighting (see Section 1.1).

Indicator	Assessed status	Comment
Seal population size relevant to the SAC (P) (all SACs)	Medium confidence (proxy data in some cases)	 Regular systematic monitoring at the scale of the SAC and/or regions is needed to inform the condition assessment.
		• Both pupping and haul out counts are needed across the region to establish whether those sites regularly monitored (e.g. Skomer) are sufficient index sites for the population.
		 Continued funding for monitoring at key sites (e.g. Skomer) is critical to our understanding of seal status. Only a single systematic survey of hauled out seals has been conducted (in summer 2023) in Wales and should be repeated at regular intervals (e.g. 2-5 years).
Colony pup production (P)	Not assessed	 This indicator was not assessed as there is no monitoring of pup production at specific colonies in Cardigan Bay.
SAC pup production (S)	Not assessed	 There is no monitoring of pup production across the Cardigan Bay SAC.
/		 Monitoring in the SAC would remove the need to use adjacent SACs as proxies and increase confidence in future assessments.
Habitat quality and function (S)	Not assessed	 There is a lack of understanding of what is quality habitat for seals and how much is sufficient to support the population using the SAC.

Indicator	Assessed status	Comment
Anthropogenic disturbance (S)	Low confidence (limited data)	• There is a lack of information on levels of recreational activity in the SAC, their impact on seals and if codes of conduct are being followed.
		• There is limited information on bycatch in net fisheries in Wales. Some studies are underway to estimate the likely bycatch in parts of Wales, but further work is required to provide robust estimates.
Water, sediment and prey contaminants (S)	Low confidence (limited data)	• There are very little data on the level of contaminants in grey seals. Dead seals are rarely autopsied and sampled for contaminants.

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