

NRW's Marine and Coastal High Priority evidence needs

As part of NRW's Marine and Coastal Evidence Programme we produce a list of high priority evidence needs, which is updated on an annual basis. Many of these are being progressed internally and completed evidence reports will be published on our website. This document describes the high priority evidence needs and the progress we have currently made with them. If you think you may be able to help us deliver any of these evidence needs, please get in touch.

We also have a longer list of other marine and coastal evidence needs and have identified projects from both lists that might be particularly suitable for delivery by partners, especially through academic research projects.

High Priority list

What are the reasons for the decline of specific species and benthic habitats across the Marine Protected Area network in Wales?

Monitoring has shown a decline in the health of various habitats and species in Welsh Marine Protected Areas (MPAs). Work is needed to identify the causes of these declines. The current focus for 2026 is fish communities and the herring population in Milford Haven and pink sea fan *Eunicella verrucosa*, red sea fingers *Alcyonium glomeratum* and potato crisp bryozoan *Pentapora foliacea* in the Skomer Marine Conservation Zone. Previous work has looked at maerl in Milford Haven, sponges and infauna in the Menai Strait and *Modiolus modiolus* (horse mussel) beds in the Pen Llŷn a'r Sarnau Special Area of Conservation and there are still outstanding evidence questions from these investigations. This work will allow effective management measures to be identified that will improve our understanding of the ways to improve the condition of MPA features, improving the resilience of marine ecosystems across Wales.

Next steps and progress: Continue Nature Networks MPA investigations projects, also any PhDs/MScs that help us to understand the ecology and sensitivities of the species and habitats in decline. Outputs for herring, maerl beds, *Modiolus modiolus* beds and sponge habitats to be finalised soon.

What is the condition of our protected marine features and status of coastal and transitional waters?

Understanding the condition of Welsh waters is a fundamental requirement that ultimately leads to us being able to advise on the management measures required to recover and/or increase biodiversity and resilience. NRW has a marine monitoring programme which covers features of Marine Protected Areas and the coastal and estuarine water bodies under the Water Environment Regulations. Ideally this would be expanded to cover more habitats, species and the wider ecosystem; with increased monitoring in terms of both frequencies and locations.

Next steps and progress: Continue with current NRW marine monitoring programme and expand if possible. Potential to establish collaborative monitoring where relevant.

What are the productivity and survival rates of seabirds at Welsh colonies?

Set up ringing and resighting for seabird species as well as camera traps for productivity diet and phenology at seabird colonies. This could include the following species: Atlantic puffin, black-legged kittiwake, common guillemot, lesser black-backed gull, razorbill, shag cormorant, tern species, gulls. Ideally this would cover the features of protected sites such as Special Protection Areas and / or Sites of Special Scientific Interest, although non protected sites could also be included. At the moment a lot of our information is only from the large colonies on the Pembrokeshire islands so a greater understanding of these metrics across a range of different geographical sites would help with understanding whether there are regional differences. This overarching information will be used in a range of NRW's work areas, including advising on applications for new developments and management advice for protected sites.

Next steps and progress: Collaboration with Academia and NGOs.

What areas of Welsh waters are used by different fish species and how?

This evidence need is for a review of the data and literature on the distribution and structure of marine fish species in Welsh waters through the year, to inform our nature conservation advice. This would include a review of available data and recommendations for gap filling. The review would consider fish species of conservation, ecosystem, commercial and recreational importance in Welsh waters, and egg, larval, juvenile and adult life stages as well as spawning and nursery life cycle processes. Maps of nursery and spawning grounds, as well as wider fish density maps would be produced to cover feeding/foraging life stages, in conjunction with qualitative description of important areas for the species in Welsh waters. This overarching information will be used in a range of NRW's work areas, including advising on applications for new developments.

Next steps and progress: Contract currently underway for three species (cod, whiting and herring), possibility of additional contract for further species.

What are the critical inshore and coastal migration routes and marine habitats used by diadromous fish in Wales?

Based on recommendations in NRW Evidence reports; 'Feasibility Study of Methods to Collect Data on the Spatial and Temporal Distribution of Diadromous Fish in Welsh Waters' and 'Acoustic tracking in Wales – designing a programme to evaluate Marine Renewable Energy impacts on Diadromous fish'. There are currently two tagging projects ongoing, one based at Swansea University with an acoustic tracking array operating in the Bristol Channel and a pilot project is due to commence in the Dee Estuary led by Liverpool University. Current work in south Wales could be expanded to include more species and further analysis could be done to benefit from the large amounts of data already gathered. The project in the Dee Estuary requires funding to carry on, extend the range of species tagged and the array could be expanded to cover coastal waters and Liverpool Bay. The evidence would be used to inform modelling tools to establish risk to salmon, sea trout, eel and shad populations (all protected species) from potential tidal range and tidal stream developments in Wales.

Next steps and progress: Strategic evidence which needs large scale funding. However, some good progress is being made notably in the Bristol Channel and Liverpool Bay through working with research partners. Potential for collaboration with academic partners already involved of other institutions with an interest in fish acoustic telemetry.

What are the best Collision Risk models and parameters to assess impacts on marine mammals?

With the increasing interest in tidal energy developments, there is a risk of marine mammals colliding with underwater turbines. This risk needs to be modelled as part of the process of assessing potential environmental impacts of these developments. Existing models and approaches and their associated input parameters should be reviewed to ensure the evidence and techniques being used in our advice are the best available (including being transparent and defensible) and are appropriate for Welsh environmental conditions.

Next steps and progress: A contract to conduct the review is currently in progress.

What is the efficacy and potential longer-term / cumulative impacts of acoustic deterrent devices for marine mammals, birds, and fish?

There remains a gap in knowledge of how some marine mammal, fish and bird species respond to acoustic deterrent devices (ADDs). They are routinely advised as potential mitigation techniques for tidal energy and other industries/activities but while there is some information for seals around aquaculture sites, and for fish at power stations, our understanding of how effective these are for some species remains limited or unknown. The need is for experimental research observing reactions to ADDs at sea. There is also a need to explore how ADDs optimised for one receptor (species) could affect other receptors, particularly given differences in hearing range, auditory sensitivity, and

behaviour in reaction to underwater noise. Finally, research is needed to evaluate potential cumulative impacts of ADD deployments from multiple infrastructure projects, and whether these could have lasting displacement or disturbance effects on different receptors and any energetic costs.

Next steps and progress: A combination of scoping this out further (there are multiple threads of research within this evidence need), and then collaborating with other government organisations / research organisations / universities to run either a project with a significant component of field research and / or PhD research projects.

How do sub-sea cabling practices affect sand wave and sand bank morphodynamics, and the wider sedimentary system?

Cable laying activities can include sand wave clearance, cable burial via trenching and cable protection measures. The morphological impacts on sand waves and sand bank systems caused by these activities, particularly sand wave clearance, are poorly understood and are dependent on site-specific factors. Knowledge of the likely impact is crucial to allow proportionate approaches to consenting these activities through designated habitats. Key questions include: do sand waves recover after clearance and what are the timescales? Does sand wave clearance affect the form and function of the sandbank system? It is particularly important to understand this for areas of Wales where cable routing and landfall is expected; for example, the North Wales coast and the Pembrokeshire coast, as this will inform advice on developments.

Next steps and progress: This evidence need is likely to be best answered through contracted research using numerical modelling. The lack of existing sand wave clearance activities and measured data around the Welsh coast makes modelling the best option.

How connected are coastal habitats along the coast and where are there gaps in connectivity?

Coastal habitats, such as sand dunes, saltmarsh, shingle and sea cliffs, form an interconnected ecological network. Connectivity between these habitats and to those they terrestrially transition with are important for ecosystem functioning and resilience. The State of Natural Resources Report (SoNaRR) 2025 has reported that habitat loss, fragmentation, and declining condition are key threats to Wales's coastal habitats highlighting that connectivity is central to improving resilience for the coastal habitats. Currently, connectivity maps exist only for sand dunes ([Priority Ecological Networks \(PENs\) | DataMapWales](#)), however, these require refinement. There are no existing connectivity maps for saltmarsh, sea cliffs or shingle habitats. Connectivity maps would highlight areas where the coastal strip is narrow or vulnerable, highlight important transition zones and support landscape scale restoration projects.

Next steps and progress: To be progressed in house.

Where is habitat rollback occurring and what gains in habitat are there in response to coastal change?

The rollback of coastal habitats in response to climate change, sea level rise and cliff erosion is expected where conditions allow. Evidence is required to understand whether this is currently occurring and the conditions under which it will occur. Initially the focus should be on saltmarsh, cliff top habitats (coastal grassland and coastal heathland) and shingle habitats, with an emphasis on understanding vegetation changes, not purely physical change. This will help us to understand the extent to which we can expect habitat rollback to occur on unconstrained coast. Currently the project is in the scoping phase. We propose a first step should be to identify areas that are both subject to change and not constrained (thus identifying those areas where habitat rollback is most likely to occur for the different habitat types of interest). The next step would be to design methodologies for monitoring some of the areas identified (including consideration of using historic information). This work will provide evidence to test the hypothesis that where man-made constraints are absent, habitats can adapt to climate change, and it will inform future management and policy (e.g. adaptation of protected sites to climate change, shoreline management plan effectiveness).

Next steps and progress: Likely to be contracted out (scoping and development of a methodology) and/or a research collaboration.

What is the sensitivity and longevity of fragile sponge species?

There is a lack of information on the sensitivity and longevity of sponges and other species, that make up the Environment (Wales) Act Section 7 *fragile sponge and anthozoan* communities. This includes mostly branching sponges such as *Axinella* spp., *Homaxinella* sp., *Raspailia* spp. and *Stelligera* spp and potentially also other sponges that form large colonies such as *Pachymatisma johnstonii* and *Cliona celata*. Additionally species that are common to the fragile sponge and anthozoan community habitat such as *Pentapora foliacea*, certain hydroids and anthozoans are of interest. Information in MarESA (Marine Evidence based Sensitivity Assessment) points to a lack of supporting information on longevity and sensitivity of these species; this work would help to plug that gap. A better understanding of the sensitivity and longevity of these species would enable more informed decisions on the management of these species.

Next steps and progress: Some work is currently contracted out to review the evidence for specific species. Scope of further work to be developed, including suggestions for research to help us to understand the longevity and sensitivities of the species.

What is the source apportionment of nutrients to Welsh estuarine and coastal waters?

We need to investigate the sources and apportionment of nutrients coming into our estuaries and causing failures there. Modelling is needed to identify those sources. Many of our transitional and coastal waters fail for Dissolved Inorganic Nitrogen (DIN) and six of our marine Special Areas of Conservation and their features are in unfavourable condition due to DIN.

Modelling of nine failing water bodies, specifically to apportion the point source discharges, is already underway, but there are other water bodies and their catchments which could also be modelled to identify solutions. An understanding of how different land management practices affect the apportionment would also be beneficial.

Other potential projects include:

- Whether and by how much does aerial deposition impact estuarine and coastal water quality?
- What is the impact of groundwater sources of nitrogen on estuarine and coastal water quality?

Next steps and progress: Some work already underway, seek external funding or collaborative working.

What are the types, distribution, frequency and intensity of fishing activities from commercial fishing vessels in Welsh waters?

The majority of Welsh commercial fishing vessels are under 12m in length. However, currently we know very little about where, when, with what gear, how much gear, and how often these boats, and other vessels commercially fishing in Wales, go fishing. Data from Welsh Government's inshore vessel monitoring systems, Catch App and logsheets could be combined and analysed to indicate the type, distribution, frequency and intensity of under 12m commercial fishing vessels' activity in Welsh waters to combine with existing over 12m vessel activity data. The final product would be a series of GIS layers showing relative intensity of potential fishing activity by different gears, which can be used to support key workstreams such as Habitats Regulations Assessment advice, statutory reporting, Marine Protected Area management advice, etc.

Next steps and progress: Seek agreement for a data request to Welsh Government and decide on an option to analyse the data i.e. contract out or produce in house.

Where is it cost effective and technically feasible to remove or modify structures in transitional and coastal heavily modified water bodies to improve hydromorphology?

This project aims to develop evidence on measures which may address hydromorphological pressures in Heavily Modified Water Bodies (HMWBs) under the Water Framework Directive (WFD). Such measures are also likely to support Marine Area Statement aims regarding coastal adaptation or implementation of nature-based solutions, and could also support condition improvement in MPAs. The project aims to consider the costs and benefits of measures to help determine what can be delivered.

The project will include an initial screening/scoping exercise to prioritise the HMWBs that should go forward for further investigation. Prioritisation should include consideration of co-

benefits to MPA condition. A study should then be undertaken in prioritised HMWBs to identify opportunities, technical feasibility, cost, and benefits to morphology (and therefore the ecology of the waterbody) of either removing obsolete structures or modifying structures.

Next steps and progress: Prioritisation and scoping of further work to be done in house initially.

How do marine mammal populations respond to removals of individuals?

Understanding the consequences to marine mammal populations from anthropogenic pressures, particularly removals as a result of marine industry developments, is a key evidence need to inform robust advice and guidance. Since our 2023 review on population and impact modelling of marine mammals in Wales, there is a need to update and review information on existing models, population parameters, spatial scales, and pressures. This information will be used to assess the population level impact of existing and newly proposed developments and inform key decisions on managing marine mammal impacts.

Next steps and progress: To be progressed in house (and possible external peer review)

How much marine mammal bycatch is there in the relevant marine mammal management units overlapping with Welsh waters?

There is no marine mammal bycatch estimate at the scale of the relevant Interagency Marine Mammal Working Group Marine Mammal Management Units (MMMUs); although estimates for OSPAR and ICES regions exist, they do not represent the same spatial area of the MMMUs. This project would rescale the bycatch rates to the relevant fishing effort within each MMMU for each marine mammal species. This requires the quantification of fishing effort by gear type/Metier, the calculation of bycatch rates (from observations) per metier and the subsequent estimation of bycatch at the relevant spatial scale, here defined as species specific MMMUs. Improvements to bycatch estimates would benefit from increased observer coverage on UK and EU fleets fishing in the MMMU, but also from improvements in estimation techniques. This is important to inform our knowledge of the relative pressures on marine mammal populations, for statutory reporting and to inform marine licence decisions, management advice and guidance.

Next steps and progress: Likely to be contracted out

How much marine mammal, seabird and diadromous fish bycatch is there in Welsh waters? Mapping netting fisheries and estimating bycatch.

It is thought that there is negligible bycatch of marine mammals and seabirds in Welsh waters (and bycatch of diadromous fish is unknown) but there is no analysis currently available that demonstrates this. This project would estimate the fishing effort and bycatch

of marine mammals, seabirds and diadromous fish potentially bycaught in Welsh waters (the Welsh zone), through field observations. This is important to inform our knowledge of the relative pressures on marine mammal, seabird and diadromous fish populations, for statutory reporting and to inform marine licence decisions, management advice and guidance.

Next steps and progress: Needs large scale funding.

What is the likely impact of *Gracilaria vermiculophylla* (formerly *Agarophyton vermiculophyllum*) on Welsh habitats?

Since its first Welsh sighting near Porthmadog, this non-native species is now found at a number of estuaries in Wales including the Dyfi, Mawddach, Dwyrdd, Malltraeth, Y Foryd and the eastern Menai Strait. It is also present in the Burry Inlet with notable rapid expansion in the Loughor Estuary. It is likely that this species has not yet reached its limit of extent and density in Wales. This species causes changes to mudflats and potentially saltmarsh habitats by causing sedimentation change and alterations to topography, potentially changing mudflat into muddy gravel or mussel beds. It also likely to affect cockle and mussel fisheries. This species has contributed to the failure of condition of the Mudflats and Sandflats feature in Carmarthen Bay and Estuaries Special Area of Conservation. However, evidence is lacking as to the exact impact this species is having on the feature. The project should primarily include an investigation into the impacts on Welsh habitats and include site based investigations, especially in areas and habitats where it is causing features to fail their condition assessment. This could include an investigation into epifauna / infauna and for example whether there is a shift to more opportunistic species. Sediment survey in areas with this species could indicate anoxia and assessment of mudflat topology and habitat will indicate any change to the physical habitat. The project could also include eradication trials or an element of prediction into suitable areas where the species is likely to spread. This information is needed to feed into site condition assessments and biosecurity actions.

Next steps and progress: May be taken forward as part of a collaborative project.

How do human activities and changes in habitat condition affect carbon sequestration and storage in the marine environment?

There is a growing focus on the ability of the marine environment to store and sequester carbon, and a requirement to both maintain and enhance blue carbon stores to help achieve net zero. Particular focus at present is on blue carbon habitats such as saltmarsh and seagrass, with progress being made to include them in the UK's Greenhouse Gas Inventory. Existing studies show that marine habitats play an important role in carbon storage and sequestration, but we have little current knowledge on how impacts on them, and / or changes to habitat condition, may affect their ability to provide this ecosystem service. Better understanding is needed of the human activities and environmental variables that affect carbon sequestration and storage to help us manage and protect these natural resources in the future.

Next steps and progress: Collaboration with Academia and NGOs

What spatial opportunities exist to compensate for loss or degradation of subtidal Annex 1 features due to expansion of the offshore renewables sector?

This study would use spatial data on subtidal habitats and features to determine whether there are opportunities to amend or assign new designations to compensate for loss or degradation of Habitats Regulations Annex 1 features in Wales due to the expansion of the offshore renewables sector. In particular, the project would look at areas where currently undesignated areas of feature could be afforded additional levels of protection via Marine Protected Area or byelaw designations.

Next steps and progress: In house, following policy discussions

What is the extent and distribution of saline lagoons in Wales?

Saline lagoons in Welsh waters were last surveyed in the late 1990s/early 2000s. Because of the dynamic nature of saline lagoons, the status of many of the potential or existing lagoons may have changed considerably in the 25 years since the main piece of work was completed. In the meantime, the guidance for notifying saline lagoons has been rewritten (Biological SSSI Guidelines. Chapter 1c: Saline lagoons) and there may be a need to change or add references to saline lagoons in some sites. In addition, change at the coast will mean that some lagoons may be lost, whilst other areas that were previously not considered lagoons may have the potential to contribute to our network of lagoons. This would form part of statutory reporting, as well as informing work we need to do on how we adapt to climate change at the coast.

Next steps and progress: Likely to be contracted out

This document was last updated in February 2026.

Next update due January 2027.

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