Ardal Gwarchodaeth Arbennig Gogledd Bae Ceredigion / Northern Cardigan Bay Special Protection Area

Advice provided by Natural Resources Wales under Regulation 37(3) of the Conservation of Habitats and Species Regulations 2017.

June 2025

Red throated Diver *Gavia stellata* by Gregory “Slobirdr” Smith under license CC BY-SA 2.0

Contents

List of Figures

List of Tables

Crynodeb Gweithredol

Mae'r ddogfen hon yn cynnwys cyngor Cyfoeth Naturiol Cymru ar gyfer ardal gwarchodaeth arbennig (AGA) Gogledd Bae Ceredigion a gyhoeddwyd o dan Reoliad 37(3) o Reoliadau Cadwraeth 2017. Sef amcanion cadwraeth a chyngor ar weithrediadau.

Mae Adran 1 yn cyflwyno'r safle, pwrpas y cyngor a strwythur yr amcanion cadwraeth. Mae Adran 2 yn cynnwys esboniad o'r rolau a'r cyfrifoldebau, ac mae Adran 3 yn amlinellu amcanion cadwraeth pob nodwedd a gwybodaeth ategol. Mae cyngor ar weithrediadau mewn perthynas â'r safle hwn i'w gael yn Adran 4. Mae rhagor o wybodaeth am yr AGA wedi'i chynnwys yn Atodiad 1.

Isod mae rhestr o nodweddion dynodedig yr AGA hon a dolen uniongyrchol i'r amcanion cadwraeth, ond mae'n bwysig darllen pob adran yn llawn.

Tabl 1. Crynodeb o nodweddion yr AGA a'r ddolen i'r amcanion cadwraeth.

Enw'r AGA	Nodweddion Dynodedig	Cysylltiad â'r Amcanion Cadwraeth
Gogledd Bae Ceredigion	• Trochydd gyddfgoch *Gavia stellata*	Amcanion cadwraeth

Executive Summary

This document contains NRW's advice for the Northern Cardigan Bay special protection area (SPA) issued under Regulation 37(3) of the Conservation Regulations 2017.

Section 1 introduces the SPA, the purpose of the advice and the structure of the conservation objectives. Section 2 includes an explanation of the roles and responsibilities before Section 3 outlines each features conservation objectives and supporting information. Advice on operations in relation to this SPA is found in Section 4. Further information on the SPA is included in Appendix 1.

Table 1 lists the designated features of this SPA and provides a direct link to the conservation objectives, but it is important that all sections are read in full.

Table 1. Summary of SPA features and link to conservation objectives.

Site Name	Designated Features	Link to Conservation Objectives
Northern Cardigan Bay	• Red-throated diver *Gavia stellata*	Conservation objectives

1. Introduction

The Ardal Gwarchodaeth Arbennig Gogledd Bae Ceredigion / Northern Cardigan Bay Special Protection Area (SPA), as the name suggests, occupies the northern half of Cardigan Bay on the west coast of Wales. Several rivers flow into the northern part of Cardigan Bay. Three shallow areas of sub-tidal reefs known as the Sarnau are important ecological habitats within the SPA and part of the reefs feature in the Pen Llŷn a'r Sarnau Special Area of Conservation (SAC).

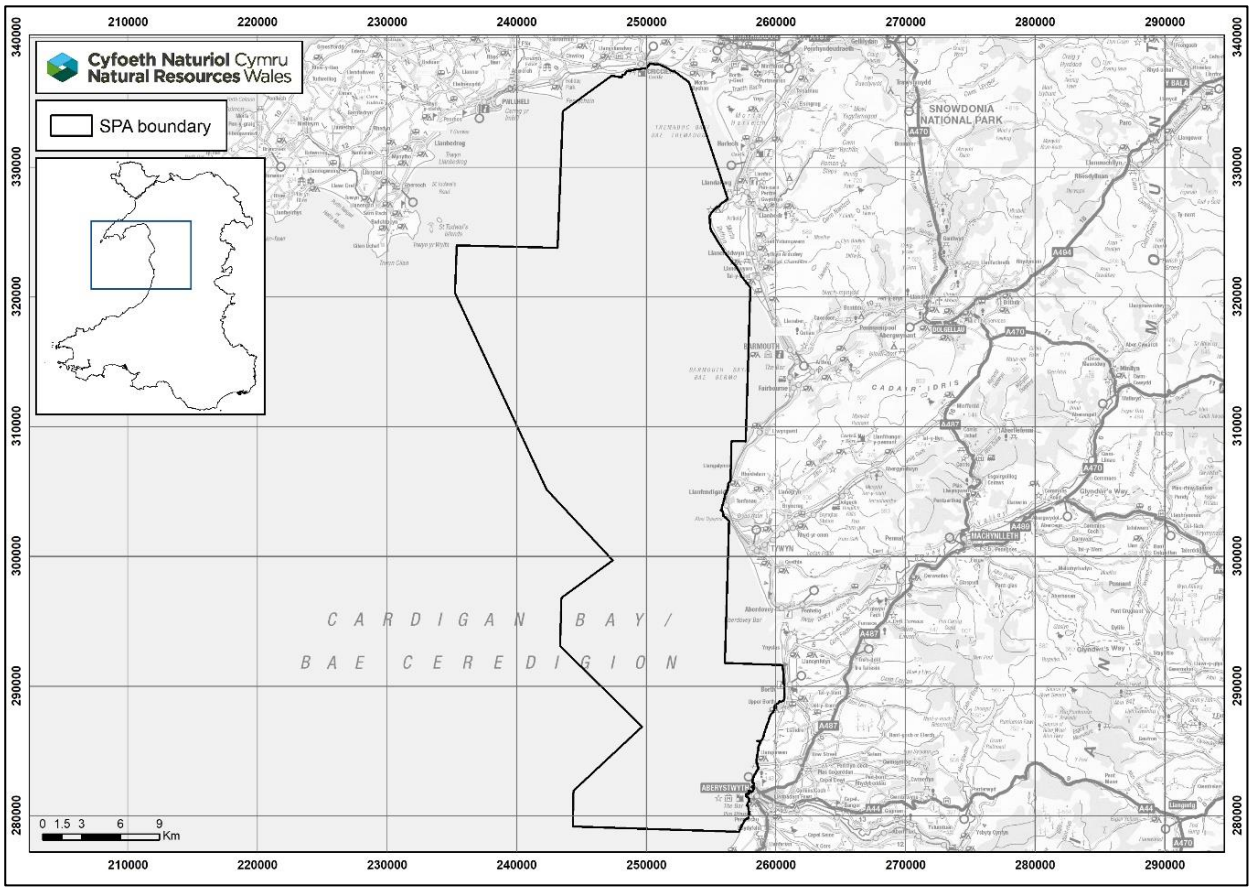
The SPA was classified in 2017 under Article 4.1 of the Conservation of Wild Birds Directive (2009/147/EC), for regularly supporting at least 1% of the non-breeding population of the Annex I species, red-throated diver *Gavia stellata*. Annual aerial survey data between 2001-04 estimated the peak mean of the red-throated diver population to be 1,186 birds (O'Brien et al. 2015).

The Pen Llŷn a'r Sarnau and West Wales Marine SACs overlap with the SPA, as do 9 sites of special scientific interest (SSSIs). The conservation advice for these protected sites can be found on the NRW website. Details of where the sites are located, and their boundaries, can be seen on the Joint Nature Conservation Council (JNCC) MPA mapper. A list of the other statutory protected sites partly or wholly overlapping with the SPA can be found in Appendix 2.

1.1. SPA map

Figure 1 shows the boundary of Northern Cardigan Bay SPA.

Figure 1. Map of the Northern Cardigan Bay SPA.



1.2. The purpose of conservation advice

Conservation advice provides a framework for assessing developments and activities with the potential to affect the features for which a European marine site (EMS) is designated. An EMS is a SAC or SPA which consists of marine areas. Conservation advice presents site specific information, in addition to highlighting activities that are potentially capable of having an impact on the site and its designated species (known as a feature).

This SPA is an EMS subject to protection under the Conservation of Habitats and Species Regulations 2017, as amended (referred to in this document as the 'Habitats Regulations'). Under the Habitats Regulations, relevant and competent authorities with functions in relation to an EMS must exercise those functions to comply with the requirements of the 1992 European Commission (EC) Habitats and Species Directive and the 2009 EC Wild Birds Directive. The key requirements of these Directives include the conservation of the features (habitat types or species) for which SACs or SPAs are designated. This requires taking appropriate steps to avoid deterioration or disturbance of SAC or SPA features and carrying out appropriate assessment of any plan or project likely to have a significant effect on a SAC or SPA.

This document contains the conservation advice for the Northern Cardigan Bay SPA. It is prepared by Natural Resources Wales (NRW) and given under our duty in Regulation 37(3) of the Habitats Regulations (see Section 2.1).

This advice is based on the best available evidence and information at the time of writing. In some cases, evidence can be limited. It will be kept under review by NRW and updated as and when appropriate.

1.3. Conservation objective structure

The conservation objectives for the designated features in this site are underpinned by conservation objective attributes. These attributes describe the ecological characteristics (e.g. population), and the ecological requirements that allow the conservation objectives for each feature to be met.

Conservation objective attributes have a target which is either quantified or qualified depending on the available evidence. The target identifies, as far as possible, the desired state to be achieved for the attribute. In many cases, the attribute targets show if the current objective is to either 'maintain' or 'restore' the attribute and are based on the latest condition assessment for the feature. Some aspects of feature condition may be assessed as unknown. In these cases, a maintain target will be set as necessary. For attributes that have been assigned 'unknown' in the condition assessment, further information on feature condition and/or activities impacting the feature will be required to inform further advice. Each attribute target will need to be assessed on a case-by-case basis using the most current information available.

The conservation objective attributes that underpin the conservation objectives are used to measure if the objective is being met. This in turn can be used to see if site integrity is

being maintained. Failure to meet any attribute means that the conservation objective is not being met and thus site integrity is not being maintained. Below is an example of a conservation objective and associated conservation objective attributes and targets.

Example Objective 1: The wintering population of the feature is stable or increasing relative to the site reference population.

Example Objective attribute	**Example Site specific target**
Wintering population	Maintain/restore the wintering population of feature at or above X individuals (mean peak population year-year).

The conservation objectives for Northern Cardigan Bay SPA are set out in Section 3. As noted in Section 1.2, NRW may refine these in the future as further information becomes available and increases our understanding of the feature.

The feature's conservation objective section provides:

1. A clear statement of each conservation objective for the feature.

2. A table summarising the attributes, and the targets for those attributes.

3. Supporting information that underpins the selection of the attributes and targets.

2. Roles and responsibilities

2.1. NRW's role

Under Regulation 5 of the Habitats Regulations, NRW is a Nature Conservation Body and, in relation to Wales, is the Appropriate Nature Conservation Body (ANCB).

In its role as the ANCB, NRW has a duty under Regulation 37(3) of the Habitats Regulations to advise relevant authorities in respect of a EMS as to:

(a) the conservation objectives for that site

(b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which that site has been designated (see Section 1.2).

Advice on operations which may cause deterioration, together with the conservation objectives, is designed to assist relevant authorities and other decision-makers in complying with their statutory duties under the Habitats Regulations. The advice on operations which may cause deterioration given in this document is without prejudice to other advice given. This includes the conservation objectives themselves, and other advice which may be given by NRW from time to time in relation to any specific operations.

"Operations" is taken to cover all types of human activity, irrespective of whether they are under any form of regulation or management. Thus, the advice contains reference to operations which may not be the responsibility of any of the relevant authorities.

NRW will provide additional advice for the site to relevant authorities and competent authorities to allow them to fulfil their duties under the Habitats Regulations. For example, by providing advice to a competent authority assessing the implications of plans or projects on the features of the EMS. Each plan or project will be judged on its own merits, and this will determine the nature of any additional advice required.

2.2. The role of competent and relevant authorities

The expressions used in this advice of "relevant authority" and "competent authority" are as defined in Regulation 3 of the Habitats Regulations. Relevant authorities are specified in Regulation 6 of the Habitats Regulations. Competent Authorities are specified in Regulation 7 of the Habitats Regulations.

Under Part 6 of the Habitats Regulations, all competent authorities must undertake a formal assessment of the implications that any new plans or projects may have on the designated features of a protected site. The implications must be assessed in the context of other plans and projects affecting the same site. Activities outside the site may also affect the features of the site, therefore, plans and projects located outside of a designated site may still need to be assessed.

In respect of the assessment provisions in Part 6 (assessment of plans or projects) of the Habitats Regulations, NRW is also the ANCB in relation to Wales.

The assessment provisions comprise several distinct stages which are collectively described as a Habitats Regulations Assessment (HRA), for which guidance is available. Before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and is not directly connected with or necessary to the management of that site, the competent authority must make an appropriate assessment of the implications of the plan or project for that site in view of that site's conservation objectives.

In light of the conclusions of the HRA and subject to derogation under Regulation 64, the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the EMS. In considering whether a plan or project will adversely affect the integrity of the site, the competent authority must have regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which it proposes that the consent, permission or other authorisation should be given.

Carrying out the HRA process is the responsibility of the decision maker as the competent authority. However, it is the responsibility of the applicant to provide the competent authority with the information that they require for this purpose.

The competent authority has a duty to consult the ANCB for the purposes of the assessment. Under Regulation 63(3) of the Habitats Regulations the competent authority must have regard to any representations made by the ANCB when reaching its decision.

Under Regulation 38(1) of the Habitats Regulations it states that, "*the relevant authorities, or any of them, may establish for a European marine site a management scheme under which their functions (including any power to make byelaws) are to be exercised so as to secure compliance with the requirements of the Directives in relation to that site".*

In other words, a group of relevant authorities, or any individual relevant authority, may create a management plan for an EMS. Management plans should be used to help relevant authorities carry out their duties to secure compliance with the Habitats Regulations. Only one management scheme may be made for each EMS. A management scheme may be amended. An authority which has established a management scheme must as soon as practicable thereafter send a copy of it to the ANCB. Any management plans created on this site should be guided by the advice in this package.

Within their areas of jurisdiction relevant authorities must have regard to both direct and indirect effects of an activity on the designated features of the site. This may include consideration of issues outside the boundary of the site. Nothing within a Regulation 37(3) package will require relevant authorities to undertake any actions to maintain or improve the condition of designated features if it is shown that the changes result wholly from natural causes.

NRW will continue to review any new evidence or information about this site and will provide further advice as appropriate. This does not stop relevant authorities from taking any appropriate conservation measures to prevent deterioration to the designated features. Such actions should be undertaken when required.

2.3. The purpose of conservation objectives

The purpose of the conservation objectives for an EMS is to help meet the obligations of the Habitats Regulations in relation to that site. They do this by supporting:

- **Communication**. The conservation objectives help convey to stakeholders what is needed to maintain or restore a feature in/to favourable condition.
- **Site planning and management**. The conservation objectives guide the development of management measures for sites. Achievement of conservation objectives may require management action to be taken inside or outside the site boundary.
- **Assessment of plans and projects**. The Habitats Regulations require the assessment of plans and projects in view of a site's conservation objectives. Subject to certain exceptions, plans or projects may not proceed unless it is established that they will not adversely affect the integrity of a site. Conservation objectives can help develop suitable compensatory measures.
- **Monitoring and reporting**. Conservation objectives provide the basis for defining the evidence that will be used for assessing the condition of a feature.

This document includes both a statement of the conservation objectives and explanatory text on their intent and interpretation specific to the site (supporting information).

2.4. The purpose of advice on operations

NRW must provide advice to relevant authorities about operations that may cause,

- deterioration of designated natural habitats
- deterioration of the habitats of designated species
- the disturbance of designated species

This is statutory advice required by Regulation 37(3)(b) of the Habitats Regulations when considering operations which may cause impacts to designated features. These are operations which could take place within or outside the boundary of the Northern Cardigan Bay SPA.

NRW can provide specific advice on existing activities and management, advising on the extent to which activities are consistent with the conservation objectives. This advice, together with the list of activities in Section 4 and the latest condition assessments should direct required management measures within a site.

2.5. When to use this advice

This advice should be used together with case-specific advice issued by NRW when developing, proposing or assessing an activity, plan or project that may affect the features of the site. Any proposal or operation that has the potential to affect a site must not prevent

the achievement of the feature's conservation objectives. Any such prevention would amount to an adverse effect on the integrity of the site.

The advice given here is without prejudice to any advice which may be provided by NRW in relation to the consideration of individual plans or projects in the carrying out of the assessment provisions as defined in Part 6 of the Habitat Regulations.

2.6. Feature condition

NRW has a dedicated condition assessment process to assess feature condition. Each feature designated in Welsh EMS have their own set of performance indicators. These indicators have targets which are assessed with the most up to date evidence available. When all required indicator targets are met a feature is in favourable condition.

The condition assessment of a feature helps to determine if its conservation objectives are being achieved. Results determine if maintain or restore conservation objectives are needed. Appropriate management must be in place to enable conservation objectives to continue being met and for feature condition to be maintained or restored as required. The conservation objectives cannot be achieved if a feature is in unfavourable condition.

Feature condition is recorded in condition assessment documents. These are available on the NRW website. NRW will update this advice package when new condition assessment information is available.

2.6.1. Favourable conservation status and National Site Network

If features are in favourable condition, it is likely they are making an appropriate contribution to Favourable Conservation Status (FCS) of the feature at the UK level. A feature cannot make an appropriate contribution to FCS without meeting its conservation objectives. More information on FCS can be found in the joint statement from the UK Statutory Nature Conservation Bodies.

Regulation 16A of the Habitats Regulations creates the National Site Network on land and at sea, including both the inshore and offshore marine areas in the UK, and sets out the powers and duties of the appropriate authority (Welsh Government).

Information on how features in a site are meeting their conservation objectives will feed into the assessment of the National Site Network management objectives. The management objectives for the National Site Network are to maintain or restore designated SAC and SPA features to favourable conservation status across their natural range. More information on the UK National Site Network and its management objectives can be found on the gov.uk website.

3. Conservation objectives for Northern Cardigan Bay SPA

The conservation objectives for the designated feature are outlined in the section below. Each objective is accompanied by objective attributes and targets (see Section 1.3) and supporting information specific to each objective. General site information and feature description can be found in Appendix 1.

The following terms are used in the conservation objectives.

Anthropogenic: In this document anthropogenic specifically relates to environmental changes caused or influenced by people, either directly or indirectly. NRW consider human influences to include climate change.

Maintain: Where existing evidence from the most recent condition assessment suggests the feature to be in favourable condition, the conservation objective is for the feature to remain in favourable condition.

Natural change: This is defined as species or habitat changes which are not a result of human influences.

Natural variability: This is defined as species or habitat variability, which are not a result of human influences.

Restore: Where existing evidence from the most recent condition assessment suggests the feature, or part of the feature, to be in unfavourable condition the conservation objective is to return the feature to favourable condition. As the feature is being returned to favourable condition, further decline in the aspects of condition that are causing it to be unfavourable should be prevented. The ability to achieve favourable condition should not be inhibited.

Significant anthropogenic disturbance: For anthropogenic disturbance on a species feature to be significant an action (alone or in combination with other effects) must impact on the species in such a way as to be likely to cause negative effects on the population associated with the site. For example, through changes to behaviour, distribution or abundance.

Unknown: Where there is not enough suitable evidence to conduct a condition assessment the feature is assigned an unknown condition

3.1. Feature 1: Red-throated diver *Gavia stellata*

Red-throated diver *Gavia stellata* in the Northern Cardigan Bay SPA is currently in **unknown** condition. NRW published the latest condition assessment in June 2025. NRW will review these conservation objectives when necessary.

Below are the attributes and targets for each conservation objective alongside supporting information.

Objective 1: The wintering population of red throated diver is stable or increasing relative to the SPA target population.

Objective attribute	Site specific target
1a. Wintering population	Maintain the wintering population of red throated diver at a minimum 5-year peak mean of 1,186 individuals across the SPA.

Supporting information

1a. Wintering population

Based on aerial survey data between 2001-2004 the peak mean of the of red-throated diver population of Northern Cardigan Bay SPA was estimated as 1,186 birds (O'Brien et al., 2015). This figure includes survey counts labelled as "unidentified divers". This was due to no other diver species being regularly recorded in the area. A similar assumption was made in relation to Liverpool Bay (Webb et al., 2006) and the Outer Thames estuary (Webb et al., 2009). In both sites many diver observations were not identified to a particular species. However, records of diver species other than red-throated diver are very rare.

As there has been no monitoring of red-throated diver in Northern Cardigan Bay since 2004 the population has been assessed as unknown (Hatton-Ellis et al., 2025). Therefore, the wintering population attribute has a default maintain target for objective 1a.

Objective 2: Red throated diver that use the SPA should continue to have access to, and can utilise, habitats necessary to maintain the population in favourable condition.

Objective attribute	Site specific target
2a. Wintering population distribution	The distribution of the wintering red throated diver population that use the SPA should not be significantly impacted by anthropogenic activity.
2b. Wintering population disturbance (by human activity)	The wintering red throated diver population that use the SPA should not be subject to significant anthropogenic disturbance.

Supporting information

2a. Wintering population distribution

This objective attribute seeks to ensure that red-throated diver can continue to use and access all areas within the SPA needed for feeding, moulting, roosting, loafing, shelter and any other activities necessary to support their survival.

Densities of wintering red-throated divers in Northern Cardigan Bay range between 0.01 birds/km^2 at the edges of the site, and up to 2.75 birds/km^2 in the core areas (O'Brien et al., 2015).

There are no known anthropogenic activities that would impact the distribution of the population The wintering population distribution attribute is being met, allowing a maintain target to be set for objective 2a. For more information see the latest condition assessment (Hatton-Ellis et al., 2025).

2b. Wintering population disturbance (by human activity)

Changes in the distribution of red throated diver may be brought on by disturbance. Disturbance occurs when an activity is sufficient to disrupt normal behaviours such as feeding or roosting. Disturbance associated with human activity may take a variety of forms including light, sound, vibration, vessel traffic, presence of people and structures.

Disturbance can lead to increased energy expenditure due to time spent moving to avoid stressors or lead to desertion of supporting habitats. If the activity occurs at a level that substantially impacts behaviour for long enough it can lead to changes in distribution through displacement as the habitat available becomes reduced. This could consequently affect the long-term viability of the population.

Red-throated diver are highly sensitive to vessel movements and have been shown to have a strong stress response to disturbance (Dierschke et al., 2017). This can be an issue when windfarms are being constructed and serviced. In a review of the sensitivity of 26 species of "seabird" to the development of offshore windfarms, Garthe and Huppop (2004) found that red-throated divers had the second highest species sensitivity index score.

Objective 3: The quality of habitat and abundance of food supply is sufficient to maintain the population of wintering red throated diver that use the SPA in favourable condition.

Objective attribute	Site specific target
3a. Supporting habitat	Maintain sufficient extent, distribution, function and quality of supporting habitat to support a wintering red throated diver population of 1,186 individuals.
3b. Food availability	Maintain the abundance and distribution of red throated diver food supply at levels sufficient to support a wintering population of 1,186 individuals.

Supporting information

3a. Supporting habitat

The extent, distribution and availability of suitable habitat which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding) should be maintained.

Northern Cardigan Bay has shallow areas of sub-tidal cobble and boulder reefs, known as Sarnau. These shallow reefs are important ecological habitats for the red-throated diver in this site.

Red throated divers are known to do well in naturally turbid environments such as Liverpool Bay and the Thames Estuary. However, as a pursuit predator of fish, red-throated divers may be sensitive to elevated levels of turbidity which could reduce their foraging success by making prey harder to see. Marine industries, such as dredging and aggregates extraction, can cause increased turbidity above natural levels. It will be important to consider the variability in natural background turbidity levels of the site which may affect the contribution of marine industry activity to the turbidity of the water at a specific location (van Kruchten and van der Hammen, 2011).

There are no known issues with the red-throated diver habitat (Hatton-Ellis et al., 2025). The supporting habitat attribute is being met, allowing a maintain target to be set for objective 3a.

3b. Food availability

Red-throated diver are opportunistic feeders, diving below the surface to catch small fish at shallow depths (McGovern, et al., 2016; Guse et al., 2009) and forage on the seabed in some environments (Duckworth et al., 2021). Evidence also suggests that red-throated diver prey on several different fish species including members of the gadoid family, various flatfish, herring, gobies, sand eels and sprat (Guse et al.,

2009). However, there is currently a lack of evidence on the diet of red-throated diver in Cardigan Bay.

There is currently a lack of evidence on the diet of red-throated diver in Cardigan Bay and population estimates are too old to be used as a proxy so food availability couldn’t be assessed (Hatton-Ellis et al., 2025). Therefore, the food availability attribute has a default maintain target for objective 3b.

4. Advice on operations

NRW must provide advice to relevant authorities about operations that may cause,

- deterioration of designated natural habitats
- deterioration of the habitats of designated species
- the disturbance of designated species

This is statutory advice required by Regulation 37(3b) of the Habitats Regulations.

This advice is to help relevant authorities direct and prioritise their management of activities that are of greatest threat to the features of the site. The advice given here is without prejudice to any advice provided in relation to the consideration of plans or projects within the meaning of Part 6 of the Habitat Regulations.

Activities operating at distance from the site may cause pressures that travel into the site. These external pressures may affect features within the site.

4.1. Operations which may cause deterioration or disturbance to the features of the site

Table 2 lists activities that have the potential to deteriorate or disturb the designated features of Northern Cardigan Bay SPA and if they are known to occur within the SPA.

This list of operations is not exhaustive. If an operation or activity is not listed in Table 2 it does not mean it does not have the potential to deteriorate the features of the site. Activities occurring outside the site may still have the potential to impact the features within the site. The occurrence information was correct at time of publication, but activities may have ceased or started since. Advice on individual operations should be sought on a case-by-case basis.

Additional information on activities can be found on the Natural England's designated sites website and Marine Scotland's Feature Activity Sensitivity Tool (FEAST). It is important to note that NRW has not agreed sensitivity thresholds with either Natural England or Nature Scot and the information should be used as a general guide. Specific advice on operations should be sought from NRW on a case-by-case basis.

Table 2. Advice on operations for Northern Cardigan Bay SPA.

Operation/Activity	Occurrence in SPA
Dredging: Construction and maintenance	Number of small to medium-scale harbours and marinas on the border of SPA. Potential for impact during maintenance and construction.
Shipping: vessel traffic and maintenance (including antifouling)	Most shipping in transit in Irish Sea unlikely to pass through SPA, except to seek shelter on passage.
Shipping: anchoring (commercial)	Possible occurrence, but commercial vessels unlikely to anchor unless sheltering from poor weather.
Power station	Not currently present in the SPA.
Pipelines	Not currently present in the SPA.
Power / communication cables	Some may be present, though locations are not known.
Effluent: discharge or disposal of sewage, chemical, thermal waste (not including) combined sewage overflows.	NRW and DCWW datasets available on locations and inputs. No thermal or sludge disposal at present.
Miscellaneous wastes and debris	Litter present in the sea from various sources.
Run-off: agricultural, urban and industrial run-off	Urban and industrial run-off is widespread and common around coastal populations and industry.
Fishing: all trawling (including beam, otter, toothed and any trawled gear).	Some otter trawling activity in the SPA. Exact scale and location of operation unknown but small vessels present in the summer.
Fishing: all dredging (including toothed, bladed, mechanical, hydraulic and any other gear not listed)	Bladed dredging for mussel seed may have occurred at a few localised areas in SPA. Deep hydraulic dredging is prohibited within the overlapping SAC under a statutory instrument. Toothed dredging has been assessed and is not permitted in the SPA.
Fishing: all netting (including gill, tangle, trammel, seine, fyke and any other fishing with netted gear)	Some netting methods are known to occur in the SPA but the scale and location of operations not known.

Operation/Activity	Occurrence in SPA
Fishing: all potting (including lobster, crab, prawn, whelk and any other fishing with potted gear)	Widespread and common in the SPA (inshore waters).
Fishing: all line fishing (including long-line and handline)	Occasional and localised handline fishing (mackerel).
Aquaculture: all forms of aquaculture (including algae, sea cages, impoundments, ranching, shellfish ropes and trestles and enclosed recirculation).	Not currently present in the SPA.
Aggregate extraction (including mineral and biogenic sands & gravels)	Not currently present in the SPA.
Oil and gas exploration: all oil and gas exploration activity (including seismic survey, drilling and discharges both operational and accidental)	Not currently present in the SPA.
Renewable energy generation: all forms of renewable energy (including tidal barrage and impoundments, tidal and wave energy, offshore wind both fixed and floating).	Not currently present in the SPA.
Oil spill response: all activities of responding to oil spills at sea and on shore (including chemical, physical and access).	Reactive only. No recent activity.
Recreation: fishing (e.g. angling and spearfishing).	Occurs extensively throughout the SPA from vessels but location and intensity information is unknown.
Recreation: boating (e.g. power craft, sailing, canoeing, surfing, kite surfing, paddle boarding, scuba diving etc).	Common in the SPA with peak activity during summer season.
Recreation: mooring and anchoring	Small vessels anchor in the SAC. Moorings in Abersoch. These are taken up in winter but not until at least October

Operation/Activity	Occurrence in SPA
Recreation: light aircraft	Occasional craft flying over SPA.
Recreation: marine wildlife watching / eco-tourism	Occurs in the SPA but location and intensity information is unknown.
Military activity: all forms of military activity (including ordnance ranges, marine exercises, aircraft etc)	No military ranges in the SPA. There is a military airfield at Llanbed and RAF Valley on Anglesey. Occasional aircraft transit over SPA and occasional military exercises in Irish sea.
Marine archaeology & salvage	No data available. Potential to occur in the SPA.
Science and outreach: education	No data available. Potential to occur in the SPA.
Science and outreach: science research	Occasional occurrence but location and intensity information is unknown.

5. References

Barrett, J. and Barrett, C.F. 1985. Divers in the Moray Firth, Scotland. *Scottish Birds*,13: 149- 154.

Dierschke, V., Furness, R. W., Gray, C. E., Petersen, I. K., Schmutz, J., Zydelis, R. and Daunt, F. 2017. Possible behavioural, energetic and demographic effects of displacement of red-throated divers. JNCC Report 605. Joint Nature Conservation Committee (JNCC), Peterborough.

Duckworth, J., O'Brien, S., Petersen, I.K., Petersen, A., Benediktsson, G., Johnson, L., Lehikoinen, P., Okill, D., Väisänen, R., Williams, J., Williams, S., Daunt, F. and Green, J.A. 2021. Spatial and temporal variation in foraging of breeding red-throated divers. *Journal of Avian Biology*, 52.

Garthe, S. and Huppop, O. 2004. Scaling possible adverse effects of marine windfarms on seabirds: developing and applying a vulnerability index. *Journal of Applied Ecology*, 41: 724- 734. A

Guse, N., Garthe, S. and Schirmeister, B. 2009. Diet of red-throated divers *Gavia stellata* reflects the seasonal availability of Atlantic herring *Clupea harengus* in the southwestern Baltic Sea. *Journal of Sea Research*, 62: 268-275.

Hatton-Ellis, M., Murphy, M., Cuthbertson, S., Jackson-Bué, M. and Wynter, E. 2025. Condition assessments for the designated features of Ardal Gwarchodaeth Arbennig Gogledd Bae Ceredigion/ Northern Cardigan Bay Special Protection Area. NRW Evidence Report No: 915, 22pp, Natural Resources Wales, Cardiff.

Irwin, C., Scott, M.S., Humphries, G. and Webb, A. 2019. HiDef report to Natural England - Digital video aerial surveys of red-throated diver in the Outer Thames Estuary Special Protection Area, Natural England Commissioned Reports, Number 260.

Lack, P. 1986. The Atlas of Wintering Birds in Britain and Ireland. T & A D Poyser, Calton.

Lawson, J., Kober, K., Win, I., Allcock, Z., Black, J. Reid, J.B., Way, L. and O'Brien, S.H. 2016. An assessment of the numbers and distribution of wintering waterbirds and seabirds in Liverpool Bay / 30 Bae Lerpwl area of search. JNCC Report No 576. JNCC, Peterborough.

McGovern, S., Goddarn, B., and Rehfisch, M. 2016. Assessment of Displacement Impacts of Offshore Windfarms and Other Human Activities on Red-throated Divers and Alcids. Natural England Commissioned Report: NECR227., APEM.

Moser, M.E., Broad, R.A., Dennis, R.H. and Madders, M. 1986. The distribution and abundance of some coastal birds on the west and north-west coasts of Scotland in winter. *Scottish Birds*,14: 61-67.

O'Brien, S.H., Win, I., Bingham, C.J. and Reid, J.B. 2015. An assessment of the numbers and distributions of wintering waterbirds using Bae Ceredigion/Cardigan Bay area of search (2010). JNCC Report No 555. JNCC, Peterborough.

Pollitt, M., Cranswick, P., Musgrove, A., Hall, C., Hearn, R., Robinson, J. and Holloway, S. 2000. The Wetland Bird Survey 1998-99: Wildfowl and Wader Counts. Slimbridge: BTO, WWT, RSPB & JNCC.

Skov, H., Durinck, J., Leopold, M.F. and Tasker, M.L. 1995. *Important Bird Areas for Seabirds in the North Sea including the Channel and the Kattegat*. Cambridge, BirdLife International.

Stone, C.J., Webb, A., Barton, C., Ratcliffe, N., Reed, T.C., Tasker, M.L., Camphuysen, C.J. and Pienkowski, M.W. 1995. An atlas of seabird distribution in north-west European waters. Peterborough, JNCC.

Thorpe, R.I. 2002. Numbers of wintering sea ducks, divers and grebes in North Cardigan Bay, 1991 – 1998. *Welsh Birds*, 3: 155 – 170.

Webb, A., McSorley, C.A., Dean, B.J., Reid, J.B., Cranswick, P.A., Smith, L. and Hall, C. 2006. An assessment of the numbers and distributions of inshore aggregations of waterbirds using Liverpool Bay during the non-breeding season in support of possible SPA identification JNCC Report No. 373, JNCC, Peterborough.

Webb, A., Dean, B.J., O'Brien, S.H., Söhle, I., McSorley, C., Reid, J.B., Cranswick, P.A., Smith, L.E. and Hall, C. 2009. The numbers of inshore waterbirds using the Greater Thames during the non-breeding season; an assessment of the area's potential for qualification as a marine SPA. JNCC Report, No. 374.

van Kruchten, Y. and van der Hammen, T. 2011. Case Study Sandwich Terns – a probabilistic analysis of the ecological effects of dredging. IMARES Report number C055/11 1–20.

Appendix 1: Additional supporting information

Site information

Local environmental conditions and supporting habitats

Northern Cardigan Bay SPA, as the name suggests occupies the northern half of Cardigan Bay on the west coast of Wales. It's boundary largely overlaps with the Pen Llŷn a'r Sarnau Special Area of Conservation (SAC). Several rivers flow into the northern part of Cardigan Bay adjacent to the SPA, including the Dwyfach, Glaslyn/Dwyryd, Wnion, Dysynni, Leri, Mawddach and Dyfi. The coastline is dominated by rocky cliffs and shores with occasional sandy beaches and estuaries.

Bathymetry and sediments

In Cardigan Bay there are large areas of boulder and cobble, both in the intertidal and subtidal parts of the SPA. Sediment structures vary from uniform to very mixed. The most extensive shallow areas of sub-tidal are 3 distinct shingle reefs are known as the Sarnau. All three of the Sarnau lie roughly north-east to south-west and are presumed to be formed from glacial deposits left at the end of the last ice age. Sarn Badrig is the largest and most northerly sarn, running parallel with the Llŷn Peninsula from Harlech up to 24 km offshore. Sarn y Bwlch is the smallest sarn, starting from near Tywyn. Sarn Cynfelyn, the most southerly sarn, starts from north of Aberystwyth. These shallow reefs are important ecological habitats within the Northern Cardigan Bay SPA and are important features of the Pen Llŷn a'r Sarnau SAC.

Tidal currents

The two tidal streams that enter the Irish Sea, from the north near the Isle of Man and the south through the St George's Channel, meet in the vicinity of Cardigan Bay/Bae Ceredigion. Tidal streams tend to run parallel to the coastline but are complicated by islands, headlands and seabed topography. Tidal streams are generally relatively weak within Tremadog Bay and the rest of northern Cardigan Bay (between 0.05 – 0.5 m/sec on spring tides).

The tidal regime within the SPA generally reflects that of Cardigan Bay, with semi-diurnal tides and a range of 2m at neap tides and 4m at spring tides.

Physical and chemical properties

Sea surface temperature averages around 7ºC in February/March and around 14.5-15ºC in August/September. In summer, surface temperatures in the shallower water of Cardigan Bay and Tremadog Bay can be much higher than the average e.g. 20ºC recorded in Tremadog Bay. Tremadog Bay also has greater overall variation between the minimum winter and maximum summer temperatures than further west.

In Tremadog Bay and around the Sarnau the sea water is freshened by the river flow from the estuaries. Observed surface salinities within Cardigan Bay in summer are less than 34‰, decreasing towards the shore and observed to drop by 0.5‰ crossing the Cardigan Bay front from west to east.

Water clarity in the SPA can be high, but periods of strong wave action, heavy rainfall and greater volume of water movement during spring tides can increase the turbidity. Within Tremadog Bay and around the Sarnau, the shallower conditions and greater proportion of sediments close to the reefs and the shore means that sediments are re-suspended more easily in rough weather.

During the summer the water in Cardigan Bay stratifies with warm, relatively freshwater overlying cooler, more saline water. There is very little data on water column and sediment dissolved oxygen levels but no reason to believe that the water column dissolved oxygen is generally less than 100% saturation.

Feature information

Red-throated diver *Gavia stellata*

The wintering population of red-throated divers in Great Britain is estimated to be 17,116 individuals (O'Brien et al., 2008), representing between 10-19% (depending on the areas included) of the NW Europe non-breeding population. This population estimate was derived primarily from visual aerial surveys and supplemented by The Wetland Bird Survey (WeBS) counts and county bird records. The implementation of digital aerial surveys (DAS) has led to the detection of much larger numbers of red-throated divers wintering in British coastal waters (Irwin et al., 2019). The Great Britain population estimate is, therefore, considered to be an underestimate.

In the UK, red-throated divers are associated with inshore waters, often occurring within sandy bays, firths and sea lochs, although open coastline is also frequently used (Skov et al., 1995; Stone et al., 1995). Lack (1986) found the distribution to be even along the east coast, with perhaps slightly fewer in the south compared to the north. The species is less abundant around western coasts and has a patchy distribution, though it is still common, especially off western Scotland (Moser et al., 1986; Stone et al., 1995). Concentrations have been recorded in Cardigan Bay/Bae Ceredigion, the Moray Firth, the Clyde and Forth Estuaries, the Aberdeenshire coast, the Suffolk/Essex coast, as well as close to Tiree (Moser et al., 1986; Barrett & Barrett 1985; Pollitt et al., 2000; Thorpe 2002). O'Brien et al., (2008) note that distribution was uneven at the national scale and by far the greatest numbers were found off southeast and east Britain. Aerial and boat transect surveys in 2002/3 identified a significant concentration in the Outer Thames Estuary (Percival et al., 2004), and recent surveys have estimated the current SPA population at 18,079 overwintering individuals (Irwin et al., 2019). Shore-based observations from the North Norfolk Coast identified winter (December-January) peaks during 1992-1995 of up to 820 individuals (Taylor et al., 1999). Subsequently, a mean peak population estimate of 1,787 red-throated divers was identified in the Greater Wash (Lawson et al., 2016). The Greater Wash area supports 10% of the GB wintering population of red-throated diver and is the second most important site in the UK for this species after the Outer Thames Estuary (Lawson et al., 2016).

Appendix 2: List of designated sites partly or wholly overlapping with the SPA

Sites of Special Scientific Interest:

- Glanllynnau a Glannau Pen – Ychain I Cricieth
- Tiroedd a Glannau rhwng Cricieth ac Afon Glaslyn
- Morfa Dyffryn
- Glannau Tonfanau i Friog
- Broadwater
- Dyfi
- Borth – Clarach
- Allt wen a traeth Tanybwlch
- Craigyfulfran and Clarach

SACs:

- Pen Llŷn a'r Sarnau /Lleyn Peninsula and the Sarnau
- Gorllewin Cymru Forol /West Wales Marine