

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 this list that might be particularly suitable for delivery by partners, especially through academic research projects.

High Priority List

Review evidence around the contribution of seaweed farming (especially kelp) to blue carbon stores and identify any knowledge gaps and uncertainties.

Proposals for seaweed farms (especially kelp) are becoming more frequent in the UK, and there is increased interest in growing and harvesting macroalgae in Wales. Proposals often cite blue carbon as being one of the benefits associated with this activity. However, the evidence supporting this claim is unclear. This project would evaluate the evidence around seaweed farming and carbon capture / storage and identify uncertainties and knowledge gaps.

Next steps and progress: Report received, will be available soon.

Investigating the causes of the decline in Milford Haven maerl bed

Monitoring has shown a decline in the health of the maerl bed in Milford Haven. Work is needed to identify the cause(s) of this decline.

Next steps and progress: Further monitoring (bid for funding submitted), desk based studies and hydrodynamic modelling studies. Report on sediment deposition received, will be available soon.

Implementing infrastructure enhancement: how much is needed to make a measurable improvement in biodiversity?

Good progress has been made to develop methods to enhance hard structures. However, we now need to develop methods to assess the difference that enhancements will make to biodiversity - both in terms of predicting those improvements and measuring them.

Next steps and progress: Collaboration with Ecostructure project and possible follow on work.

Update Saltmarsh extent and National Vegetation Classification (NVC) saltmarsh maps, using aerial photos, groundtruthing and field survey.

NVC maps exist for much of the saltmarsh in Wales including coverage of the vast majority of the extent of the Special Areas of Conservation and Sites of Special Scientific Interest. However, these maps are out of date having been produced between 1996 and 2003. Some of these maps were produced without the aid of aerial photographs or GPS and the dynamic nature of saltmarsh means that in many areas they are now inaccurate.

Next steps and progress: In house GIS work has been done to improve existing maps, targeted ground truthing work is being planned to follow up this work. A NVC survey planned for summer 2022: a contract is in the process of being let.

Coastal Habitats - Shingle vegetation baseline data

Complete baseline survey of all shingle structures (vegetated and non-vegetated) required for Wales. We are currently working with an old dataset which is out of date.

Next steps and progress: NVC surveys planned for summer 2022.

Assessing the distribution, frequency and intensity of fishing activities from commercial fishing vessels

Currently we know very little about where, when, and how often Welsh boats go fishing and their impacts on protected features. The majority of the Welsh fleet are <12m and are currently not required to have vessel monitoring systems onboard (VMS). The new Welsh inshore VMS will become mandatory in 2022. The new mandatory catch app for <10m vessels will record species caught and effort from Feb 2021, >10m vessels complete logsheets. This proposed work area should investigate the distribution, frequency, and

intensity of commercial fishing vessels' activity in Welsh waters - e.g. by utilising inshore VMS and catch app data when available.

Next steps and progress: Continue to liaise with Welsh Government.

Productivity and survival studies at seabird colonies

To understand more about productivity, survival and diet of seabirds in Welsh waters we need to set up ringing and resighting studies, as well as camera traps at seabird colonies. Key species would be: Atlantic puffin, black-legged kittiwake, common guillemot, lesser black-backed gull, razorbill, shag, cormorant, tern species, gulls etc.

Next steps and progress: Collaboration with Universities and other organisations to deliver this work. Some work already underway.

Distribution, abundance and population structure of marine fish species in Welsh waters

An assessment of abundance, distribution, and structure of marine fish species in Welsh waters through the year. This would include mapping nursery and spawning grounds and wider fish density maps that cover feeding/foraging life stages. The work would contribute to developing a baseline for environmental assessments.

Next steps and progress: Under consideration.

Hydroacoustic tagging and tracking array project

The project would hydroacoustically tag and track diadromous fish from a selection of Welsh rivers, to collect data on their distribution, particularly in marine energy resource areas. The evidence would be used to inform modelling tools to establish risk to salmon, sea trout, eel and shad populations from tidal range and tidal stream developments in Wales.

Next steps and progress: Funding required for this to progress.

Modelled Distributions and Abundance of Cetaceans and Seabirds of Wales and Surrounding Waters

The [2nd edition of the Marine Mammal atlas](#) is now 10 years old. There has been a great deal of data collected since then and new analytical procedures (habitat based modelling) developed. A new version of the 'Atlas' has been commissioned by NRW to collate, model

and map distribution and abundance data from vessel, visual aerial and digital aerial surveys since the 1990s, but this time includes both cetaceans and marine birds. The contract was awarded to Sea Watch Foundation and utilises similar methods developed under the Marine Ecosystems Research Programme (MERP) but at a finer temporal and spatial scale.

Next steps and progress: Report received, will be available soon.

Marine mammal bycatch in the Welsh Zone

It is thought that there is negligible bycatch of marine mammals in Welsh waters but there is no analysis currently available that demonstrates this. This project would estimate the fishing effort and bycatch rates of marine mammals potentially bycaught in Welsh waters (the Welsh zone).

Next steps and progress: Under consideration. OSPAR assessments have contributed to this evidence need

Noise abatement

It is likely that noisy activities such as piling for offshore wind, and detonation of unexploded ordnance, may cause adverse effects. Noise abatement methods such as bubble curtains to reduce noise at source or reduce how far the noise is able to propagate, have been demonstrated to reduce the noise impact. However there is no information on how these techniques might perform under the hydrographical conditions in Welsh waters such as deep water or strong tidal areas. This project has been scoped out to include lab studies (testing resonant bubbles), field studies (bubble curtains for UXOs) and a desk review.

Next steps and progress: Seeking funding from OWEC (Offshore Wind Evidence for Change) for a project which will cover some aspects of this project. Field studies would need collaboration with developers.

Low-Order Deflagration as Mitigation for Unexploded Ordnance Noise impacts

Low-order deflagration as a method of detonating Unexploded Ordnance (UXO) has been demonstrated to be effective under some conditions and is likely to be proposed as mitigation for the underwater noise impacts from UXO impacts in future projects. Evidence is limited, further test trials on UXO of varying charge sizes, and under different hydrological conditions is required to give confidence that this method can reliably mitigate this impact.

Next steps and progress: Collaboration with ORJIP (Offshore Renewables Joint Industry programme) and OWEER (Offshore Wind Environmental Evidence Register) projects. The National Physical Laboratory is currently carrying out research on this, funded through the SEA research programme.

Investigation of efficacy of acoustic deterrent devices on marine mammals, birds, and fish

There has been some work on reviewing acoustic deterrent devices (ADDs) (JNCC report in prep; ORJIP). There remains a gap in knowledge of how some species respond, especially dolphins. ADDs are routinely advised as potential mitigation techniques but our understanding of how effective these are for some species remains unknown (e.g. bottlenose dolphins, Risso's dolphins and, to some extent, harbour porpoise). The need is for experimental research. This would include lab and field studies.

Next steps and progress: Needs to be scoped out in more detail.

Understanding population level effects of renewable energy on mobile species

Update and improve understanding of the potential population level effects of removal of protected mobile species (mainly marine mammals) from marine industry projects. Following a recent review on marine mammals, there will be a need to regularly update and review information on existing models, population parameters, spatial scales, and pressures.

Next steps and progress: Build on interim modelling review (marine mammals) produced in March 2021, report due end summer 2022.

Monitoring wave and tidal renewable energy devices for mobile species behaviour and collision

Improvement of knowledge on the frequency, nature, and consequences of near-field interactions between mobile species and tidal turbines through monitoring of deployed devices. To include: near-field avoidance and evasion behaviour, quantification of number of collisions and near misses, consequences of collisions (e.g. injury/damage to animal) and identification of object/species types (to inform behaviour and impact studies). This information will provide contextual and empirical evidence to inform impact assessments and predictions of collision risk for tidal stream development.

Next steps and progress: This evidence gap requires deployment of tidal turbine devices before monitoring can be undertaken. Needs discussion with Government and Industry regarding post consent monitoring.

Strategic long-term monitoring of renewable energy devices impacts to physical processes (with wave & tidal stream identified as a priority)

We need to understand how embryonic renewables technologies (e.g. wave & tidal) will impact on changes to energy, and how that manifests itself in terms of impact on natural variability. There is a need to differentiate between natural processes and anthropogenic impacts, and to understand regional scale and medium to long-term effects of energy extraction on morphodynamics and sediment transport regime on other receptors such as habitats, flood risk etc.

Next steps and progress: This evidence gap requires deployment of renewable energy devices before monitoring can be undertaken. Needs discussion with Government and Industry regarding post consent monitoring.

Developing methods for monitoring wave and tidal devices for mobile species behaviour and collision

Development of instrumentation to monitor mobile species behaviour around tidal stream turbines (including near-field responses). This includes methodologies to detect avoidance of tidal stream turbines, collision events and consequences of collisions. Due to the reliability and survivability of instruments in high energy waters there are a number of operational challenges that need to be addressed including: hydrodynamic forcing, corrosion and biofouling, pressure and sealing and development of solutions to reduce electronic interference between instruments on platforms. In addition advancements are required to improve efficiencies in storing, processing, and analysing large amounts of data generated by monitoring.

Next steps and progress: Collaboration with Welsh Government and projects like the MEECE (Marine Energy Engineering Centre of Excellence) innovation challenge.

An assessment of the opportunities to use nature-based solutions as mitigation/enhancement in estuarine and coastal heavily modified water bodies and cost/benefit analysis of those opportunities

This includes consideration of measures which may address hydromorphological pressures in Heavily Modified Water Bodies, measures which would support coastal adaptation or implementation of nature-based solutions, and importantly consider the costs and benefits of those measures to help inform business cases / cost-benefit analysis to determine what can be delivered.

Next steps and progress: We have recently received funding approval to progress the project through Welsh Government Water Capital Funding. We expect to start scoping out the project within the next couple of months following the recruitment of a project manager

Extent and severity and impacts of diffuse water pollution &

Develop a better understanding of the relationship between nutrient inputs, algae growth, and undesirable balance

These two projects would investigate the extent to which diffuse water pollution (from both agriculture and urban sources, including point sources and in combination effects) affects estuarine and coastal waters, including MPA condition. A large part of the focus would be on nutrient levels and eutrophication.

Next steps and progress: Currently being scoped out in more detail.

This document was last updated in April 2022.

Next update due November 2022.

For more information please contact Dr Kirsten Ramsay
kirsten.ramsay@cyfoethnaturiolcymru.gov.uk