The Bates Partnership
Dredging, Harbour and Offshore Consultants

Western Marinas Dredging Ltd

Maintenance Dredging

Information to Inform a Habitats Regulations Assessment – Stage 1 Screening Assessment

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1 Introduction

1.1 Background

1.1.1 Western Marinas Dredging Ltd (WMDL) are proposing to undertake maintenance dredging at Aberystwyth Marina to restore the required water depths. Maintenance dredging will remove sediment from the marina by using water injection dredging (WID) to relocate the sediment into the downstream reaches of the estuaries of Afon Rheidol and Afon Ystwyth and, potentially, into the coastal waters of Cardigan Bay. By taking this approach to the maintenance dredging, the sediment will be retained within the same sediment cell from where it originated, which is the generally preferred dredged material management option set out in the Welsh National Marine Plan (Welsh Government, 2019).

1.1.2 In accordance with the provisions of the Marine & Coastal Access Act 2009, WMDL need a marine licence from Natural Resources Wales (NRW) to undertake the maintenance dredging activity. Given the nature of the maintenance dredging activity, the marine licence application will be subject to an assessment of whether it complies with the provisions of the Conservation of Habitats and Species Regulations 2017 (as amended) (hereafter referred to as 'the Habitats Regulations').

1.1.3 Accordingly, this report has been prepared by The Bates Partnership (TBP) on behalf of WMDL to present information to show whether, on the basis of objective information and scientific evidence, the proposed maintenance dredging of Aberystwyth Marina is likely to have any significant adverse effects on a European site either alone or in combination with other plans or projects.

2 Project Definition

2.1 Aberystwyth Marina

2.1.1 Aberystwyth Marina is situated in the estuary to the Afon Rheidol and within the town of Aberystwyth, approximately 400m upstream of the breakwaters that form the entrance to Aberystwyth Harbour (**Figure 1**). The marina provides 154 berths largely as floating pontoon moorings and onshore facilities and services.

Figure 1 – Location of Aberystwyth Marina (map source: Google Earth; accessed 27-04-2026)

2.2 Previous Maintenance Dredging Activity

2.2.1 Since the capital dredging to form the basin, Aberystwyth Marina has been subject to a series of maintenance dredging campaigns to maintain a maximum bed level of -2mCD.

2.2.2 Apart from a maintenance dredging campaign in 2008, the most recent maintenance dredging has been undertaken under marine licence DML1907. Under marine licence DML1907, the former operator of the marina – The Marine Grroup - was permitted to dredge up to 42,000 wet tonnes of dredged material (sand and silt) by WID. This activity was granted on an annual basis from 2019 to 2023, and was conditioned such that it avoided the bathing water season between 15 May and 30 September inclusive. The HRA screening assessment accompanying marine licence DML1907 found the proposed dredging activity would not have a significant effect on the features of the Lleyn Peninsula and the Sarnau Country SAC (ADBP, 2015).

2.3 Proposed Maintenance Dredging Activity

Dredging Location

2.3.1 Maintenance dredging will be undertaken to remove sediment that has accumulated within Aberystwyth Marina (see figure in **Appendix 1**). The vertical and horizontal extent of the proposed maintenance dredging is the same as previous maintenance dredging campaigns undertaken under previous marine licences DML 1554 and DML1907. Horizontally, the proposed dredging activity will remove accumulated sediment at and around the floating pontoon berths, which covers an area of approximately 1.531 hectares. Vertically, the proposed dredging activity will remove accumulated sediment to achieve an average bed level of -1.7mCD (i.e., 1.7m below Chart Datum). To achieve this, a dredging tolerance of 0.3m is required such that the proposed dredging activity could result in a maximum bed level of -2.0mCD.

Dredged Material Characteristics

2.3.2 In line with NRW sample plan SP2511, sediment samples were collected from four sampling locations within the marina (see figure in **Appendix 2**). Sediment samples were taken at the surface (i.e., 0m) and at 1m intervals down to the required dredge depth, which required sampling down to 1.5m below the existing bed level.

2.3.3 Particle size analysis was undertaken on the sediment samples to determine the distributions of sediment sizes and proportions of dominant sediment types (i.e., gravel, sand and silt) (see tables and figures in **Appendix 3**). The particle size distributions show the sediment samples to be dominated by particle fractions that are less than 63µm, such that silt is the dominant sediment type.

2.3.4 Chemical analyses were undertaken on the sediment samples to determine concentrations of a range of potentially contaminating substances; namely, metals, organotin compounds and polycyclic aromatic hydrocarbons (PAHs) (see tables in **Appendix 4**).

2.3.5 The concentrations of contaminants in the sediment have been compared to sediment quality criteria to indicate whether the proposed maintenance dredging activity has the potential to adversely affect the receiving environment. The principal sediment quality criteria are the UK ‘action levels’ (Cefas Action Level 1 (AL1) and Cefas Action Level 2 (AL2)), which are used to inform marine licence applications about the suitability of sediment for disposal at sea. Generally, sediment with contaminant concentrations below AL1 is considered suitable for disposal at sea (Mason *et al.*, 2021). UK action levels are partially available (AL1 but no AL2) for some contaminants including PAHs, so the US ‘effects ranges’ (effects range low (ERL) and effects range median (ERM)) can be used to inform marine licence applications about the suitability of sediment for disposal at sea; albeit on an advisory basis because the other criteria have no legal or policy standing in the UK. Generally, sediment with contaminant concentrations below the ERL is considered unlikely to cause harm to marine life (Long et al., 1995; Gorham-Test, 1998) and, by implication, is considered suitable for disposal at sea.

2.3.6 Chemical analyses determined that the sediment samples representing the dredged material in the marina are characterised by most contaminants at concentrations below the AL1 and/or the ERL, and a few contaminants at concentrations above the AL1 and/or the ERL but well below the AL2 and/or the ERM.

2.3.7 Given the results of the particle size analysis and chemical analyses, the sediment in the marina should be suitable for relocating downstream: notably, it should not change the physical and chemical characteristics of the existing bed material within the downstream reaches of the estuaries of the Rivers Rheidol and Ystwyth and, potentially, the coastal waters of Cardigan Bay.

Dredging Method

2.3.8 The intended method for the proposed maintenance dredging activity will involve water injection dredging (WID).

2.3.9 WID plant consists of a small vessel or floating pontoon with a water pump and injection arm attached. The WID dredging method is described as follows. The vessel / pontoon is manoeuvred by its own propulsion system to the desired dredging location. The injection arm is lowered to the bed and passed over the dredging area as the vessel / pontoon is manoeuvred ahead at very low speeds (<1 knot). Water is pumped from the surface through the injection arm and injected into the bed sediment at low pressures (approximately 1.5 bars) through a series of nozzles positioned along the horizontal beam at the end of the injection arm. The injected water breaks down the cohesion between the sediment particles and creates a layer of water and sediment at the bed with a higher density than the overlying water column. This fluidised sediment layer acts a low viscosity fluid and flows horizontally along the bed's sediment-water interface as a density current into lower bed levels / deeper waters under the influence of gravity and currents. It is by this process that the WID method relocates sediments from a dredging area to the surrounding environment. The vertical dispersion of the fluidised sediment is limited to the lower fraction of the water column (immediately above the bed) as the low pressure of injected water avoids putting sediment into suspension in the overlying water column. The horizontal dispersion of the fluidised sediment depends on the viscosity characteristics of the fluidised sediment, the morphological characteristics of the bed, and the hydrodynamic characteristics of the water body. The flow velocity of the fluidised sediment is typically in the range 0.2m/s to 2m/s, depending on the sediment itself and the local bathymetry (e.g., slope), hydrodynamic conditions (e.g., tidal currents) and bed friction (e.g., presence of vegetation).

2.3.10 In the case of the proposed maintenance dredging activity, WID is expected to relocate sediment such that it flows as a density current, largely under the influence of gravity and ebb tides, from the marina, down the River Rheidol, out of the harbour and into the coastal waters of Cardigan Bay. Vertical dispersion of the fluidised sediment is expected to remain close to the bed such that there will be limited exchange with the overlying water column. Horizontal dispersion of the fluidised sediment is expected to be initially confined by the dimensions of the River Rheidol's subtidal channel through the harbour and beyond the breakwaters, and then broadened as it flows into deeper water in Cardigan Bay.

Dredging Programme

2.3.11 Maintenance dredging of the marina is proposed to take place over a series of annual campaigns over the next three years. The maximum volume of sediment to be dredged within each 12-month period is 30,000m^3.

2.3.12 Each annual dredging operation is expected to take approximately 10-15 days. The proposed dredging activity will only occur during the period of 1 hour before high tide to 1 hour before low tide on falling tides (i.e., no dredging will take place on rising tides apart from the hour before high water when current velocities have decreased significantly). Dredging is planned for the autumn / winter months to ensure sufficient water depths are in place at the marina for the important spring / summer recreational period. As per the previous marine licence (DML 1907), no dredging will take place between 15 May and 30 September to avoid the bathing water season.

Dredging Management

2.3.13 A number of plans will be in place to manage environmental risks during maintenance dredging of the marina. These plans are expected to include a Pollution Prevention Plan (or equivalent) for minimising the risk of pollution from spills and leaks from construction plant, a Marine Biosecurity Risk Assessment and Management Plan (or equivalent) for minimising the risk of introducing or spreading marine invasive non-native species (INNS).

Dredging Impact Footprint: Removal of Sediment from Aberystwyth Marina

2.3.14 The impact footprint due to sediment removal will correspond with the dredging location within Aberystwyth Marina (see figure in **Appendix 2**), will be the same as previous maintenance dredging campaigns undertaken under previous marine licences, and covers an area of approximately 1.531 hectares.

Dredging Impact Footprint: Relocation of Fluidised Sediment to Cardigan Bay

2.3.15 Research on fluidised sediment propagation (e.g., Sigwald et al., 2015) combined with the local bathymetric and hydrodynamic conditions characterising the lower reach of the River Rheidol and inshore waters of Cardigan Bay (e.g., Royal Haskoning, 2011) can be considered to indicate the impact footprint of the sediment relocated by the proposed maintenance dredging activity.

2.3.16 The fluidised sediment is expected to propagate as a discernible density current under the influence of gravity and tidal currents and, to a lesser extent, bed friction (given the lack of vegetation).

2.3.17 The marina is situated in the lowermost reach of the River Rheidol immediately downstream of a weir and approximately 325m upstream of the confluence of the Rivers Rheidol and Ystwyth. This reach of the River Rheidol flows through Aberystwyth Harbour and is flanked by lengths of vertical quay wall, sloping rock revetment, intertidal shingle banks and a spending beach. Water levels within this reach are heavily influenced by tides such that water covers the entire area at high water but is constrained to a central channel at low water. Water levels typically change by approximately 3.2m between low water and high water, but can increase to approximately 5.0m on larger spring tides and decrease to approximately 0.9m on smaller neap tides. Flow velocities typically range between 0.2m/s and 0.8m/s during average tidal conditions and normal river conditions

(i.e., when the flows are not affected by heavy rain events or dam releases upstream). There is a small shingle shoal at the confluence of the Rivers Rheidol and Ystwyth, and a shallow bar at the entrance to the river / harbour. These features influence flow direction at the entrance to the river / harbour and reduce wave propagation into the river / harbour. Beyond the river / harbour entrance, this part of Cardigan Bay is characterised by flow velocities that are weaker than velocities passing through the river / harbour entrance. The beaches fronting Aberystwyth comprise relatively coarse-grained sediment (i.e., gravelly sand, sandy gravel) and are gradually eroding. The harbour's southern breakwater interrupts the net northerly longshore sediment transport direction and, therefore, the supply of material to these beaches.

2.3.18 Given the local bathymetric and hydrodynamic conditions, the fluidised sediment is expected to propagate (mainly under the influence of gravity and the ebb tidal current) from the marina, through the harbour (where it will be confined and directed by the river's central channel, the shingle shoal at the confluence with the River Ystwyth, and the shallow bar at the river / harbour entrance), and into Cardigan Bay. Once in Cardigan Bay, the fluidised sediment is expected to propagate (mainly under the influence of gravity and the residual effect of the ebb tidal current) in a largely offshore direction until settling on the bed on slack water. It is not possible to accurately predict the extent of the fluidised sediment's propagation, however, the timing of the maintenance dredging activity relative to tidal times and current velocities indicates that the impact footprint due to sediment relocation is expected to extend offshore into Cardigan Bay for potentially 5km, where the remnant of the fluidised sediment is expected to be no longer discernible from background conditions for bedload sediment transport.

2.4 Other Plans and Projects

Development subject to Planning Control

2.4.1 Reference to Ceredigion County Council's online planning information (ceredigion-online.tascomi.com; accessed 26-05-2026) identifies that no planning applications have been granted for development at and around Aberystwyth Marina, Aberystwyth Harbour and the adjacent beaches since 2020.

2.4.2 On the basis that development prior to and including 2020 can be considered integrated into baseline conditions, and no development since 2020 has occurred, then there is no potential for the proposed maintenance dredging activity to have in-combination effects with development.

Activities subject to Marine Licensing

2.4.3 Reference to NRW's public register (publicregister.naturalresources.wales; accessed 26-05-2026) identifies several marine licence applications have been granted for activities at and around Aberystwyth Marina, Aberystwyth Harbour and the adjacent beaches since 2020.

2.4.4 Under marine licence DML2473, Ceredigion County Council was permitted to dispose of 10,000 wet tonnes of dredged material (gravel, sand and silt) from the southern part of Aberystwyth Harbour to the beaches either side of the river / harbour entrance. This activity was granted on an annual basis from 2025 to 2030, and must occur during a spring tide cycle in winter / early spring (January to March inclusive). Marine licence DML2473 continues the dredged material disposal activity that took place from 2022 to 2025 under marine licence DML2160. The HRA screening assessments accompanying

marine licences DML2473 and DML2160 both found the proposed dredged material disposal activities would not have a significant effect on the features of the West Wales Marine Special Area of Conservation (SAC) and the Northern Cardigan Bay Special Protection Area (SPA) (Engineering Design Services, 2024 and Engineering Design Services, 2021).

2.4.5 Under marine licence CML2513 Andrew Scott Ltd was permitted to install a storm outfall through the sea wall at Old College, Aberystwyth. This activity was granted for one year from April 2025 to March 2026. The HRA screening assessment informing marine licence CML2513 found the proposed outfall installation activities would not have a significant effect on a European site because there was no impact pathway (NRW, 2025a).

2.4.6 On the basis that licensable activities since 2020 have no potential for significant effects, then there is no potential for the proposed maintenance dredging activity to have in-combination effects with these activities.

3 HRA Stage 1 Screening Assessment

3.1 Introduction

3.1.1 This Stage 1 screening assessment provides information to determine whether the proposed maintenance dredging activity could have a 'likely significant effect' on a European site(s) either alone or in combination with other plans or projects such that it needs to be subject to a Stage 2 appropriate assessment in accordance with the provisions of the Habitats Regulations.

3.2 Screening of European Sites

3.2.1 The first step in this screening assessment is to identify the European sites which could be affected by the proposed maintenance dredging activity. Reference to NRW's Wales Environmental Information Portal (smnr-nrw.hub.arcgis.com; accessed 27-05-2026) shows three European sites situated within five kilometres of the proposed maintenance dredging activity (see figures in **Appendix 5**), namely:

- West Wales Marine SAC / Gorllewin Cymru Forol SAC.
- Lleyn Peninsula and the Sarnau SAC / Pen Llyn a'r Sarnau SAC.
- Northern Cardigan Bay SPA / Gogledd Bae Ceredigion SPA.

3.2.2 The potential for the proposed maintenance dredging activity to have discernible effects on one or more of the above European sites has been informed by a consideration of the dredging method. As noted in **Section 2.3**, the proposed maintenance dredging activity will involve WID plant working in the marina and will relocate fluidised sediment downstream from the marina through the harbour and into Cardigan Bay. The maintenance dredging activity itself will be limited spatially and temporally (i.e., small, specialist WID plant operating within the marina intermittently for approximately 6 hours around ebb tides for approximately 10-15 days) but will be visible and will generate a degree of airborne noise and/or underwater noise. However, the enclosed nature of the marina within the harbour will limit the impact pathways for effects on European sites; notably, the harbour walls and breakwaters will limit lines of sight and airborne noise propagation between the maintenance dredging activity and coastal waters at Aberystwyth (Cardigan Bay), and will limit underwater noise propagation between the maintenance dredging activity and coastal waters at Aberystwyth (Cardigan Bay). The

sediment relocation will generate a degree of sediment dispersion and deposition; however, the WID method will limit sediment dispersion to the water column immediately above the bed and will limit sediment dispersion and deposition in coastal waters at Aberystwyth (Cardigan Bay).

3.2.3 All three European sites have features and/or supporting habitat situated within 0.5km of the marina and, therefore, are potentially within the discernible impact footprints of the proposed maintenance dredging activity and, therefore, are considered further in this report.

3.3 Summary Descriptions of European Sites

West Wales Marine SAC / Gorllewin Cymru Forol SAC[1]

3.3.1 The SAC is designated for the protection of one species:

- Harbour porpoise (*Phocoena phocoena*).

3.3.2 The SAC's boundary extends into Cardigan Bay from the Llŷn peninsula in the north to the Pembrokeshire coast in the south-west, and covers approximately 7,376km^2 (see figure in **Appendix 5**). The whole SAC is identified as an important summer area for harbour porpoise (April-September, and a smaller section to the south of the SAC, around Cardigan Bay, is also identified as an important winter area for harbour porpoise (October-March) (see figure in **Appendix 5**).

3.3.3 The SAC's conservation objectives are to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status for harbour porpoise by ensuring that:

- Harbour porpoise is a viable component of the site.
- There is no significant disturbance of the species.
- The condition of supporting habitats and processes, and the availability of prey is maintained.

Lleyn Peninsula and the Sarnau SAC / Pen Llyn a'r Sarnau SAC[2]

3.3.4 The SAC is designated for the protection of nine habitats and three species:

- Reefs.
- Large shallow inlets and bays.
- Sandbanks which are slightly covered by seawater all the time.
- Estuaries.
- Coastal lagoons.
- Mudflats and sandflats not covered by seawater at low tide.
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*).
- Salicornia and other annuals colonising mud and sand.
- Submerged or partially submerged sea caves.
- Grey seal (*Halichoerus grypus*).
- Bottlenose dolphin (*Tursiops truncatus*).
- Otter (*Lutra lutra*).

[1] Sources: NRW and JNCC (2017), NRW and JNCC (2019)
[2] Sources: CCW (2009), NRW (2018), NRW (2025b)

3.3.5 The SAC's boundary extends from Nefyn on the north coast of Llŷn and includes parts of the shore and the waters and seabed around the Llŷn Peninsula, in north Cardigan Bay and along the Meirionnydd coast to Clarach in Ceredigion south of the Dyfi estuary, including the Glaslyn/Dwyryd, Atro, Mawddach and Dyfi estuaries, and covers 1,460km^2 (see figure in **Appendix 5**). Much of the SAC comprises subtidal areas, but there are also extensive intertidal areas.

3.3.6 The SAC's conservation objectives are to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status for the habitats features by ensuring that:

- The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing.
- The physical, biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded.
- The presence, abundance, condition and diversity of typical species are such that habitat quality is not degraded.

3.3.7 The SAC's conservation objectives are to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status for the species features by ensuring that:

- The population is maintaining itself on a long-term basis as a viable component of its natural habitat.
- The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future.
- The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing.

Northern Cardigan Bay SPA / Gogledd Bae Ceredigion SPA[3]

3.3.8 The SPA is designated for the protection of one species:

- Red-throated diver (*Gavia stellata*).

3.3.9 The SPA's boundary occupies the northern half of Cardigan Bay and extends from Criccieth in the north to just beyond Aberystwyth in the south, and covers approximately 3,924km^2 (see figure in **Appendix 5**).

3.3.10 The SPA's conservation objectives are to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status for red-throated diver by ensuring that:

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

[3] Sources: NRW (2019) and NRW (2025c)

3.4 Screening of European Site Features

3.4.1 The second step in this screening assessment is to identify which of the European site features could be potentially affected by the proposed maintenance dredging activity. This step uses a source-pathway-receptor approach to identify whether there is the potential for an effect (i.e., a potential pathway can be established that links a receptor (i.e., a European site feature) to a source of a potential impact (e.g., impacts arising from the proposed maintenance dredging activity). If there is no pathway between a source and a receptor, then there is no potential for a receptor to be exposed to an impact and, therefore, there is no potential for a likely significant effect. If there is a potential pathway between a source and a receptor, then there is the potential for a receptor to be exposed to an impact and, therefore, a screening assessment has been undertaken to consider the potential for a significant effect (see **Section 3.5**).

West Wales Marine SAC / Gorllewin Cymru Forol SAC

3.4.2 Based on the spatial extent of the SAC's feature reported by NRW and JNCC (2019) and harbour porpoise sightings shown on the National Biodiveristy Network (NBN) Atlas (source: wales.nbnatlas.org; accessed 12-06-2026) (see figures in **Appendix 5**), the following SAC feature potentially occurs within the discernible impact footprints of the proposed maintenance dredging activity (as described in **Section 2.3**) and, therefore, is considered further in this report:

- Harbour porpoise.

Lleyn Peninsula and the Sarnau SAC / Pen Llyn a'r Sarnau SAC

3.4.3 Based on the spatial extents of the SAC's features reported by NRW (2025a) and shown on NRW's Wales Environmental Information Portal (smnr-nrw.hub.arcgis.com; accessed 27-05-2026) (see figures in **Appendix 5**), the following SAC features potentially occur within the discernible impact footprints of the proposed maintenance dredging activity (as described in **Section 2.3**) and, therefore, are considered further in this report:

- Reefs.
- Submerged or partially submerged sea caves.

3.4.4 The SAC's other features occur beyond discernible impact footprints of the proposed maintenance dredging activity (as described in **Section 2.3**) and, therefore, are not considered further in this report.

Northern Cardigan Bay SPA / Gogledd Bae Ceredigion SPA

3.4.5 Based on the spatial extent of the SPA's feature reported by NRW (2025c) (see figures in **Appendix 5**), the following SPA feature potentially occurs within the discernible impact footprints of the proposed maintenance dredging activity (as described in **Section 2.3**) and, therefore, is considered further in this report:

- Red-throated diver.

3.5 Screening for Likely Significant Effects

3.5.1 The next step for screening is to assess whether the impact pathways identified in **Section 3.4** could manifest as a significant effect(s) on the European sites. This step in the screening process is informed by the description of the proposed maintenance dredging activity (**Section 2.3**), the potential for other plans and projects to arise at and

around Aberystwyth Marina and Aberystwyth Harbour (**Section 2.4**), the findings of the dredged material's physical characterisation (**Section 2.3** and **Appendix 3**) and chemical characterisation (**Section 2.3** and **Appendix 4**), habitat and species distributions (**Appendix 5**), and other published information including the conservation objectives and condition assessments for the European sites, and relevant pressure benchmarks for Marine Evidence-based Sensitivity Assessment (MarESA) (source: marlin.ac.uk; accessed 12-06-2026).

3.5.2 Based on the above information, the potential for the proposed maintenance dredging activity to have a significant effect on the European sites has been considered in relation to the following impact pathways:

- Potential effect of dredging (sediment removal) on the West Wales Marine SAC's harbour porpoise due to underwater noise disturbance.
- Potential effect of dredging (sediment removal) on the Northern Cardigan Bay SPA's red-throated diver due to visual and/or airborne noise disturbance.
- Potential effect of dredging (sediment relocation) on the Lleyn Peninsula and the Sarnau SAC's reefs and sea caves, the West Wales Marine SAC's supporting habitat for harbour porpoise, and the Northern Cardigan Bay SPA's supporting habitat for red-throated diver due to physical changes to geomorphological and sedimentological conditions.
- Potential effect of dredging (sediment relocation) on the Lleyn Peninsula and the Sarnau SAC's reefs and sea caves, the West Wales Marine SAC's supporting habitat for harbour porpoise, and the Northern Cardigan Bay SPA's supporting habitat for red-throated diver due to chemical changes to water and sediment quality conditions.

3.5.3 The assessments for these impact pathways to have a significant effect are set out in **Table 1**. The assessments conclude that sediment removal and sediment relocation associated with the proposed maintenance dredging activity will not have a significant effect on the conservation status of the European sites' features either alone or in-combination with other plans or projects.

Table 1: Screening for Significant Effects			
Source	**Pathway**	**Receptor(s)**	**Screening Assessment for Likely Significant Effect**
Maintenance dredging activity in Aberystwyth Marina	Dredging (sediment removal) of sediment leading to the disturbance of species features	West Wales Marine SAC: harbour porpoise	Maintenance dredging has the potential to disturb harbour porpoise within the SAC by changing underwater noise conditions (i.e., increase sound pressure levels), which could result in auditory injury and/or behavioural responses such as flight responses (e.g., displacement / movement) and/or behavioural changes (e.g., alarm calls, heads up, change in feeding or roosting activity). It is noted that Aberystwyth Marina, Aberystwyth Harbour and Cardigan Bay are ongoing areas of human activity causing underwater noise from mechanical sources (e.g., vessel movements), so harbour porpoise may have a degree of habituation to certain disturbances. Reference to NRW and JNCC's conservation objectives and advice on operations for the SAC (NRW and JNCC, 2019) identifies persistently elevated densities of harbour porpoise in the nearshore coastal waters at Aberystwyth during summer (April to September) but not winter (October to March) (see figure in **Appendix 5**). Also, reference to NRW and JNCC's conservation objectives and advice on operations for the SAC (NRW and JNCC, 2019) identifies dredging as well as other maritime construction and operation activities (e.g., shipping, drilling, aggregate extraction, pile driving, etc) as known anthropogenic activities that impact the distribution of harbour porpoise within the SAC through underwater noise causing mortality, injury, disturbance including behavioural change, and/or habitat change / loss. The SAC's harbour porpoise is primarily a summer feature (April to September) in the nearshore coastal waters at Aberystwyth, so its presence may overlap with the proposed maintenance dredging activity that is expected to occur over 10-15 days sometime between October and mid-May. There is a limited source for underwater noise disturbance from the WID plant because WID generates continuous (non-impulsive) underwater noise (1) at sound pressure levels of approximately 170dB at one metre from the noise source (HR Wallingford, 2023 in Tyler and Emery, 2024), which is below harbour porpoise's sound exposure levels for auditory injury as a permanent threshold shift (181dB; NOAA, 2024) but slightly above harbour porpoise's sound exposure levels for auditory injury as a temporary threshold shift (161dB; NOAA, 2024), and (2) at low frequencies of <1kHz, which is below harbour porpoise's most susceptible hearing frequencies (5.93-186kHz; NOAA, 2024). Also, there is a very limited pathway for underwater noise disturbance from the WID plant because the proposed maintenance dredging activity will take place within the confines of Aberystwyth Harbour such that quay wall and breakwater structures will substantially restrict underwater noise propagation to the nearshore coastal waters at Aberystwyth and, therefore, will prevent disturbance leading to the exclusion of harbour porpoise from 20% of the SAC in any given day. Accordingly, there is very limited potential for the proposed maintenance dredging activity to disturb the SAC's harbour porpoise feature and, therefore, there will be no significant effect on the European site either alone or in-combination with other plans and projects.
Maintenance dredging activity in Aberystwyth Marina	Dredging (sediment removal) leading to the disturbance of species features	Northern Cardigan Bay SPA: red-throated diver	Maintenance dredging has the potential to disturb red-throated diver within the SPA when feeding, moulting, loafing, sheltering and any other activity necessary to support its survival by changing visual conditions (e.g., presence of humans) and airborne noise conditions (i.e., increase sound pressure levels), which could result in behavioural responses such as flight responses (e.g., displacement / movement) and/or behavioural changes (e.g., alarm calls, heads up, change in feeding or roosting activity). It is noted that Aberystwyth Marina, Aberystwyth Harbour and the town and beach areas fronting Cardigan Bay are ongoing areas of human activity (e.g., beach users, dog walkers, etc) and above water noise from mechanical sources (e.g., vessel movements to/from and within the marina and harbour), so red-throated diver may have a degree of habituation to certain disturbances.

Table 1: Screening for Significant Effects			
Source	**Pathway**	**Receptor(s)**	**Screening Assessment for Likely Significant Effect**
			Reference to NRW's condition assessment for the SPA (NRW, 2025c) identifies low densities of red-throated diver in the nearshore coastal waters at Aberystwyth, and high densities of red-throated diver in the supporting habitat (submerged reefs, known as Sarnau) in the nearshore coastal waters to the north of Aberystwyth) (see figure in **Appendix 5**). Also, reference to NRW's condition assessment for the SPA (NRW, 2025c) identifies there are no known anthropogenic activities that impact the distribution of red-throated diver and/or its supporting habitat within the SPA through disturbances such as light, sound, vibration, vessel traffic, presence of people and structures. The SPA's red-throated diver is an overwintering feature (October and March) so its presence is likely to overlap with the proposed maintenance dredging activity that is expected to occur over 10-15 days sometime between October and mid-May. There is a very limited pathway for visual disturbance (e.g., line of sight disturbance due to physical presence of WID plant or human activity) and/or above water noise disturbance (i.e., non-impulsive noise propagation from the WID plant) because the proposed maintenance dredging activity will take place within the confines of Aberystwyth Harbour such that quay wall and breakwater structures will substantially restrict lines of sight and airborne noise propagation to the nearshore coastal waters at Aberystwyth. Accordingly, there is very limited potential for the proposed maintenance dredging activity to disturb the SPA's red-throated diver feature and, therefore, there will be no significant effect on the European site either alone or in-combination with other plans and projects.
Maintenance dredging activity in Aberystwyth Marina	Dredging (sediment relocation) leading to the physical change of habitat / supporting habitat features	Lleyn Peninsula and the Sarnau SAC: reefs and submerged or partially submerged sea caves West Wales Marine SAC: supporting habitat for harbour porpoise Northern Cardigan Bay SPA: supporting habitat for red-throated diver	Maintenance dredging has the potential to reduce the range and/or degrade the structure and function of habitats within the Lleyn Peninsula and the Sarnau SAC and/or supporting habitats within the West Wales Marine SAC and/or Northern Cardigan Bay SPA by physically changing the geomorphological and sedimentological conditions through the relocation of sediment to. nearshore coastal waters at Aberystwyth. Habitats in the Lleyn Peninsula and the Sarnau SAC occupy different areas of the SAC and overlap in some locations. Reference to the SAC's condition assessment (JNCC, 2019) habitat features (see figures in **Appendix 5**) indicates that the reefs and sea caves features are present in Cardigan Bay at a distance of approximately 3.5km north of the entrance to the river / harbour at Aberystwyth, with other habitat features more than 10km distant from the entrance to the river / harbour at Aberystwyth. Supporting habitats to the West Wales Marine SAC and/or Northern Cardigan Bay SPA include the characteristics of the seabed and water column. Reference to the West Wales Marine SAC's condition assessment (NRW, 2025b) indicates that the water column is a key supporting habitat for harbour porpoise; particularly because it supports the principal food resource (i.e., shoaling fish such as gobies, sand eel, whiting, sprat, herring). Reference to the Northern Cardigan Bay SPA's condition assessment (NRW, 2025c) indicates that the water column and shallow reefs are key supporting habitats for red-throated diver; particularly because they support the principal food resource (i.e., gadoids, gobies, sand eel, sprat, herring and various flatfish). There is considered to be negligible potential for an impact on the habitat and supporting habitat. There is a limited pathway for physical change in the nearshore coastal waters at Aberystwyth due to the relocation of sediment. Maintenance dredging will relocate sediment at a magnitude that may initially exceed the MarESA benchmark for smothering of 30cm but, as explained in **Section 2.3**, the fluidised sediment is expected to disperse offshore into Cardigan Bay for potentially 5km such that the remnant of the fluidised sediment is no longer discernible from background conditions for bedload sediment transport. Accordingly, there is a limited source for sediment and there will be negligible physical change to the geomorphological and sedimentological conditions of the Lleyn Peninsula and the Sarnau SAC's habitats and the West Wales Marine SAC and/or

Table 1: Screening for Significant Effects			
Source	**Pathway**	**Receptor(s)**	**Screening Assessment for Likely Significant Effect**
			Northern Cardigan Bay SPA's supporting habitats and, therefore, there will be no significant effect on the European sites either alone or in-combination with other plans and projects.
Maintenance dredging activity in Aberystwyth Marina	Dredging (sediment relocation) leading to the chemical change of habitat / supporting habitat features	Lleyn Peninsula and the Sarnau SAC: reefs and submerged or partially submerged sea caves West Wales Marine SAC: supporting habitat for harbour porpoise Northern Cardigan Bay SPA: supporting habitat for red-throated diver	Maintenance dredging has the potential to reduce the range and/or degrade the structure and function of habitats within the Lleyn Peninsula and the Sarnau SAC and/or supporting habitats within the West Wales Marine SAC and/or Northern Cardigan Bay SPA by chemically changing the water and sediment quality conditions through the relocation of sediment to. nearshore coastal waters at Aberystwyth. Habitats in the Lleyn Peninsula and the Sarnau SAC occupy different areas of the SAC and overlap in some locations. Reference to the SAC's condition assessment (JNCC, 2019) habitat features (see figures in **Appendix 5**) indicates that the reefs and sea caves features are present in Cardigan Bay at a distance of approximately 3.5km north of the entrance to the river / harbour at Aberystwyth, with other habitat features more than 10km distant from the entrance to the river / harbour at Aberystwyth. Supporting habitats to the West Wales Marine SAC and/or Northern Cardigan Bay SPA include the characteristics of the seabed and water column. Reference to the West Wales Marine SAC's condition assessment (NRW, 2025b) indicates that the water column is a key supporting habitat for harbour porpoise; particularly because it supports the principal food resource (i.e., shoaling fish such as gobies, sand eel, whiting, sprat, herring). Reference to the Northern Cardigan Bay SPA's condition assessment (NRW, 2025c) indicates that the water column and shallow reefs are key supporting habitats for red-throated diver; particularly because they support the principal food resource (i.e., gadoids, gobies, sand eel, sprat, herring and various flatfish). There is considered to be negligible potential for an impact on the habitat and supporting habitat. There is a limited source for chemical change – including a chemical change that will exceed the MarESA benchmark for exposing marine species or habitats to one or more relevant contaminants via uncontrolled releases or incidental spills - because chemical characterisation shows that the sediment within Aberystwyth Marina contains low concentrations of contaminants that pose minimal risk to habitats and species. Notably, comparing contaminant concentrations against sediment quality assessment criteria shows that concentrations are generally below or occasionally slightly above the lower assessment criteria (**Section 2.3** and **Appendix 4**), thereby indicating that the sediment in the marina is suitable for disposal (or relocation) in the marine environment (Mason et al., 2021) and contains contaminants at concentrations where adverse biological effects are rarely observed (Long et al., 1995). Accordingly, there is a limited source for contaminants and there will be negligible chemical change to the water and sediment quality conditions of the Lleyn Peninsula and the Sarnau SAC's habitats and the West Wales Marine SAC and/or Northern Cardigan Bay SPA's supporting habitats and, therefore, there will be no significant effect on the European sites either alone or in-combination with other plans and projects.

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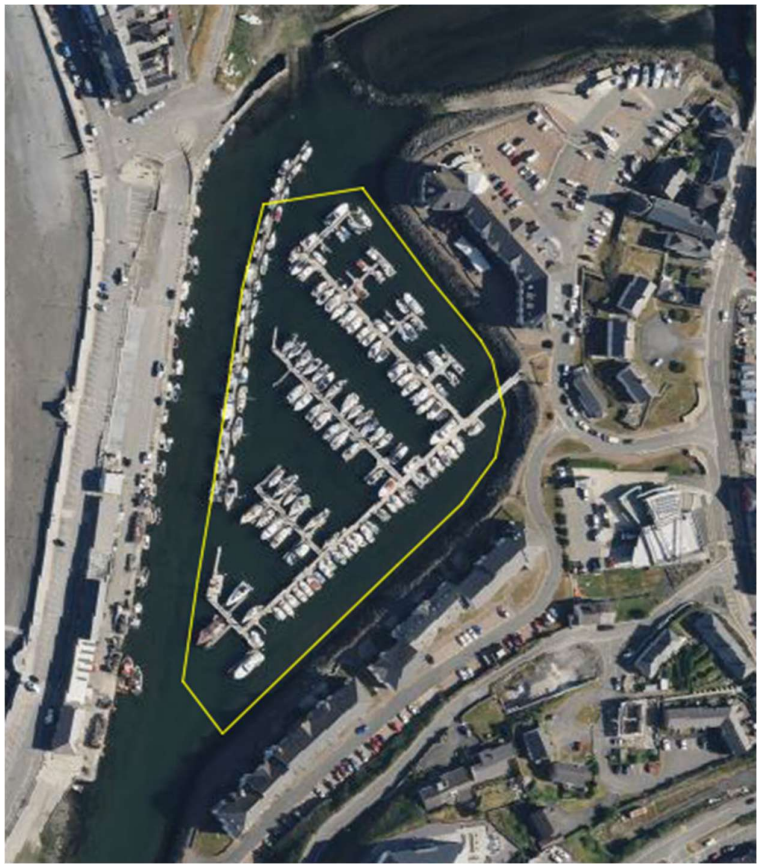
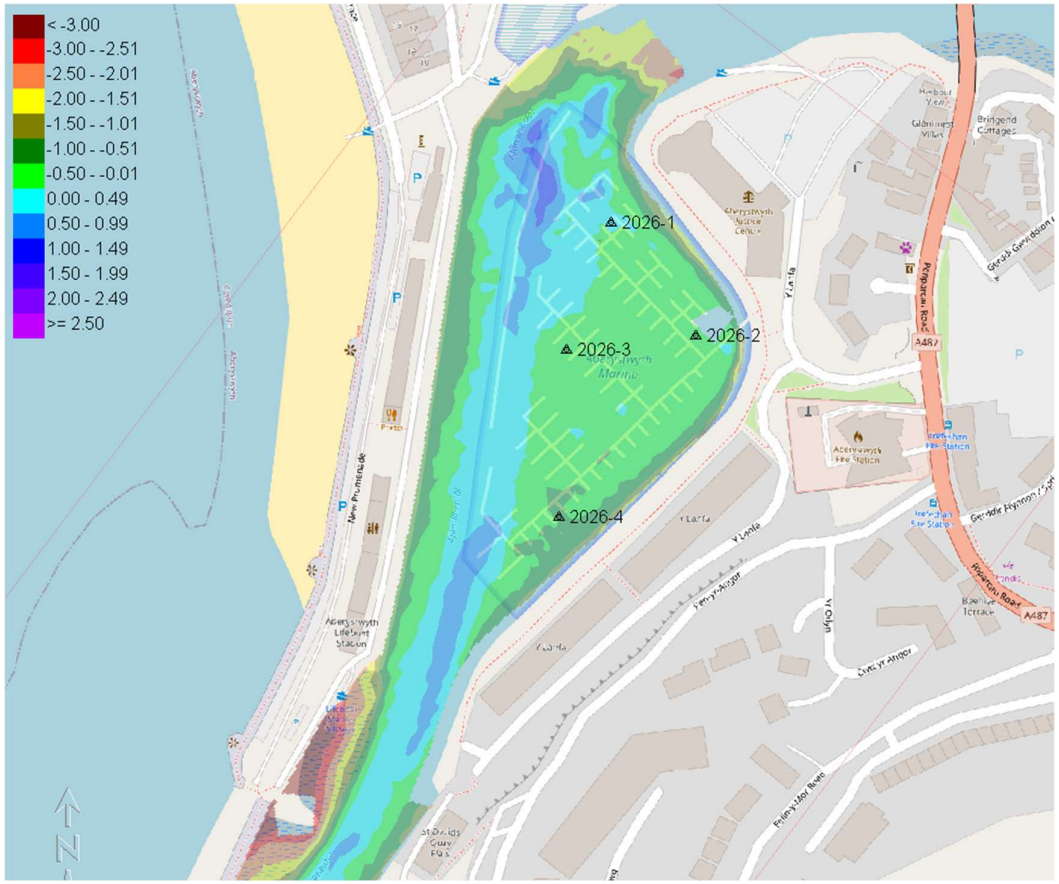
APPENDIX 1: PROPOSED DREDGING ACTIVITY LOCATION

Dredging Location within Aberystwyth Marina



APPENDIX 2: SEDIMENT SAMPLING LOCATIONS (NRW SAMPLE PLAN SP2511)

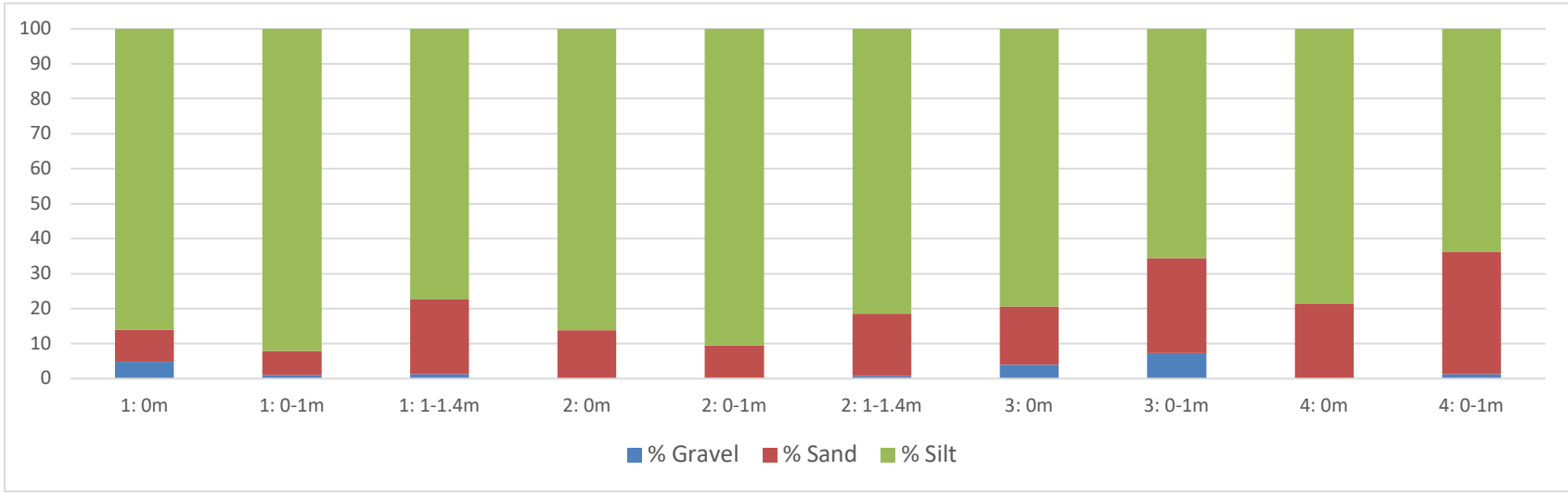
Sediment Sampling Locations in Aberystwyth Marina



APPENDIX 3: PHYSICAL CHARACTERISATION OF DREDGED MATERIAL (NRW SAMPLE PLAN SP2511)

Sample ID	Visual Appearance	% Total Solids	% Gravel (>2mm)	% Sand (0.063-2mm)	% Silt (<0.063mm)
1: 0m	Mud, plant material	38	4.82	9.18	85.97
1: 0-1m	Mud	54.1	1.01	6.84	92.12
1: 1-1.4m	Mud, cohesive	58.8	1.22	21.40	77.40
2: 0m	Mud	45.6	0.06	13.81	86.13
2: 0-1m	Mud	55.2	0.21	9.28	90.53
2: 1-1.4m	Mud, cohesive	66.9	0.82	17.75	81.42
3: 0m	Mud, plant material	65.6	3.94	16.72	79.36
3: 0-1m	Mud	58.4	7.35	27.10	65.54
4: 0m	Mud	47.8	0.00	21.45	78.55
4: 0-1m	Mud	54.8	1.29	34.98	63.72

Relative Particle Size Distributions (% Gravel, Sand and Silt)



APPENDIX 4: CHEMICAL CHARACTERISATION OF DREDGED MATERIAL (NRW SAMPLE PLAN SP2511)

Sediment Quality Criteria		Groups of Chemical Parameters		
		Metals	Organotin Compounds	Polycyclic Aromatic Hydrocarbons
UK Action Levels	Action Level 1 (AL1) and Action Level 2 (AL2)	✓	✓	✓
US Effects Ranges	Effects Range Low (ERL) and Effects Range Median (ERM)	-	-	✓

Indicator	Data Comparison to Sediment Quality Criteria
	Data is either below UK AL1 or below US ERL
	Data is either between UK AL1 and UK AL2 or between US ERL and US ERM
	Data is ether above UK AL2 or above US ERM
	Not applicable as there are no UK Action Levels or US Effects Ranges

Analyte Group	Analyte Abbreviations
Metals	Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Mercury (Hg), Nickel (Ni), Lead (Pb), Zinc (Zn)
Organotin Compounds	DBT (dibutyltin), TBT (tributyltin)
Polycyclic Aromatic Hydrocarbons	Polycyclic Aromatic Hydrocarbons (PAHs), ACENAPTH (acenaphthene), ACENAPHY (acenaphthylene), ANTHRACN (anthracene), BAA (benzo[a]anthracene), BAP (benzo[a]pyrene), BBF (benzo[b]fluoranthene), BEP (benzo[e]pyrene), BENZGHIP (benzo[ghi]perylene), BKF (benzo[k]fluoranthene), C1N (C1-naphthalenes), C1PHEN (C1-phenanthrene), C2N (C2-naphthalenes), C3N (C3-naphthalenes), CHRYSENE (chrysene), DBENZAH (dibenzo[ah]anthracene), FLUORANT (fluoranthene), FLUORENE (fluorene), INDPYR (indeno[1,2,3-cd]pyrene), NAPTH (naphthalene), PERYLENE (perylene), PHENANT (phenanthrene), PYRENE (pyrene)
Low Molecular Weight PAHs	∑LMW PAHs (sum of LMW PAHs comprising ACENAPTH (acenaphthene), ACENAPHY (acenaphthylene), ANTHRACN (anthracene), FLUORENE (fluorene), PHENANT (phenanthrene), NAPTH (naphthalene) and C1N (C1-naphthalenes))
High Molecular Weight PAHs	∑HMW PAHs (sum of HMW PAHs comprising CHRYSENE (chrysene), DBENZAH (dibenzo[ah]anthracene), FLUORANT (fluoranthene), BAA (benzo[a]anthracene), BAP (benzo[a]pyrene) and PYRENE (pyrene))

	Metals (mg.kg^{-1})								Organotin Compounds (mg.kg^{-1})	
Sample ID	Arsenic	Cadmium	Chromium	Copper	Mercury	Nickel	Lead	Zinc	DBT	TBT
1: 0m	14.2	0.53	32.8	24	0.08	35	95.8	189	<LOD	<LOD
1: 0-1m	13.5	0.42	29.7	21.6	0.06	34.1	73	166	<LOD	<LOD
1: 1-1.4m	13.5	0.51	33	23.5	0.06	36.4	102	197	<LOD	<LOD
2: 0m	14.4	0.52	34.2	24	0.06	43	80	206	<LOD	<LOD
2: 0-1m	13.7	0.55	32.3	24.5	0.06	35.8	85.9	199	<LOD	<LOD
2: 1-1.4m	13	0.62	29.2	26.4	0.08	35.7	125	231	<LOD	<LOD
3: 0m	11.6	0.48	32.9	24.2	0.08	35.8	77.2	181	<LOD	<LOD
3: 0-1m	10.7	0.61	31.2	24.4	0.07	37.3	142	243	<LOD	<LOD
4: 0m	12.8	0.34	30.5	21.4	0.06	34.6	67.6	151	<LOD	<LOD
4: 0-1m	12.3	0.57	30.6	23.8	0.09	34.1	104	193	<LOD	<LOD
UK AL1	20	0.4	40	40	0.3	0	50	130	0.1	0.1
UK AL2	100	5	400	400	3	200	500	800	1	1

	PAHs (µg.kg^{-1})										
Sample ID	ACENAPTH	ACENAPTHY	ANTHRAC	BAA	BAP	BBF	BENZGHIP	BEP	BKF	C1N	C1PHEN
1: 0m	3.94	2.64	6.49	24.8	28.9	37.7	30.6	30	36.7	46.1	51
1: 0-1m	6.01	4.78	13.3	37.6	43.4	54.8	40	41.1	42.9	52.2	163
1: 1-1.4m	6.22	3.39	8.51	32.9	37.7	50	35.6	36.3	41.9	49.5	93.8
2: 0m	4.89	<LOD	5.66	22.4	26.2	35.6	26.9	26	30.2	36.4	50.1
2: 0-1m	5.78	3.06	9.89	34.6	36.4	49.2	36.7	36.2	46	46	103
2: 1-1.4m	12.8	7.77	27.3	99.1	99.2	107	67.4	70.8	95.2	38.8	156
3: 0m	2.52	<LOD	4.59	17.5	20	26.9	19.5	19.3	22.7	26.6	67.4
3: 0-1m	8.77	6.4	28.1	81.6	81.5	89.8	57.8	60.2	79.7	49.5	112
4: 0m	4.16	3.41	13.6	47.9	43.9	62.3	35.8	38.8	43.7	41.5	55.6
4: 0-1m	6.56	3.98	12.7	44.5	47.3	51.7	39.6	40	48.4	44.9	57.8
UK AL1	100	100	100	100	100	100	100	100	100	100	100
UK AL2	-	-	-	-	-	-	-	-	-	-	-

Sample ID	PAHs (µg.kg^{-1})										
	C2N	C3N	CHRYSENE	DBENZAH	FLUORANT	FLUORENE	INDPYR	NAPTH	PERYLENE	PHENANT	PYRENE
1: 0m	63.1	35.8	40.4	6.81	55.4	11.2	27.8	20.7	23.2	43.3	42.7
1: 0-1m	66.9	50.4	54.9	9.45	78.5	14.1	40	22.6	158	49.5	61
1: 1-1.4m	68.4	43.5	51.4	8.63	72.7	14.7	35.2	20.4	142	48.6	57.8
2: 0m	50.3	27.9	36.8	5.8	52.2	9.06	25	15	19.9	39	40.8
2: 0-1m	63.1	42.6	51.8	8.81	73.8	12.8	34.6	20.3	138	50.2	57.6
2: 1-1.4m	58.6	44.6	118	17.3	214	18.4	68.3	19.4	162	108	174
3: 0m	42	23.3	27.6	4.65	37.5	7	19.3	12.2	13.6	28.1	29.1
3: 0-1m	65.6	51.1	104	15.6	182	17.4	59	22.2	190	82.5	143
4: 0m	49.7	35.9	71.9	10.2	80.1	12.4	37.2	19.1	30.3	53.7	58.7
4: 0-1m	68.6	44.1	62.1	10.1	103	12.8	37.5	30.1	102	58	79.8
UK AL1	100	100	100	100	100	100	100	100	100	100	100
UK AL2	-	-	-	-	-	-	-	-	-	-	-

Sample ID	LMW PAHs (µg.kg^{-1})							
	ACENAPTH	ACENAPTHY	ANTHRAC	FLUORENE	PHENANT	NAPTH	C1N	∑LMW PAHs
1: 0m	3.94	2.64	6.49	11.2	43.3	20.7	46.1	134.37
1: 0-1m	6.01	4.78	13.3	14.1	49.5	22.6	52.2	162.49
1: 1-1.4m	6.22	3.39	8.51	14.7	48.6	20.4	49.5	151.32
2: 0m	4.89	<LOD	5.66	9.06	39	15	36.4	105.12
2: 0-1m	5.78	3.06	9.89	12.8	50.2	20.3	46	148.03
2: 1-1.4m	12.8	7.77	27.3	18.4	108	19.4	38.8	232.47
3: 0m	2.52	<LOD	4.59	7	28.1	12.2	26.6	78.49
3: 0-1m	8.77	6.4	28.1	17.4	82.5	22.2	49.5	214.87
4: 0m	4.16	3.41	13.6	12.4	53.7	19.1	41.5	147.87
4: 0-1m	6.56	3.98	12.7	12.8	58	30.1	44.9	169.04
US ERL	-	-	-	-	-	-	-	552
US ERM	-	-	-	-	-	-	-	3,160

	HMW PAHs (µg.kg^{-1})						
Sample ID	CHRYSENE	DBENZAH	FLUORANT	BAA	BAP	PYRENE	∑HMW PAHs
1: 0m	40.4	6.81	55.4	24.8	28.9	42.7	199.01
1: 0-1m	54.9	9.45	78.5	37.6	43.4	61	284.85
1: 1-1.4m	51.4	8.63	72.7	32.9	37.7	57.8	261.13
2: 0m	36.8	5.8	52.2	22.4	26.2	40.8	184.2
2: 0-1m	51.8	8.81	73.8	34.6	36.4	57.6	263.01
2: 1-1.4m	118	17.3	214	99.1	99.2	174	721.6
3: 0m	27.6	4.65	37.5	17.5	20	29.1	136.35
3: 0-1m	104	15.6	182	81.6	81.5	143	607.7
4: 0m	71.9	10.2	80.1	47.9	43.9	58.7	312.7
4: 0-1m	62.1	10.1	103	44.5	47.3	79.8	346.8
US ERL	-	-	-	-	-	-	1,700
US ERM	-	-	-	-	-	-	9,600

APPENDIX 5: FIGURES

Figure A5.1 Boundary of the West Wales Marine SAC / Gorllewin Cymru Forol SAC and Winter and Summer Areas for Harbour Porpoise (source: JNCC, 2019)

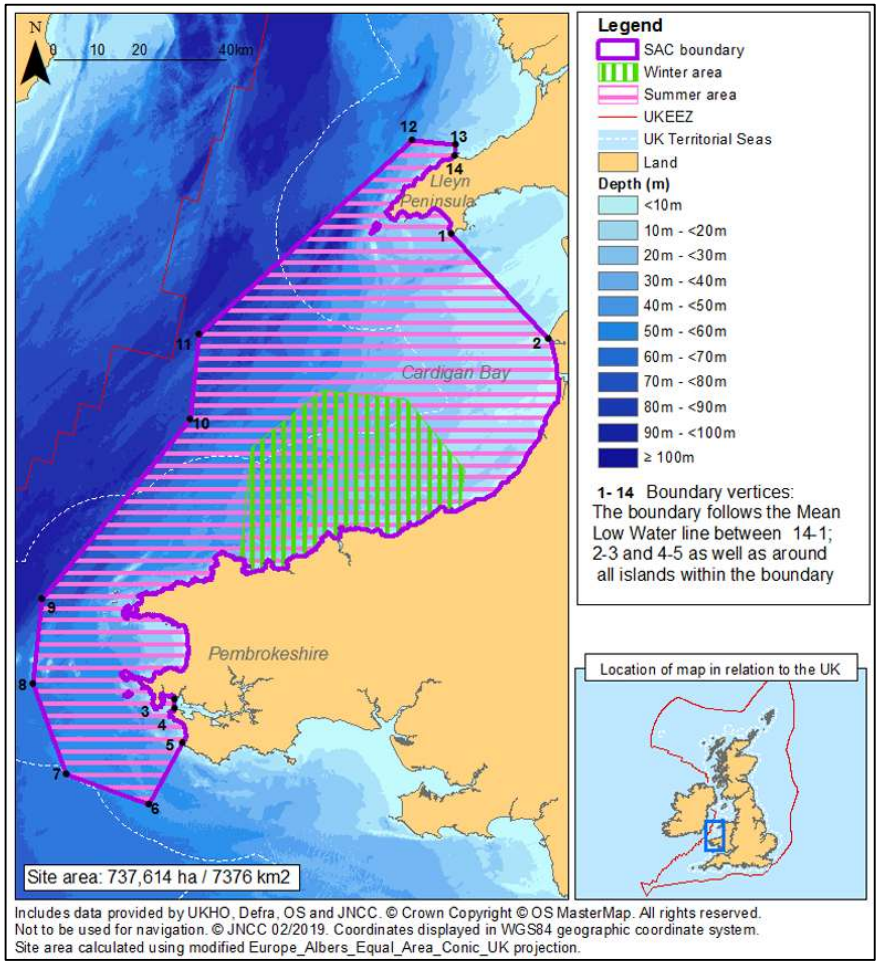
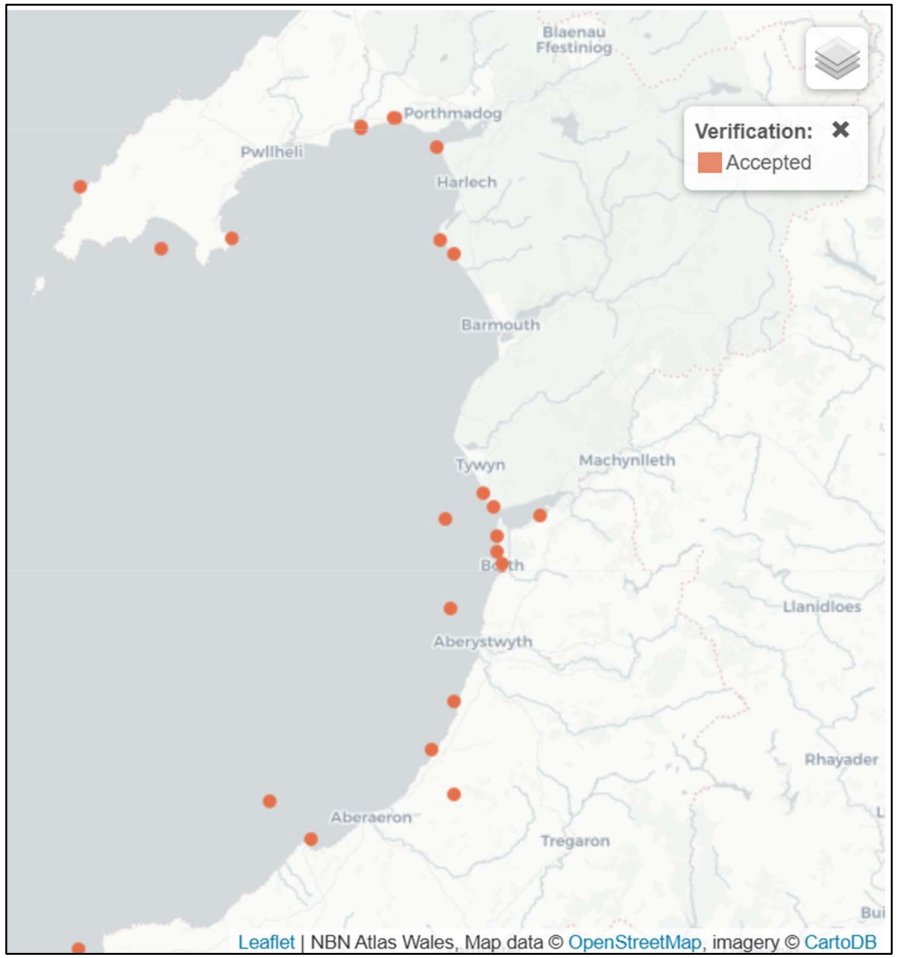


Figure A5.x Harbour Porpoise Sightings in and around Cardigan Bay (left) and in Nearshore Coastal Waters at Aberystwyth (right) (source: wales.nbnatlas.org; accessed 12-06-2026)



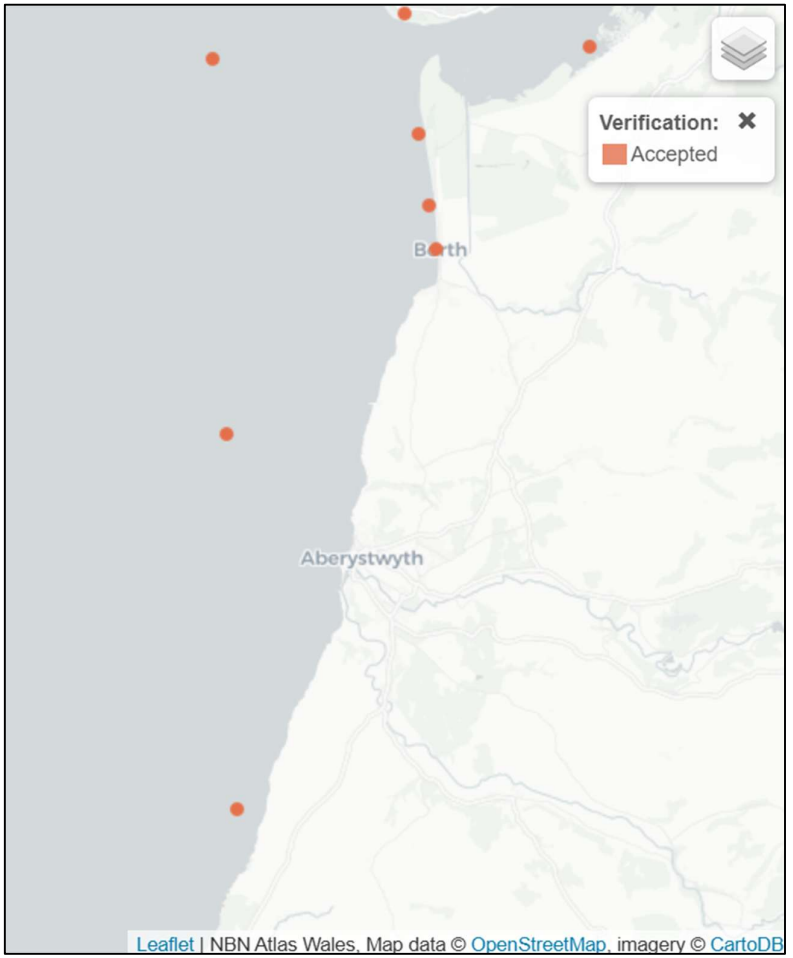


Figure A5.x Boundary of the Lleyn Peninsula and the Sarnau SAC / Pen Llŷn a'r Sarnau SAC (NRW, 2025a)

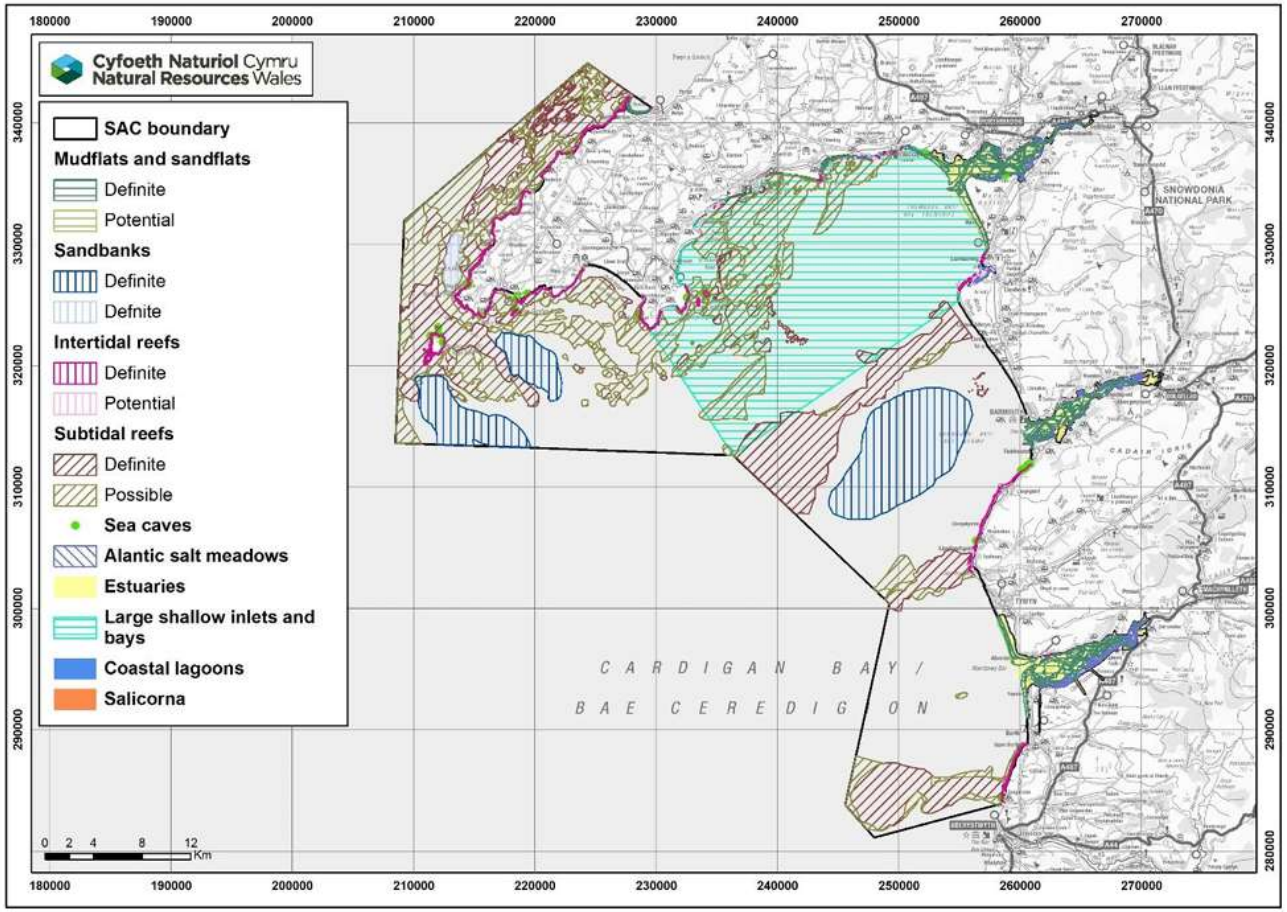


Figure A5.x Subtidal Reefs near Aberystwyth in the Lleyn Peninsula and the Sarnau SAC / Pen Llŷn a'r Sarnau SAC (source: smnr-nrw.hub.arcgis.com; accessed 11-06-2026)

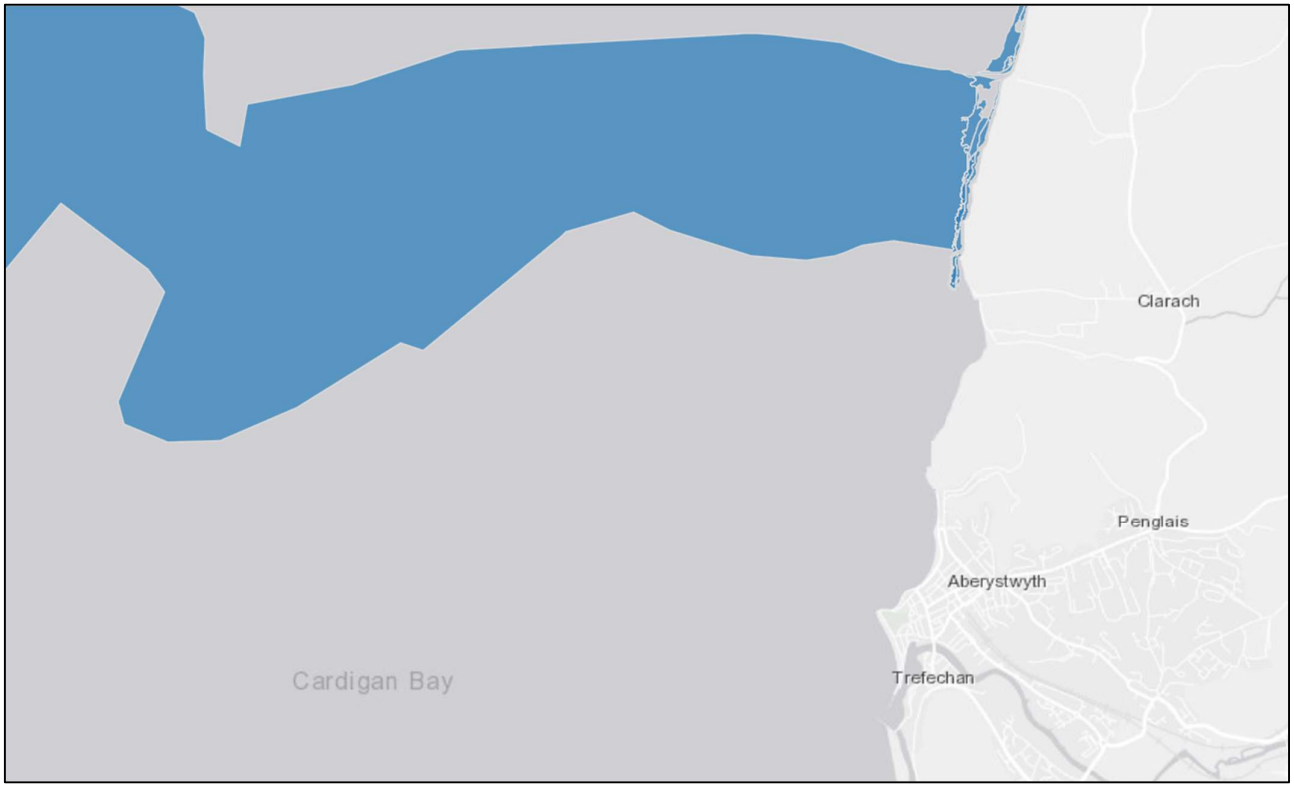


Figure A5.x Sea Caves near Aberystwyth in the Lleyn Peninsula and the Sarnau SAC / Pen Llŷn a'r Sarnau SAC (source: smnr-nrw.hub.arcgis.com; accessed 11-06-2026)

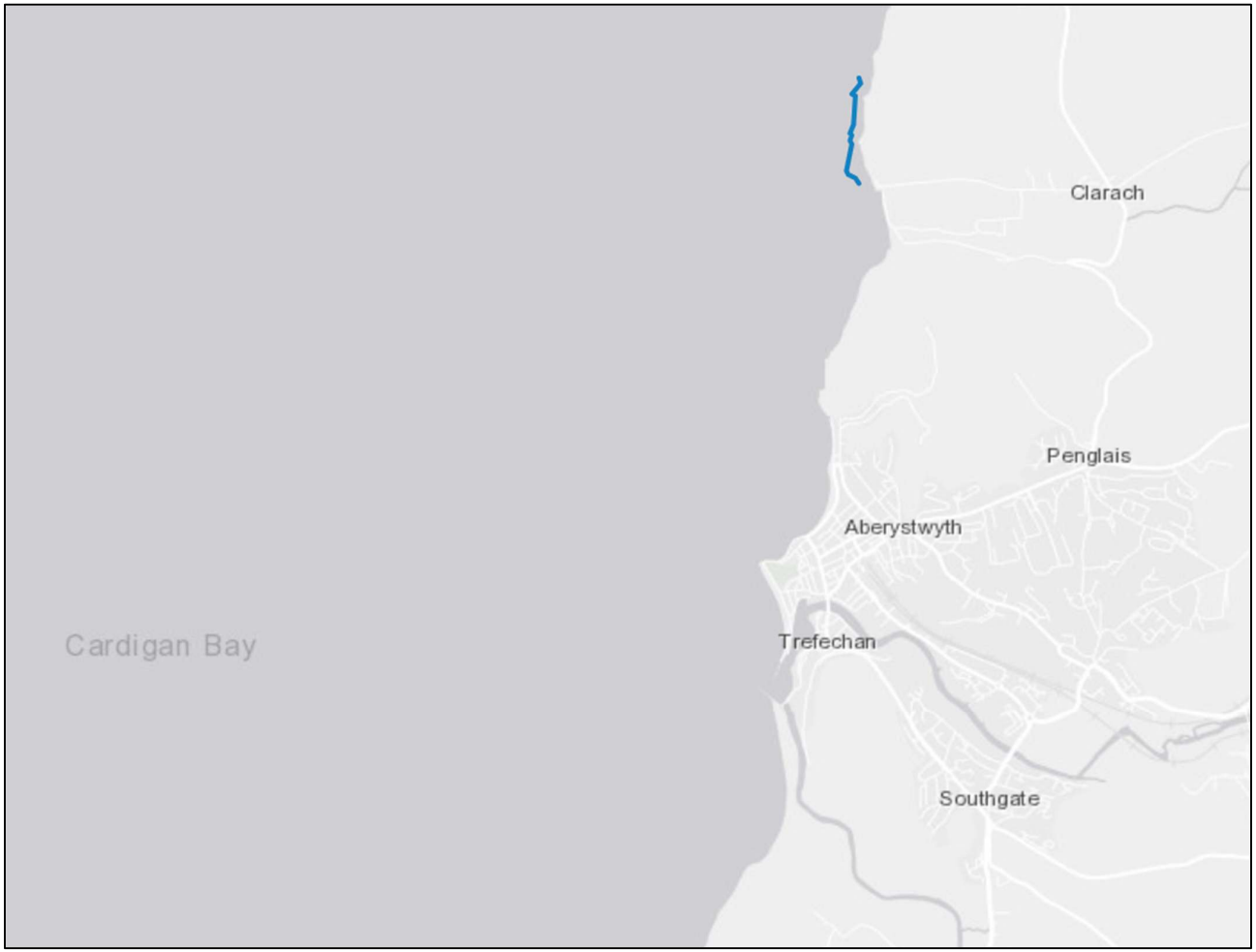


Figure A5.x Boundary of the Northern Cardigan Bay SPA / Gogledd Bae Ceredigion SPA (source: NRW, 2025b)

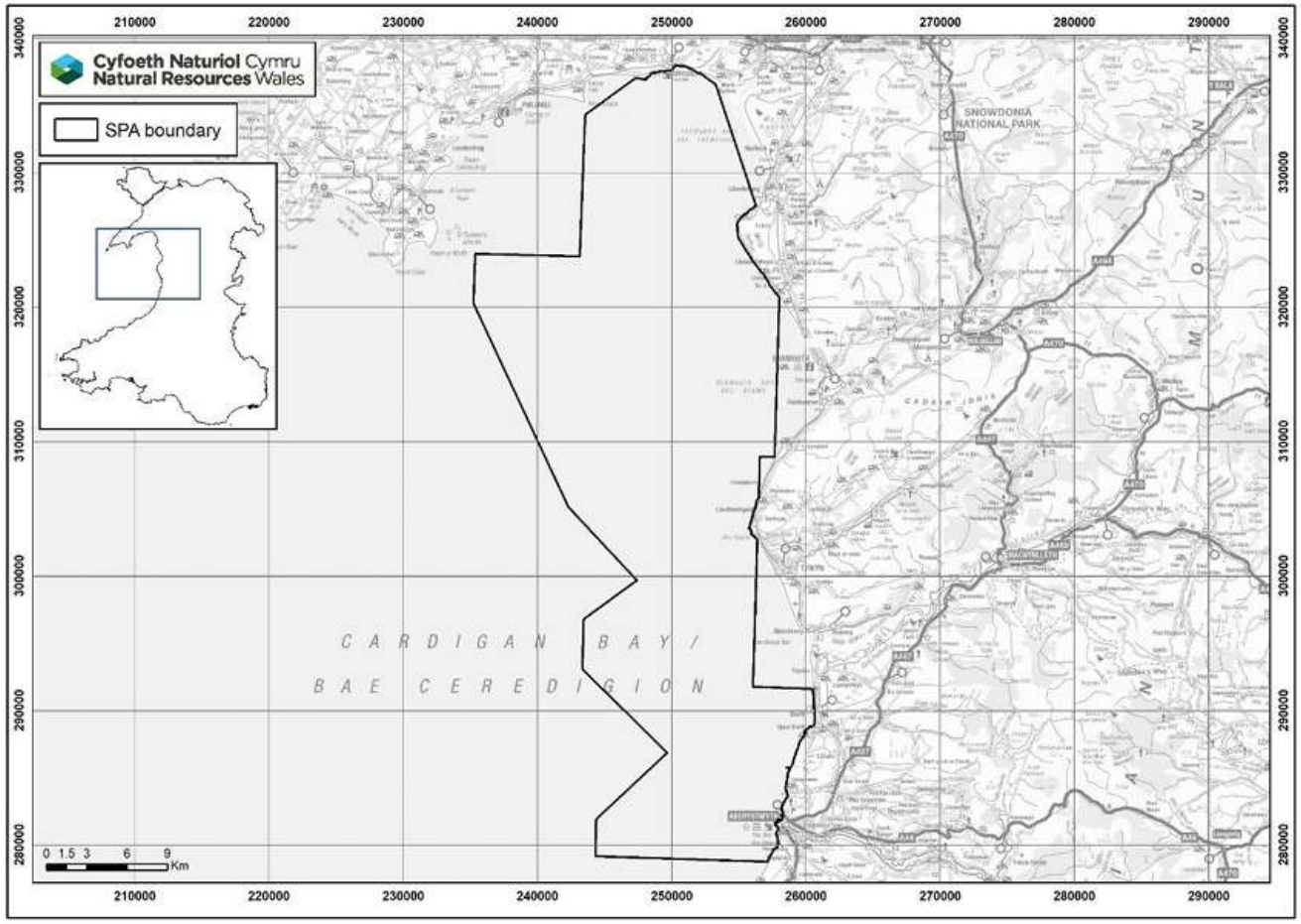


Figure A5.X Mean Red-throated Diver Density and Possible Boundary for Red-throated Diver Aggregations in the Northern Cardigan Bay SPA / Gogledd Bae Ceredigion SPA (source: NRW, 2025b)

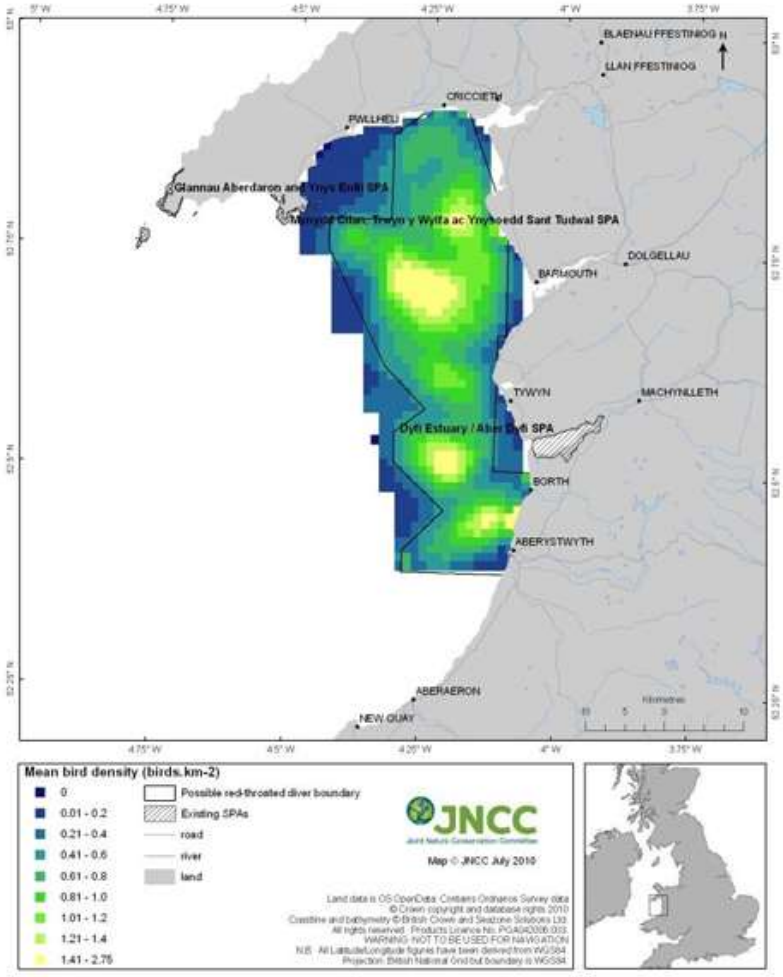


Figure A5.x Red-throated Diver Sightings in and around Cardigan Bay (left) and in Nearshore Coastal Waters at Aberystwyth (right) (source: wales.nbnatlas.org; accessed 12-06-2026)