Ocean Energy ORJIP working to accelerate offshore consenting

Llywodraeth Cymru Welsh Government

ORJIP Ocean Energy

Information Note: Data Transferability

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MarineSpace Making Sense of the Marine Environment™

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Information Note: Data Transferability

1 INTRODUCTION

This series of technical, topic specific Information Notes has been co-produced by the Welsh Consenting Strategic Advisory Group's Science and Evidence subgroup (SEAGP) in order to support the consenting of wave and tidal stream energy projects. The Information Notes have been developed to establish the current position of key stakeholders in Wales on the evidence available on interactions of wave and tidal energy technologies with the marine environment. They are designed to set out a starting point for applicants by providing an understanding of where consenting challenges might lie. The aim of the Information Notes is to support marine licence applications that are robust, proportionate and focused on assessing the key potential significant impacts and possible interactions between marine renewable energy (MRE) devices and the marine environment.

These Information Notes will support careful consideration of how, for a particular development, potential impacts that are considered low risk could be safely retired from further detailed consideration within Environmental Impact Assessments (EIA), where available evidence supports this approach. Ocean Energy Systems-Environmental (OES-Environmental) has set out a general process for risk retirement[1,2] but for developments in Welsh waters, risk retirement should always be discussed between developers and Natural Resources Wales (NRW) at the pre-application stage. In the context of these Information Notes, risk retirement implies that all potential impacts are included for consideration at the project scoping stage, and that following a review of the evidence some impacts may be 'scoped out' of any further detailed assessment to focus EIA on key significant impacts[3]. In all cases, potential impacts should be acknowledged in EIAs, with evidence-based justifications describing why particular impacts could be 'scoped out' of further detailed assessment.

Further information about this series of Information Notes, who these documents are for, how they were produced, and how they should be used can be found in the accompanying document *Information Notes: Background*

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[1] https://tethys.pnnl.gov/events/oes-environmental-webinar-risk-retirement
[2] https://tethys.pnnl.gov/publications/state-of-the-science-2020-chapter-13-risk-retirement
[3] It should be noted that The Wildlife Trusts expressed concerns about the use of the phrase 'risk retirement' being applied in this context, particularly considering the uncertainties in impact assessment that are likely to arise with increasing scale of MRE developments.

Information. The *Information Notes: Background Information* documentation also contains information about the terminology used in this document.

1.1 DATA TRANSFERABILITY– GENERAL

Data transferability refers to the application of existing learning, analyses and datasets from one site or project to another, in some instances across jurisdictional boundaries and/or across geographies. Data transferability is important in order to support the reduction of risk associated with MRE device development (Copping et al. 2018).

There are high costs associated with baseline environmental assessments and post-installation mitigation, monitoring and management requirements and these are often cited as one of the key barriers to development of the MRE industry. In many cases, monitoring activities around MRE developments are supported by bespoke grant-funded research and monitoring programmes. These programmes generate substantial knowledge and learning, in addition to the mitigation and monitoring activities driven by consent/licence conditions. Cautious application of available knowledge and data from previous or currently operational MRE developments could help to reduce barriers to further development by reducing environmental uncertainty and risk.

A challenge for data transferability in the MRE sector is that there is no standardised approach for data collection methods or technologies. If similar parameters and methods of data collection were used for baseline assessments and post-installation monitoring of MRE developments, the results would be more readily comparable. This would lead to a decrease in scientific uncertainty and support a common understanding of the risk of MRE devices to the marine environment which would facilitate more efficient and shorter consenting processes, decreasing the financial risk for MRE project development.

The legislation describing what should be assessed in EIA for MRE developments is the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended), although this does not specifically address the issue of data transferability. NRW provide guidance on marine ecology datasets for marine developments [4] which contains useful links to existing datasets. This guidance does not, however, contain information on how data from other sites could or should be used to support impact assessments. Recognised and quality assured datasets were also considered as part of Welsh Governments Sustainable

[4] https://naturalresourceswales.gov.uk/guidance-and-advice/business-sectors/marine/marine-ecology-datasets-for-marine-developments/?lang=en#:~:text=%20Marine%20ecology%20datasets%20for%20marine%20developments%20,migratory%20fish%20and%20shellfish%20on%20JNCC.GOV.%20More%20

Management of Marine Natural Resources (SMMNR) project[5] which set out an approach to undertaking a confidence assessment for datasets that could potentially be applied to the data transferability issue.

OES-Environmental has introduced a data transferability process that could be useful for regulators, industry, developers, consultants, and researchers. The data transferability process consists of four components:

1. The data transferability framework which brings together datasets, compares the applicability of each dataset for use on other projects and guides the process of data transfer.
2. The data collection consistency table, to provide preferred measurement methods or processes, reporting units, and the most common methods of analysis or interpretation and use of data.
3. The monitoring datasets discoverability matrix which allows a user to discover datasets based on the approach presented in the framework.
4. The best management practices (BMPs) include four BMPs related to data transferability and collection consistency.

1.2 EVIDENCE SOURCES CONSIDERED BY SEAGP

SEAGP members were asked to apply their expertise and were encouraged to read the background information associated with the OES-Environmental data transferability framework and process[6], and to review the information on data transferability in the OES-Environmental Short Science Summary document on risk retirement[7] in advance of providing a response to an environmental monitoring technologies and techniques questionnaire. Respondents were also encouraged to consult the information on data transferability within the full chapter on risk retirement within the OES-Environmental 2020 State of the Science Report[8]. Additional key references are listed at the end of this document.

1.3 SCENARIOS FOR DATA TRANSFERABILITY

This Information Note sets out four general scenarios for data and knowledge transfer between projects, which are used to illustrate the perspectives of SEAGP members. These scenarios are illustrated in Figure 1.

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[5] https://gov.wales/sustainable-management-marine-natural-resources-work-package-1-final-report

[6] https://tethys.pnnl.gov/data-transferability

[7] https://tethys.pnnl.gov/summaries/short-science-summary-risk-retirement-data-transferability

[8] https://tethys.pnnl.gov/publications/state-of-the-science-2020-chapter-13-risk-retirement

- **Scenario 1** represents a situation where data and learning from an existing installation of MRE devices are applied to the deployment of more of the same type of device at the same site. This scenario would apply to the build-out of a site.

- **Scenario 2** represents a situation where data and learning from an existing or previous installation of MRE devices are applied to the deployment of different devices at the same site. This scenario might arise where previous deployments have been decommissioned and a new or different development is planned for the site; or where a site to be enlarged with devices of a different type. Two small arrays are depicted for illustrative purposes, but this scenario could also represent single devices and large arrays.

- **Scenario 3** represents a situation where data and learning from an existing or previous site are applied to a new deployment of the same technology at a different location. Two small arrays are depicted for illustrative purposes, but this scenario could also represent single devices and large arrays.

- **Scenario 4** represents a situation where data and learning from previous MRE developments are applied to new developments of different technologies in different locations. This scenario arises when information gathered from a previous or existing development is applied to a new technology at a different development site – for example knowledge from a deployment in Scotland might be applied to a different type of development in Wales. Two small arrays are depicted for illustrative purposes, but this scenario could also represent single devices and large arrays.

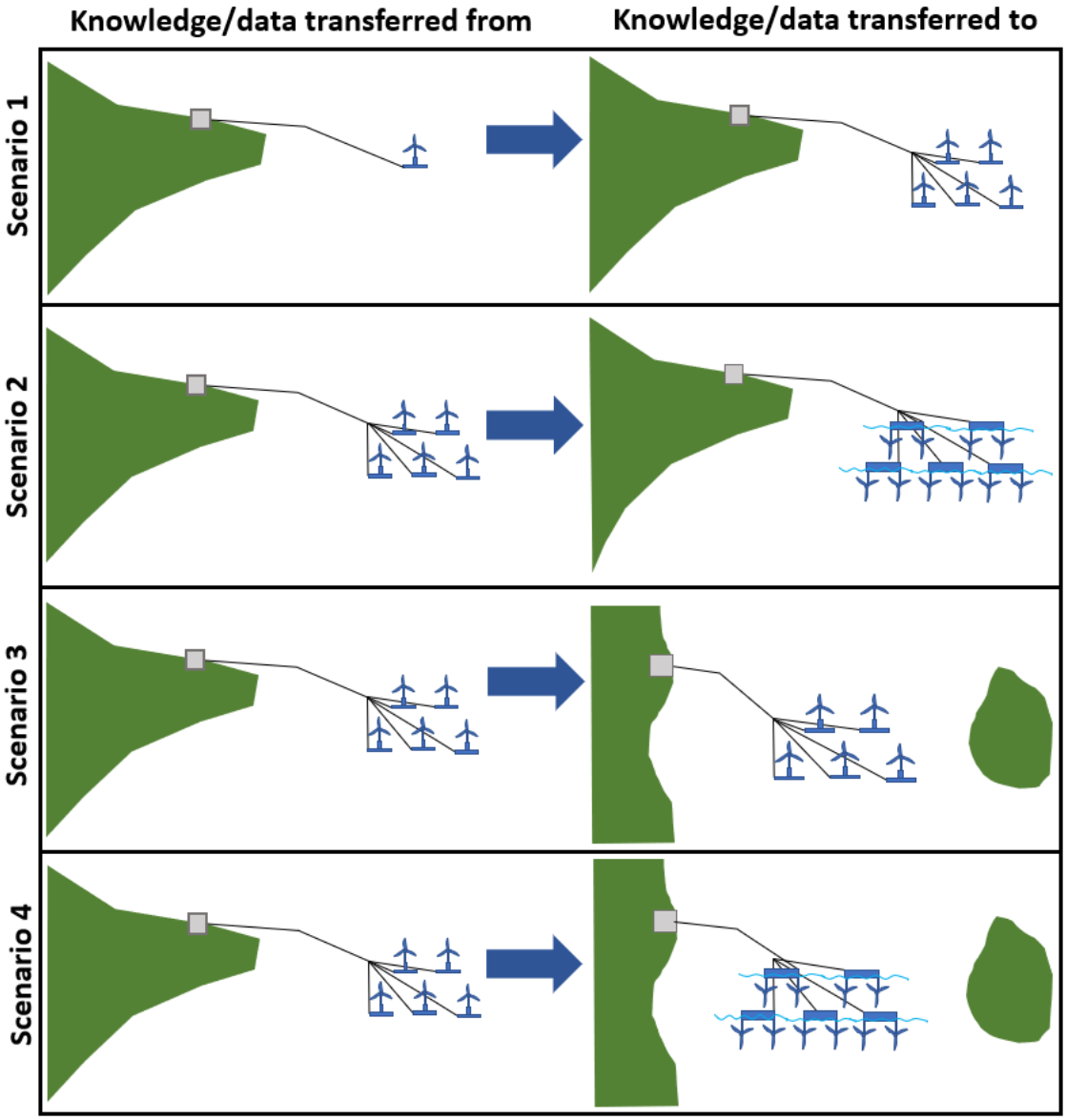

Figure 1: Scenarios for data and knowledge transfer between MRE development sites.

2 VIEWS OF NATURAL RESOURCES WALES ON DATA TRANSFERABILITY

Information in this section was gathered in consultation with NRW offshore renewable energy advisors and receptor specialists.

2.1 GENERAL PRINCIPLES OF DATA TRANSFERABILITY

The transferability of data and information is dependent on many factors, described in the sections below. NRW recognise that to reduce uncertainty about the impacts of MRE devices on the marine environment, it will be necessary to justify scoping out risks to specific receptors (e.g. benthic habitats, seabirds, fish, marine mammals, coastal processes). Given that the

wave and tidal stream sector is emerging and still in the demonstration phase, NRW understand that data and information gathered from other parts of the UK and internationally, used in combination with site specific information will allow the reduction of uncertainty and risk at the project level.

Wales has an extensive Marine Protected Area (MPA) network and areas of high marine energy resource are important for marine mammals and seabirds. NRW suggest that in such a situation data transferability should be complemented by additional consideration of the potential impacts of a development and appropriate management measures.

NRW advise that EIA scoping is necessary to establish what information is already available and how it can be applied to impact assessments. In the scoping stage, NRW can provide a preliminary view on the information required and relevant information sources.

NRW have provided guidance on scoping and preparing an EIA[9] and on marine ecology datasets for marine developments[10].

2.1.1 Time between data collection, analysis, and application

The time between data collection and analysis for an existing development and its application to a new development can stretch from months to years.

NRW believe that data and knowledge transfer between projects would be acceptable for more than five years for site physical characteristics, but this would be shorter (3-5 years) for species behaviour and monitoring outcomes and observations. These acceptable timeframes for knowledge transfer are most relevant for scenarios 1 and 2 above, where information is gathered at the same location and could support EIA for a future deployment. In cases like Scenario 1 where there is an increased number of devices, the magnitudes of effects are likely to increase, leading to greater uncertainty in data transferability. For scenarios 3 and 4, NRW advise that timeframes for knowledge transfer would very much depend on the data or information in question. For example, where applicants wish to use information from other projects elsewhere to support conclusions or assumptions in an EIA rather than supplement data for an EIA the time period would likely be considered less relevant. Further general considerations about the type of data or information to be transferred is presented in Table 1.

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[9] https://naturalresources.wales/guidance-and-advice/business-sectors/marine/scoping-and-preparing-an-eia-for-marine-development/?lang=en

[10] https://naturalresources.wales/guidance-and-advice/business-sectors/marine/marine-ecology-datasets-for-marine-developments/?lang=en

Table 1: Further considerations from NRW on data transferability for different types of data or information.

Type of data/ information	Considerations
Site physical characteristics	• Areas with strong tidal currents are likely to be highly dynamic. • In some locations with habitats that come and go naturally e.g. *Sabellaria* spp., more frequent site characterisation may be required.
Device-specific parameters	• Device-specific parameters are key to collision risk modelling for highly mobile species. If parameters change between project phases then there may be need to re-run models to inform an impact assessment.
Species ecology	• Species diversity and ecology at a site are unlikely to change in the short term. • Understanding species populations for receptors (e.g. marine mammals, seabirds, fish) is critical for collision risk models. • Timeframes for data transferability depend on the statistical power needed to demonstrate an effect. For example, collisions are rare events, so greater time is needed to gather sufficient data to demonstrate an effect or lack thereof. • Developers may also need to account for seasonality; highly seasonal species may need longer monitoring timeframes to provide sufficient information for assessment.
Species behaviour, monitoring outcomes and observations	• The appropriateness of data transfer depends on whether the volume of data is considered sufficient to inform a new assessment. • Where an increased number of devices would be deployed, the magnitude of effect is likely to increase, increasing uncertainty in data transfer.

2.1.2 Characteristics enabling data transferability

NRW highlight a number of characteristics that are important to consider to enable data transferability. These are:

- Consistency in data collection and analysis methods;
- Data recorded and provided as consistent and standardised variables;

- Consistent data exchange formats and quality checking (for example NMBAQC scheme [11]);
- Similar environmental conditions and functional use of the development site by species;
- Same species in question; and
- Similar MRE technology type.

Characteristics that NRW consider to be less important for data transferability are:

- Academic 'peer review' of data, analysis, or knowledge; and
- Similar MRE development size.

It should be noted that the importance of the above characteristics is dependent on the impact pathway in question, and some data or information, for example collision risk and sediment transport models, may not be acceptable if they have not been independently verified through a peer review process.

2.1.3 Data transferability for specific receptors

NRW suggest that data transferability may also be more appropriate for some receptor groups than for others. NRW indicate that data transfer is:

- Appropriate for seabed habitats, seabirds, marine mammals; and
- Sometimes appropriate for sessile invertebrates, mobile invertebrates, demersal fish, pelagic fish, diadromous fish and coastal processes.

NRW do not think that there are any receptors where it would be inappropriate to consider transferability. However, there are some important considerations that should be accounted for such as the need to understand the degree to which data and receptor behaviour and functional use of the site are specific to a particular location. Additional considerations can be found in Table 2.

Table 2: NRW considerations for data transferability according to receptor

Receptor type	Considerations for data transferability
Seabed habitats	• Seabed habitat data and information is generally site specific, and it is likely that site specific surveys will be required.

[1111] NE Atlantic Marine Biological Analytical Quality Control Scheme, http://www.nmbaqcs.org/

Receptor type	Considerations for data transferability
	• Knowledge of how devices interact with certain habitats may be transferable from other locations and used to inform an impact assessment. • Data transferability also depends on physical process modelling, the identified zone of impact, and the sensitivity of receptors.
Sessile and mobile invertebrates	• Considerations for seabed habitats apply to sessile and mobile invertebrates. • Additional data to support data transferability should be collected via video analysis, grab sampling, and subsequent analysis of species presence and abundance.
Demersal fish Pelagic fish Diadromous fish Seabirds Marine mammals	• Data and information on mobile species can be very dependent on the species abundance, proximity and linkage to MPAs and environmental conditions. These aspects need to be considered for data transferability. • Data on the functional use of a tidal site by marine mammals (such as foraging areas and site use at particular states of the tide) is likely to be transferable between projects in the same location. • Information on species interactions with a certain device type deployed in another location may also be comparable particularly if evidence has been gathered on the same species.
Coastal processes	• Knowledge and data on coastal processes is generally site specific (Scenario 1 & 2). • Information on how a device behaves in the water column and its impact on hydrodynamics may be transferable as well as knock on effects on sediment (e.g. scour).

2.1.4 Cross-sectoral data transferability

There are further opportunities for data transferability between other sectors and the MRE industry, although it is important that the knowledge or data to be transferred reflects similar habitats and species. NRW consider that there are likely to be opportunities for transferability from the fixed offshore wind and floating offshore wind sectors, particularly around electromagnetic field (EMF) emissions from cables, underwater noise, mooring design (floating offshore wind), and construction activities.

There may also be some opportunities for data transferability from the oil and gas industry, although this will be dependent on the similarities of the receptor,

impact pathway, scale, and deployment location. There may also be some construction or operational activities that enable data transfer between the MRE and the aquaculture sectors (including the use of acoustic deterrent devices). NRW suggest that opportunities for data transfer between the shipping and MRE industries would be limited to information about underwater noise, displacement, and the consequences of collision.

2.2 SCENARIOS FOR DATA TRANSFERABILITY

NRW suggest that there could be opportunities to transfer data and information between MRE sites for all impact pathways in all four scenarios outlined in Section 1.3, but that these opportunities would be dependent on several factors. These are outlined in the sections below.

2.2.1 Scenario 1

In scenario 1, NRW advise that data transferability was likely to be appropriate or very appropriate for all receptors, however, it was important that consideration be given to the effects of scaling up any development. For example, although collision risk is likely to be very appropriate for data transfer, other effects such as behavioural avoidance and barrier effects will become more important for arrays. For other impact pathways, the effects of larger developments may not scale directly and/or may act cumulatively over a larger area.

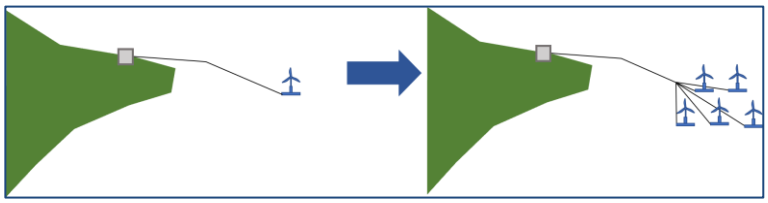

Figure 2: Data transferability scenario 1

2.2.2 Scenario 2

In scenario 2, NRW advise that data transferability is likely to be appropriate for all receptors, although the level of appropriateness depends on a number of factors, the characteristics of each type of device being one of the most important. For example, while some input parameters for collision risk modelling might be comparable between the two developments, device-specific inputs will also be required. Likewise, different types of devices will emit different levels and frequencies of underwater noise, resulting in different effects.

NRW suggest that some information on benthic habitats is likely to be transferable if there is sufficient confidence in the seabed type present across the site, but advise that it will be important to consider whether there are different impact pathways or zones of impact associated with each device type.

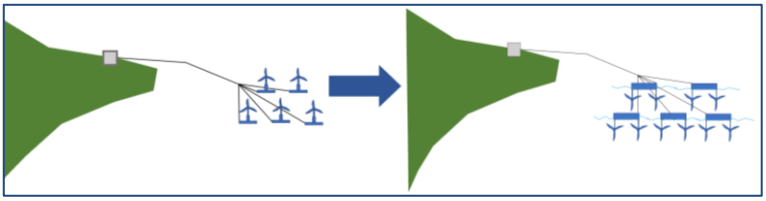

Figure 3: Data transferability scenario 2

2.2.3 Scenario 3

In scenario 3, NRW advise that data transferability is likely to be appropriate for all receptors, although this will depend on the specific environmental conditions associated with each site such as bathymetry, current flow speeds, and sediment type. For example, these environmental conditions can cause underwater noise propagation to vary substantially between location.

For mobile species, NRW caution that information on species type, abundance, behaviour, and functional use of each site would need to be used cautiously, because they may not be comparable between sites.

Information about how specific device types interact with hydrodynamics and the seabed may be transferred from other locations and used to inform impact assessments, although ultimately the impacts on benthic habitats and oceanographic systems will depend on the environmental conditions specific to each site (i.e. distance to coast, seabed substrate type).

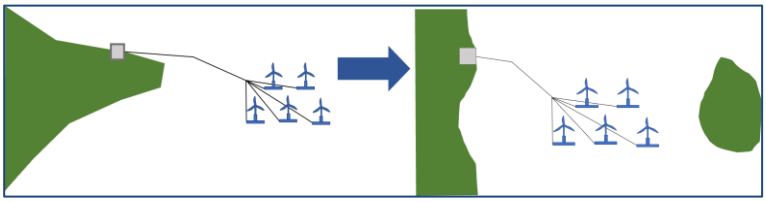

Figure 4: Data transferability scenario 3

2.2.4 Scenario 4

Although data transferability is considered to be appropriate for information about EMF and interactions with cables and moorings in scenario 4, NRW suggest that for other impact pathways such as collision risk data transferability will be dependent on the similarities in the device characteristics and environmental conditions at each site.

For benthic habitat change and changes in oceanographic systems, it is very likely that additional site-specific information would be required in this scenario.

For marine species, information could be drawn from deployments of MRE devices with very similar characteristics in other locations to inform understanding of potential interactions with the MRE devices in question. For

example, in this case evidence on the avoidance of devices by certain species could be applied to new developments. Information about sound emissions from similar devices could also be applied at different locations, provided that a comparable deployment methodology is used and that the two sites have similar environmental conditions.

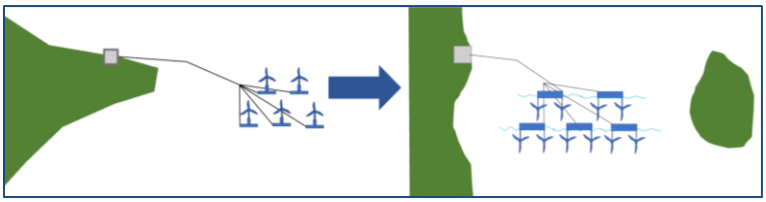

Figure 5: Data transferability scenario 4

3 PERSPECTIVES FROM ENVIRONMENTAL ORGANISATIONS

Perspectives in this section were obtained from the Royal Society for the Protection of Birds (RSPB) and The Wildlife Trusts (TWT).

Both RSPB and TWT urge caution in interpreting data from one species to another, or to transfer data across geographical areas and between development sites. Any data transfer must reflect the same species and the same environmental conditions as far as possible, as there are very specific conditions that lead to environmental risk at each site. Where transferred data or knowledge is associated with different environmental conditions or receptors, these should be clearly stated to avoid misinterpretation.

RSPB provide collision risk as a key example. Animal collisions with devices are known to be rare, but it would be wrong to assume that this is true at all sites. Collisions between offshore wind turbines and seabirds are known to be rare, but there have been observed instances of collision. These instances differ between sites in relation to individual seabird and population behaviours at different locations. Similar principles of location specific conditions and animal behaviour will make data transferability difficult for some impact pathways in the MRE sector.

TWT urge caution in transferring data across MRE developments of differing size or technology type. Increasing development size can often amplify impacts that were insignificant at smaller developments into significant impacts on receptors and MPAs. This is particularly relevant when considering cumulative and population-scale impacts. Differences in MRE technology types can also lead to differing impact pathways, and these must be considered if data or knowledge is to be transferred.

4 PERSPECTIVES FROM INDUSTRY

4.1 GENERAL PRINCIPLES OF DATA TRANSFERABILITY

Industry members encourage ongoing work to clarify the role that data transferability can play in the consenting of MRE developments in Welsh waters. There has been very little environmental monitoring around MRE devices deployed in Welsh waters, and so industry highlight that it will be important to consider data and reports from deployments in other locations to support consenting in Wales. Data transferability enables the industry to reduce risk by providing an improved understanding of the likelihood of particular impacts.

The Marine Energy Test Area (META) facility offers a good opportunity to conduct environmental monitoring during scale deployments, and this knowledge could be transferred to deployments of similar technologies at larger scales. Industry members would support efforts to improve the accessibility and application of existing data and information.

Regardless of age of datasets or their location, industry members consider there is a need to identify, pool, and utilise existing data as it is time consuming and costly to generate. Collective action and pre-emptive data collection will be central to this and should be contributed to by all stakeholders across the sector.

4.1.1 Time between data collection, analysis and application

The views from Industry members on the time period over which data and knowledge transfer should be acceptable between projects varied substantially. However, even where existing data is available, industry members suggest that developers would wish to carry out pre-installation surveys to provide a good understanding of seabed characteristics (for moorings and foundations) and tidal flow dynamics for device performance. This would be the case for all scenarios discussed.

4.1.2 Characteristics enabling data transferability

Industry members recognise that consistency in data collection and analysis methods are important to enable data transferability. Similar MRE technology type, development size, and receptors of interest are also important considerations. Industry members consider that similar environmental conditions are somewhat important, and the importance of academic peer review is mixed between members.

Prior to the UK leaving the European Union, most environmental legislation in the UK and across Europe was derived from the same European Union directives. However, there may have been some differences in how these directives were enacted into country specific regulations. Industry members suggest it would be helpful to understand how the results of monitoring

outcomes from projects around Europe have been transferred and interpreted by other regulators in other countries.

4.1.3 Data transferability for specific receptors

Like NRW, industry members suggest that the transfer of data and information would be appropriate for most receptors, although there is some uncertainty as to how appropriate this would be for fish. For seabed habitats, industry members also consider that baseline seabed habitats would need to be similar across development sites to enable data to be transferrable and used to inform an environmental assessment.

Industry acknowledges the site-specific nature of tidal energy sites, and that risks for different receptors will be geographically specific. Receptors will demonstrate different behaviours at different locations, and the consequences of those behaviours at each site should be considered based on risk.

Monitoring data gathered at multiple sites is important to understand the overall degree to which data transferability is appropriate for specific receptors in particular locations.

4.1.4 Cross-sectoral data transferability

Industry is supportive of data transfer across marine sectors and considers that information about seabed impacts, contamination and moorings and anchors (and associated entanglement) gathered in the oil and gas industry could be applied to MRE developments. Fixed and floating offshore wind developments also offer opportunities for data transfer around EMF, seabed habitat impacts and underwater noise and given the rapid expansion of offshore wind in UK waters, industry considers there are opportunities to apply the same approach to assessment of cumulative impacts to the MRE sector.

Industry also considers that there are opportunities for data transfer from the shipping industry, including for underwater noise impacts. Data on seabed habitat disturbance resulting from cargo ship anchors and on the transfer of invasive/non-native species could provide useful insight into the level of risk associated with similar effects from MRE developments.

Data transfer could also be appropriate between the aquaculture and MRE sectors, specifically around effects associated with floating structures, moorings, and anchors such as entanglement. Industry notes that there are a number of additional impacts associated with aquaculture which would not be present in a MRE development, including the introduction of chemicals, additional nutrients and diseases, which may reduce data transferability.

4.2 SCENARIOS FOR DATA TRANSFER

Of the four scenarios presented in Section 1.3 above, industry agree that data transfer is likely to be more appropriate for developments where the same or

similar devices are deployed (scenarios 1 and 3). Data transfer is also likely to be more appropriate between developments in the same, or similar locations (scenarios 1 and 2).

Industry perspectives on data transferability are mixed where developments are situated in different locations and employ different devices but are of similar scale (scenario 4) and this may be due to uncertainty or a lack of detailed understanding of those effects.

5 SUMMARY AND RECOMMENDATIONS

There is recognition across SEAGP members that there are currently very limited data available in Wales to support the consenting of MRE developments. Therefore, the ability to learn from and use data from other countries or previously collected from other developments or sectors is important to inform the growth of MRE in Wales.

There are differences of opinion on the length of time that data should be considered relevant in terms of transferability. It suggested that some data could be considered relevant where it is more than 3 years old and that many data types should be considered relevant for more than 5 years.

Overall, it is considered appropriate to transfer data across national boundaries, but risks must be identified and carefully managed. However, there may be site-specific geographical and species-specific circumstances which may make transferability very challenging and higher risk, as set out by RSPB in Section 3.

There is the potential for transfer of data from other sectors such as floating offshore wind and fixed offshore wind. Data transfer from other sectors such as oil and gas, shipping and aquaculture is likely to be appropriate for only some impact pathways.

Stakeholders agree that it will be important to establish a common system for storing, accessing, and transferring data efficiently. This system might take the form of a portal (either for Wales or internationally) requiring a level of membership, although existing systems such as Tethys[12] are effective and should also be considered as a potential alternative to new systems.

The perspective of the regulator will ultimately determine the appropriateness of data transfer, and a risk-based approach to incorporating data from other MRE developments or other industries should be observed. Applicants must provide convincing arguments supported by evidence to support transfer of any data or knowledge in their application.

[12] https://tethys.pnnl.gov/

5.1 KEY RECOMMENDATIONS

- The use and application of data, knowledge, and evidence from other MRE developments, industries, or geographies is important to inform the development of MRE in Wales.
- Data transferability must be considered and carefully managed on a case by case and risk-based approach in recognition that there are site specific and species-specific characteristics which will differ between development sites and device types.
- The establishment of metadata and data management systems to ensure consistency and the common availability of data to support EIA/consenting processes is recommended.

6 REFERENCES

NOTE THAT ADDITIONAL REFERENCES ARE INCLUDED THAT ARE NOT CITED IN THIS INFORMATION NOTE

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APPENDIX A ADDRESSING DATA TRANSFERABILITY IN PREVIOUS MARINE ENERGY PROJECTS: LICENSING DOCUMENTS AND CONSENT CONDITIONS

At present there are limited examples of the application of data transfer between MRE sites, or between other sectors and MRE developments. At present, examples are not included in the appendix of this Information Note. As set out in 'Information Note: Background Information', this series of Information Notes are considered to be live documents, and this appendix will be updated in line with updates of the Information Note series.

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