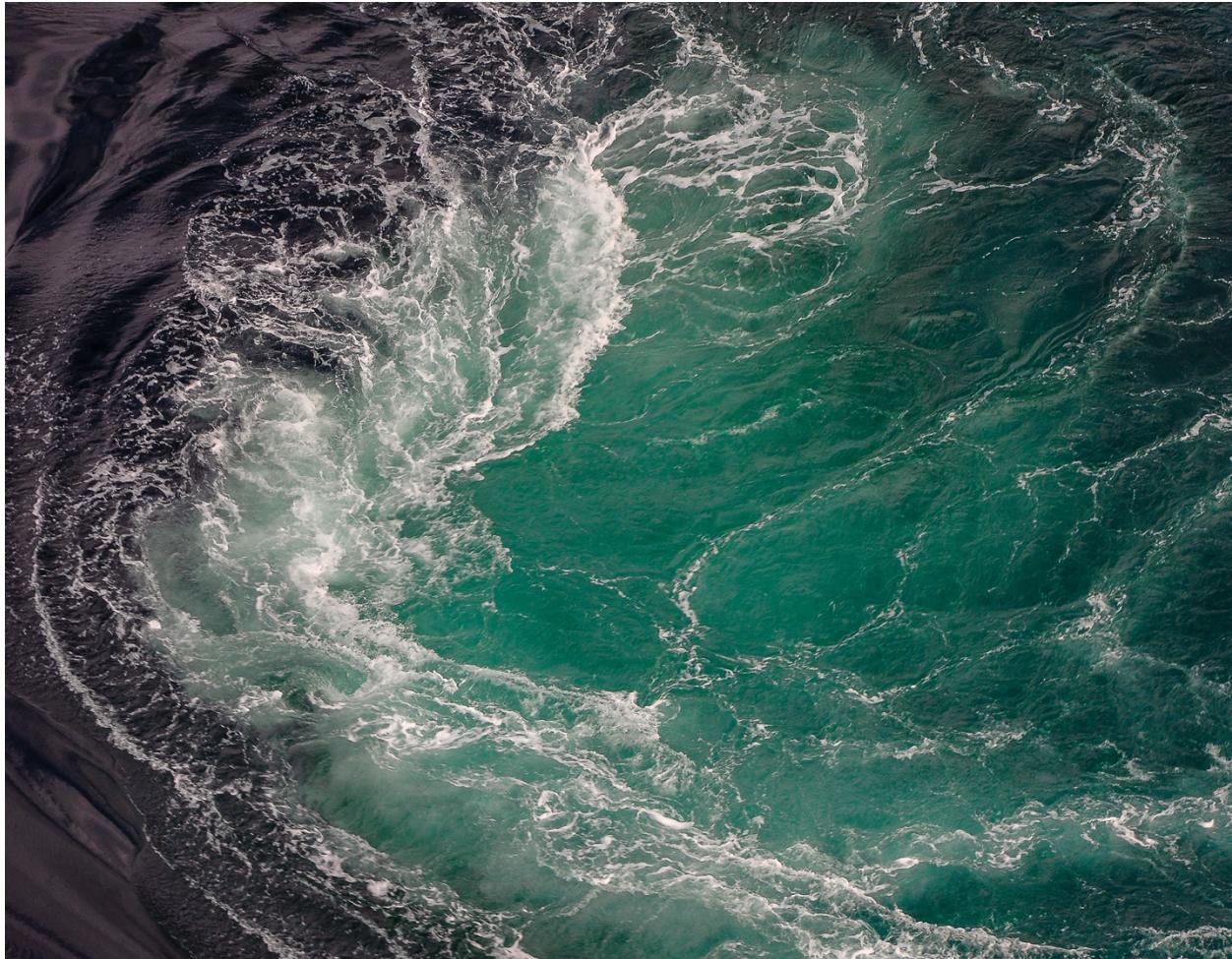


# Marine Renewable Energy Regulator Survey: *UNITED KINGDOM*



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## Introduction

As the marine renewable energy (MRE) industry progresses around the world, understanding of the potential environmental effects of MRE has improved. Opportunities to investigate the environmental effects of operational MRE devices have increased in recent years with more projects in the water. Despite these advancements, some areas of uncertainty persist. Key concerns remain about how MRE devices and arrays interact with surrounding environments, and how marine animals behave around them. These uncertainties continue to pose challenges during consenting processes for MRE. Additionally, the development of larger-scale MRE devices and arrays presents new questions and uncertainty for MRE consenting processes, particularly in understanding how potential environmental effects of MRE scale up and interact with other ocean activities.

To better understand how regulators perceive and manage environmental risks during consenting processes for MRE projects, a survey was conducted across several OES-Environmental member countries beginning in 2025. Building on a previous regulator survey conducted by OES-Environmental for multiple countries from 2017-2021, this survey included updated questions to reflect changing information needs regarding the potential environmental effects of MRE. Its purpose was to understand regulators' familiarity with MRE technologies, perceptions of potential environmental risks associated with MRE technologies across varying scales, and views on best approaches to MRE development, including consenting and the applicability of data transferability. The survey also included questions to collect information on the use of Tethys. A list of questions and answer options are provided in Appendix A.

This report summarizes the results from the survey of regulators in the **United Kingdom (UK)**. Countries within the UK included in this survey are Scotland and Wales. Results are compared to the previous survey for the UK, conducted in 2018 and published in 2019<sup>1</sup>.

## Participants

Email invitations for the 2025 Survey on Regulatory Needs Regarding Environmental Effects of Marine Renewable Energy were sent to 42 individuals known to be involved in consenting MRE in the UK. Only two full responses were received: one from an individual and one from a group of 19 respondents from the same organization. However, survey responses were anonymized.

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<sup>1</sup> Rose, D.; Freeman, M. (2019). MRE Regulator Survey Report: United Kingdom. <https://tethys.pnnl.gov/publications/mre-regulator-survey-report-united-kingdom>

Both respondents self-identified as working at a national level in the UK government. When asked about the number of planned, consented, or operational MRE projects in their jurisdiction, one respondent reported that there are between one and five projects, and the other reported more than 10. Respondents were also asked to indicate their organization's focus for consenting MRE developments. Figure 1 ( $n = 2$ ) shows the top focus of organizations represented. One of the two responses also added birds and cumulative effects under 'other'.

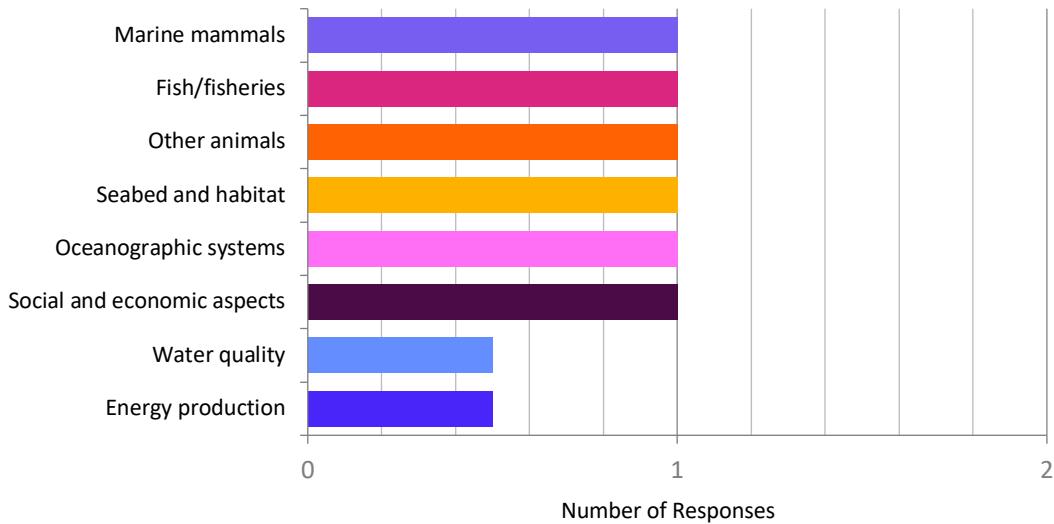


Figure 1. Organization focus in consenting marine renewable energy projects. ( $n = 2$ )

Both respondents indicated that they work in a role advising or informing licensing and policy decisions. One of the respondents also issues, reviews, and manages consents, has held a position related to consenting processes for MRE projects for over five years, and has directly participated in an MRE regulatory process in a management capacity for an operational project. The other respondent has held a position related to consenting processes for MRE projects for three to five years, works in a government research program role to inform planning, policy, and licensing policy decisions, and has not directly participated in a regulatory process for an MRE project.

## Familiarity with MRE Technologies

Respondents were asked to rate their familiarity with MRE technologies (e.g., ocean current energy, tidal energy, wave energy, ocean thermal energy conversion, salinity gradient, riverine energy) on a scale of 1 (not familiar) to 5 (very familiar). They were provided with explanations of all of the terms presented from <https://openei.org/wiki/PRIMRE/Basics>. The results are presented in Figure 2. Both respondents are at least somewhat familiar with wave energy technologies and are most familiar with tidal energy technologies. One respondent was also somewhat familiar with riverine and ocean current energy technologies. Both respondents consider themselves less familiar with ocean thermal energy conversion and salinity gradient technologies.

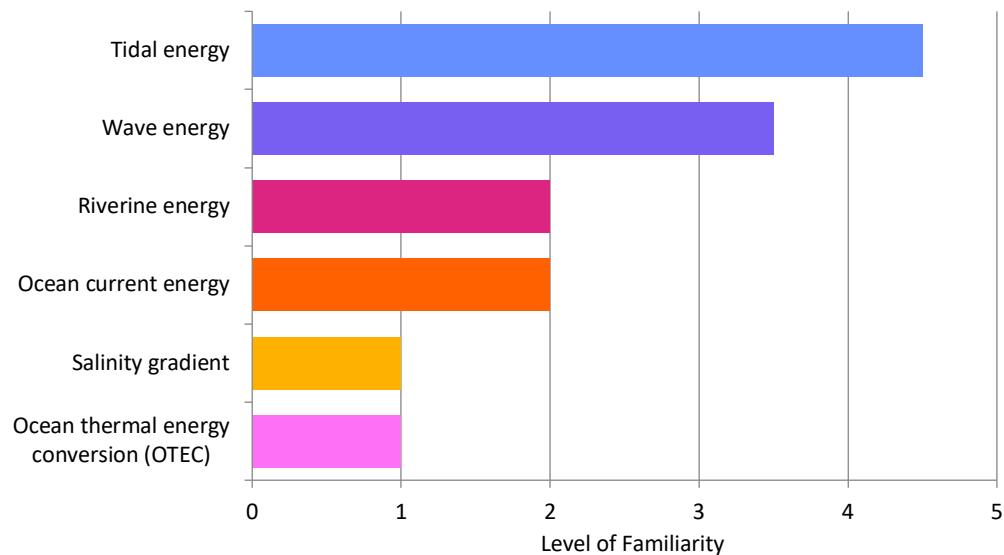


Figure 2. Average level of familiarity with marine renewable energy technologies from 1 (not familiar) to 5 (very familiar). (n = 2)

## Top Challenges and Perceptions

The following questions differentiated between small arrays and large arrays of MRE devices to understand how perceptions of risk and information needs vary for different MRE project scales. Small arrays refer to projects with one to six devices, and large arrays refer to projects with more than six devices.

### Small arrays

Respondents were asked to rank the following environmental effects by how challenging they are when consenting small arrays, from most challenging to least challenging.

- Effects of electromagnetic field emissions from underwater cables and other electrical infrastructure on marine animals
- Attraction, avoidance, or displacement of marine animals
- Changes to habitats
- Effects of underwater noise from devices on marine animals
- Risk of marine animals colliding with turbine blades
- Changes in oceanographic systems (e.g., energy removal, sediment transport, etc.)
- Entanglement of large marine animals with mooring lines and underwater cables

Figure 3 shows respondents' perceptions of the level of challenge posed by environmental effects when consenting small arrays. The top-ranked challenges were calculated by Survey Monkey, such that the answer choice with the largest average ranking, or value, is the top challenge. In the UK, the top challenges for respondents in consenting small arrays are collision risk with turbines, attraction, avoidance or displacement; changes in oceanographic systems, and underwater noise.

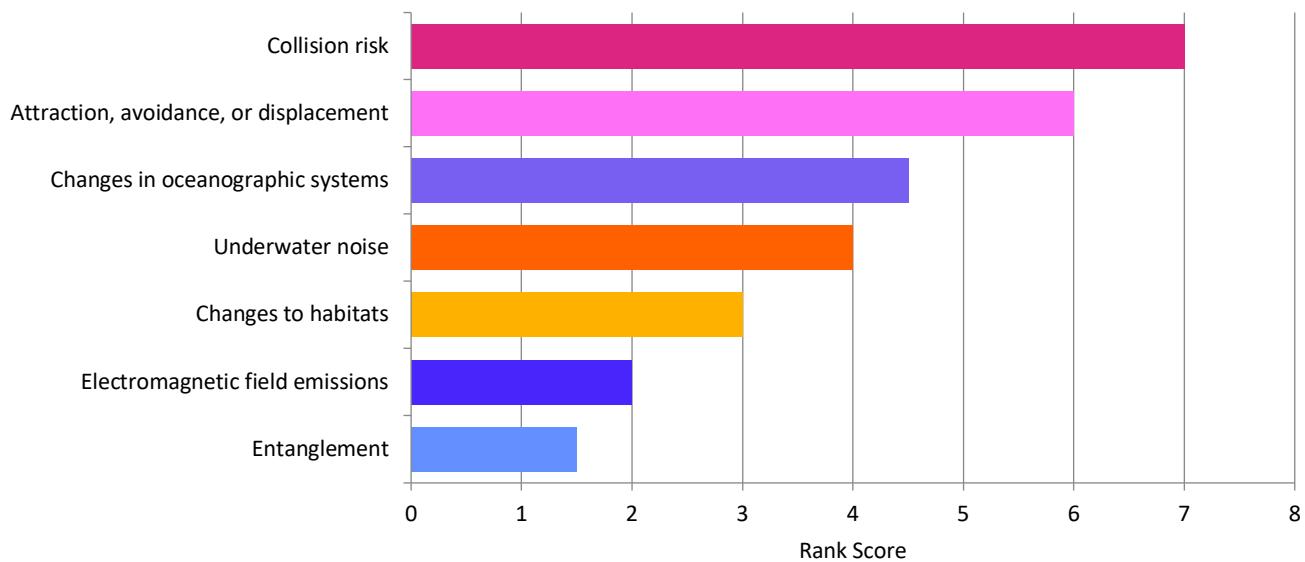


Figure 3. Ranking of challenges to consenting small arrays (one to six). (n = 2)

Respondents were also asked to rank their agreement with several statements regarding additional needs for consenting for small arrays, with respect to their top-ranked challenges for small arrays.

The results of this question are summarized in Table 1. Respondents were either neutral or in agreement (agreed or strongly agreed with all statements).

*Table 1. Perceptions of small array statements.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<b>Additional research/studies are needed to better understand the likely risk</b>	0	0	0	0	1*
<b>Field data are needed to determine the risk and uncertainty of an MRE project</b>	0	0	0	1	1
<b>Validated numerical models are needed for environmental consenting</b>	0	0	0	1	1
<b>Organization/policy guidance is needed to interpret potential environmental risk and manage uncertainty</b>	0	0	0	0	2
<b>Regulators/advisors need to be knowledgeable and trained on MRE technologies, environmental interactions, etc.</b>	0	0	0	1	1
<b>Additional monitoring methods, instruments, etc. are needed to document environmental interactions</b>	0	0	0	0	2

\*Note: only one regulator responded to this statement, as the survey formatting allows respondents to leave portions of the question blank.

## Large arrays

Regulators were asked to rank the following environmental effects by how challenging they are when consenting large arrays, from most challenging to least challenging. Note that cumulative effects and ecosystem-wide effects were added for this question in contrast to single devices.

- Effects of electromagnetic field emissions from underwater cables and other electrical infrastructure on marine animals
- Attraction, avoidance, or displacement of marine animals
- Changes to habitats
- Effects of underwater noise from devices on marine animals
- Risk of marine animals colliding with turbine blades
- Changes in oceanographic systems (e.g., energy removal, sediment transport, etc.)
- Entanglement of large marine animals with mooring lines and underwater cables
- Cumulative effects with other anthropogenic activities/marine developments, including other MRE projects
- Ecosystem-wide effects

Figure 4 shows respondents' perceptions of the level of challenge posed by environmental effects when consenting small arrays. The top-ranked challenges were calculated by Survey Monkey, such that the answer choice with the largest average ranking is the top challenge. In the UK, the top challenges for respondents in consenting large arrays are collision risk; attraction, avoidance or displacement; cumulative effects; and ecosystem-wide effects.

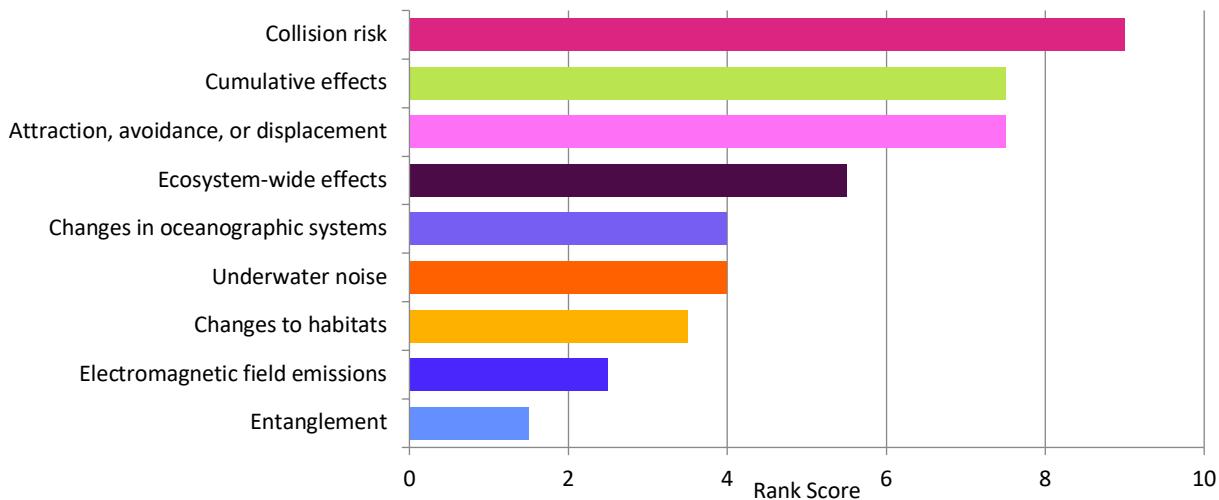


Figure 4. Ranking of challenges to consenting large arrays (greater than 6 devices). (n = 2)

Regulators were also asked to rank their agreement with several statements regarding additional needs for consenting large arrays, with respect to their top-ranked challenges for large arrays. The results of this question are summarized in Table 2. Both respondents were in agreement (agreed or strongly agreed with all statements).

Table 2. Regulator perceptions of device array statements. (n = 2)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<b>Additional research/studies are needed to better understand the likely risk</b>	0	0	0	1	1
<b>Field data are needed to determine the risk and uncertainty of an MRE project</b>	0	0	0	1	1
<b>Validated numerical models are needed for environmental consenting</b>	0	0	0	1	1
<b>Organization/policy guidance is needed to interpret potential environmental risk and manage uncertainty</b>	0	0	0	0	2
<b>Regulators/advisors need to be knowledgeable and trained on MRE technologies, environmental interactions, etc.</b>	0	0	0	1	1
<b>Additional monitoring methods, instruments, etc. are needed to document environmental interactions</b>	0	0	0	0	2

## Barriers to Consenting

Regulators were asked to select statements that “Describe a barrier to consenting for you or your organization regarding environmental effects of MRE projects”. The predefined statements and associated responses are shown in Figure 5.

The barriers to consenting for both respondents regarding environmental effects of MRE projects are scientific uncertainty regarding environmental effects, limited availability of research or environmental monitoring data, and insufficient guidance for managing environmental risks. Only one respondent identified a lack of expertise and/or access to subject matter experts as a barrier to consenting.

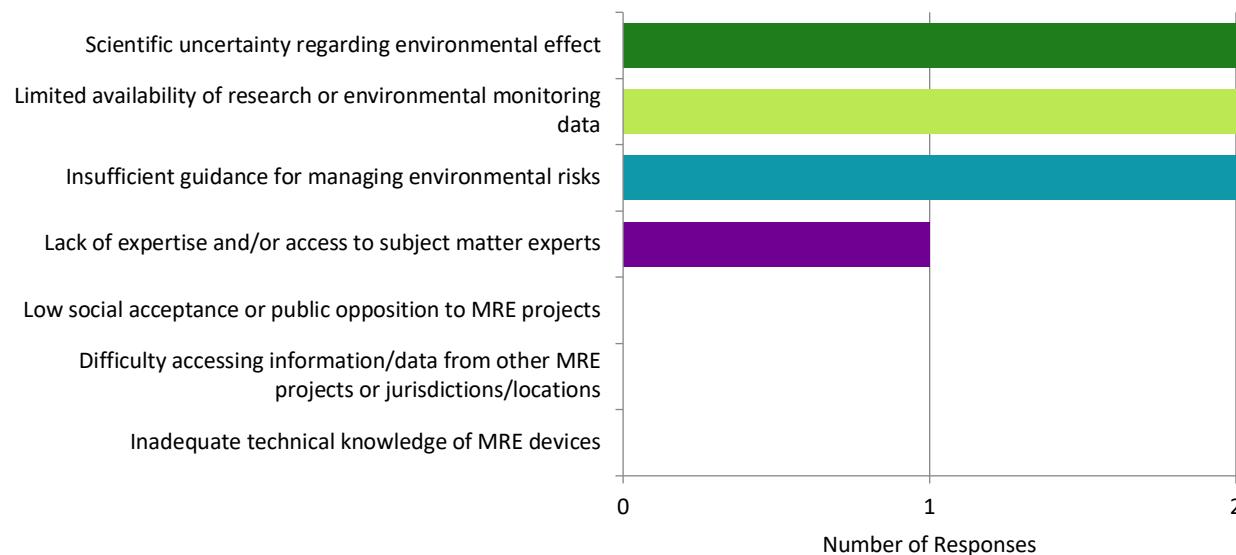


Figure 5. Barriers to consenting marine renewable energy projects. (n = 2)

## Data Transferability and Risk Retirement

Risk retirement is a process to help simplify consenting processes for single or small numbers of devices by “retiring” risks of specific environmental interactions that are unlikely to cause harm to marine animals or habitats, so that extensive investigations for every new MRE project are not required. Through data transferability, MRE developers and respondents may rely on what data from already consented projects, from related research studies, or from analogous offshore industries. To guide the application of risk retirement and data transferability by MRE developers and respondents, OES-Environmental has created various tools and resources available on the Tethys [Risk Retirement page](#) and [Data Transferability page](#).

Respondents were provided with the following definition of risk retirement:

“Risk retirement is a process by which available data and information are examined to identify environmental effects that are unlikely to cause significant effects on marine habitats, animals, or ecosystem processes. These effects can therefore be retired and may not require extensive investigation for each new MRE project.”

Based on this definition, respondents were asked, “Can any of the following potential risks be retired for small arrays (one to six devices) in your jurisdiction?” Respondents ranked the ability to retire each of the following potential environmental risks as either strongly disagree, disagree, neutral, agree, or strongly agree.

- Effects of electromagnetic field emissions from underwater cables or other electrical infrastructure on marine animals
- Changes to habitats
- Attraction, avoidance, and displacement of marine animals
- Effects of underwater noise from devices on marine animals
- Risk of marine animals colliding with turbine blades
- Changes in oceanographic systems (e.g., energy removal, sediment transport, etc.)
- Entanglement of large marine animals with mooring lines and underwater cables

Respondent were also asked their perceptions of the ability to retire risks for small arrays (one to six devices). Both respondents disagree that any of the predefined risks for small arrays can be retired, with one respondent ranking each risk as “strongly disagree” and the other respondent ranking each risk as “disagree”. Additional responses were also provided by both respondents:

- “There remains uncertainty on these risks, however evidence is emerging to better understand these issues.”
- “Disagree that any [environmental risks] can be completely retired as there is insufficient field evidence. It depends on definition of risk retirement. In UK context, we apply the relevant environmental procedures. Through this process, it may be possible to screen out [environmental risks] based on data and information.”

Respondents were also asked to respond to the question: “Can data collected at other locations be used to inform consenting processes for proposed MRE developments within your jurisdiction?” Respondents were given the options of ‘Never’, ‘Maybe’, and ‘Absolutely’.

Both respondents selected ‘Maybe’ and provided additional responses to the question:

- “It depends on the relevance to the site/species involved. Evidence is reviewed on a case-by-case basis to inform consenting decisions.”
- “Yes, but must consider the transferability of such data and not make assumptions that risks can be retired based on data from different projects/habitats/environments.”

## Best Approach to MRE Development

Respondents were asked, “Which of the following approaches best describes your strategy for managing environmental risks and uncertainties during the consenting process when moving from small arrays (one to six devices) to large arrays (greater than six devices) (Choose one).”

The options, as provided to respondents in the survey, are listed below:

- *Precautionary principle*. Potential environmental risks should be avoided through preventative measures and consideration of alternatives to avoid unacceptable impact, particularly when there is scientific uncertainty. Project proponents are responsible for proving that a risk will not cause irreversible environmental harm.
- *Mitigation hierarchy*. Potential environmental risks should be systematically limited by taking actions to avoid, minimize, mitigate and/or compensate for risks through siting and/or mitigation measures.
- *Adaptive management*. Potential environmental risks and scientific uncertainty can be managed through a flexible, learning-based approach that includes adapting monitoring and mitigation over time to understand risks, decrease uncertainty, and mitigate impacts.
- *Survey, deploy, monitor*. Potential environmental risk level should be identified through surveys or available data at a proposed project site. If low risk, consenting may be fast-tracked. If high risk, the project may require additional surveys. Surveys and post-deployment monitoring should be based on a risk-based approach and proportionate to the project scale.

Both respondents provided additional responses, which are shown in Table 3 next to the management strategy selected.

*Table 3. Selected strategies for managing environmental risks and uncertainties during the consenting process when moving from small arrays (one to six devices) to large arrays (greater than six devices. (n = 2)*

<b>Management strategy selected</b>	<b>Additional Comment</b>
<i>Precautionary principle</i>	“In the UK, environmental risks are managed via the Environmental Impact Assessment process.”
<i>Mitigation hierarchy</i>	“Would apply mitigation hierarchy before adaptive management. Survey, deploy and monitor is part of adaptive management, but not as defined here.”

## Off-grid MRE

Respondents were asked:

“MRE devices are being designed for uses other than supplying electricity to the national grid. These systems are likely to consist of fewer and/or smaller-scale devices, to provide power to remote, coastal, or island communities or at-sea applications such as aquaculture, ocean observations, and navigation. Would the consenting process for these smaller MRE projects differ from national grid-scale projects in your jurisdiction?”

Responses were open-ended and are listed below:

- “It would be considered on a case-by-case basis, based on the potential environmental impact.”
- “The type of consent needed depends on the generation capacity of the project. However, all would require a marine license and the consenting process would be the same for all.”

## Use of Tethys

In addition to questions about consenting MRE projects, respondents were asked how they find information on the environmental effects of MRE and their awareness and use of the [Tethys online database](#). The results are provided in the subsections below.

### Finding Information

Respondents were asked, “What resources or methods do you use to find information on the environmental effects of MRE and support consenting? (check all that apply)”. The response options included:

- Other regulators/colleagues
- MRE project developers
- Conferences/workshops
- Newsletters
- Scientific journals
- Government organization reports
- Tethys

Responses indicated that the respondents use all of these resources and methods, and one response added an additional comment: “Any other evidence could be considered if it is scientifically robust”.

### Awareness, Purpose, and Usefulness

Respondents were asked if they were aware of Tethys, and both respondents responded “Yes”. They were also asked to indicate how they use Tethys by indicating all uses that apply from the following list:

- To find papers and reports on the environmental effects of MRE
- To view live or archives webinars and expert forums
- To receive Tethys Blast newsletter
- To find project information (e.g., OES-Environmental metadata)
- To use tools and resources (e.g., data discoverability matrix, management measures tool, etc.)

Shown in Figure 7, both respondents use Tethys to find papers and reports on environmental effects of MRE and to receive the Tethys Blast Newsletter, while only one respondent uses Tethys to view webinars and expert forums. One respondent also included an additional comment, “To stay up to date with upcoming events, engage with international colleagues to learn from other countries and their experiences”. When asked about the usefulness of Tethys (not useful, somewhat useful, very useful), both respondents indicated that they find Tethys very useful.

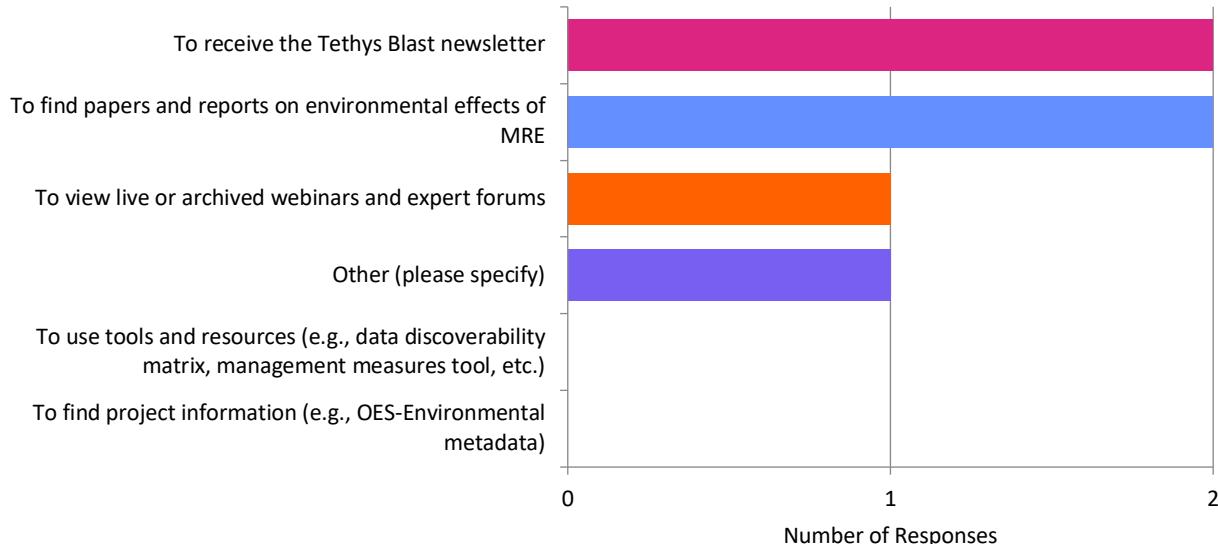


Figure 6. How do you use Tethys? (n = 2)

## Conclusion

The respondents in the UK who participated in this survey have varying experiences with consenting processes for MRE projects. They are most familiar with tidal and wave energy, and have limited familiarity with ocean thermal gradient energy conversion and salinity gradient energy. The respondents work for organizations that identified their focus on various aspects of MRE consenting, including water quality, marine mammals, fish, other animals, the seabed and habitat, oceanographic systems, and social and economic effects. Additionally, one organization focuses on energy production and cumulative environmental effects. While only two responses were included in this report, one response represented the perspectives and experiences of multiple respondents, providing greater diversity in the feedback collected.

Listed below are the key findings from the 2025 UK Regulator Survey:

- While cumulative effects were not provided as a response option for small arrays, their ranking as a greater challenge for large arrays suggests heightened concern or uncertainty among UK respondents regarding the potential cumulative environmental effects of larger-scale MRE projects.
- The respondents either disagree or strongly disagree that specific environmental risks can be completely retired. However, they note that emerging evidence is improving understanding, and environmental risks in the UK may be considered on a case-by-case basis using established procedures.
- The respondents are cautious in using data collected at other locations to inform consenting decisions in their jurisdictions. While the respondents note that evidence is reviewed on a case-by-case basis to inform consenting decisions in their regulatory context, they stress the need for data to be relevant for site-specific conditions if data transferability is applied.
- Overall, UK regulators are aware of risk retirement and data transferability, but challenges in field evidence, uncertainty, and varying site conditions may need to be addressed for broader adoption.

Additionally, similarities and differences in responses were identified between the 2025 UK Regulator Survey and the previous UK Regulator Survey conducted by OES-Environmental in July 2019<sup>2</sup>. Most notable similarities were the shared perspectives across the two survey iterations regarding the use of data transferability and additional needs for resolving top-ranked consenting challenges across scales. However, the top challenges identified for environmental consenting processes for arrays differed between the two survey iterations. In 2019, UK regulators identified collision risk as a top challenge, followed by underwater noise. In contrast, responses to the 2025 survey identified collision risk as a top challenge, followed by cumulative effects and attraction, avoidance, or displacement. While this shift may suggest that underwater noise is no longer a key challenge for UK regulators when consenting large arrays, it is important to note that cumulative effects were not included as a response option in the 2019 survey, and the definitions of 'array' and 'large array' varied across the two survey iterations.

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<sup>2</sup> Rose, D.; Freeman, M. (2019). MRE Regulator Survey Report: United Kingdom. <https://tethys.pnnl.gov/publications/mre-regulator-survey-report-united-kingdom>

Understanding regulators' needs and challenges over time helps address key barriers to the advancement of the MRE industry. By identifying these evolving needs, information and tools can be developed that are relevant in various contexts.

## Appendix A

#	Question	Potential Choices
1	What level of government does your organization represent?	<ul style="list-style-type: none"> <li>- National</li> <li>- County</li> <li>- Local</li> <li>- Other (please specify)</li> </ul>
2	What country do you work in?	<ul style="list-style-type: none"> <li>- Text box</li> </ul>
3	How many MRE (wave, tidal, current, thermal or salinity gradient) projects are currently planned, consented or operational in your jurisdiction?	<ul style="list-style-type: none"> <li>- 0</li> <li>- 1-5</li> <li>- 6-10</li> <li>- &gt;10</li> </ul>
4	Please indicate your organization's focus for consenting MRE projects. Check all that apply.	<ul style="list-style-type: none"> <li>- Water quality</li> <li>- Marine mammals</li> <li>- Fish/fisheries</li> <li>- Other animals</li> <li>- Seabed and habitat</li> <li>- Oceanographic systems</li> <li>- Energy production</li> <li>- Social and economic aspects</li> <li>- Other (please specify)</li> </ul>
5	Please indicate your role in consenting MRE projects. Check all that apply.	<ul style="list-style-type: none"> <li>- Issue licences/consents</li> <li>- Manage licenses/consents during operational phase</li> <li>- Advise regulators or provide consultations</li> <li>- Review/advise on applications for licenses/consents</li> <li>- Advise policy-level decisions in your organization</li> <li>- Subject matter expert</li> <li>- Other (please specify)</li> </ul>
6	How long have you held a position related to the consenting process for MRE projects?	<ul style="list-style-type: none"> <li>- Less than 1 year</li> <li>- 1-2 years</li> <li>- 3-5 years</li> <li>- &gt;5 years</li> </ul>
7	Have you directly participated in the regulatory process for an MRE project?	<ul style="list-style-type: none"> <li>- Consenting</li> <li>- Management of an operational project</li> <li>- Decommissioning</li> <li>- No</li> </ul>

8	<p>How familiar are you with the following MRE technologies on a scale of 1 (not familiar) to 5 (very familiar)? For more information on these technologies, see <a href="https://openei.org/wiki/PRIMRE/Basics">https://openei.org/wiki/PRIMRE/Basics</a>.</p>	<ul style="list-style-type: none"> <li>- Ocean current energy</li> <li>- Tidal energy</li> <li>- Wave energy</li> <li>- Ocean thermal gradient conversion (OTEC)</li> <li>- Salinity gradient</li> <li>- Riverine energy</li> </ul>
9	<p>How challenging are the following MRE environmental effects when consenting <b>small arrays (1-6 devices)</b>? Rank the below options from 1 (most challenging) to 7 (least challenging).</p>	<ul style="list-style-type: none"> <li>- Effects of electromagnetic field emissions from underwater cables and other electrical infrastructure on marine animals</li> <li>- Attraction, avoidance, or displacement of marine animals</li> <li>- Changes to habitats</li> <li>- Effects of underwater noise from devices on marine animals</li> <li>- Risk of marine animals colliding with turbine blades</li> <li>- Changes in oceanographic systems (e.g., energy removal, sediment transport, etc.)</li> <li>- Entanglement of large marine animals with mooring lines and underwater cables</li> </ul>
10	<p>Based on your top-ranked response from Question 19, how strongly do you agree or disagree with the following statements for <b>small arrays (1-6 devices)</b>?</p>	<ul style="list-style-type: none"> <li>- Additional research/studies are needed to better understand the likely risk</li> <li>- Field data are needed to determine the risk and uncertainty of an MRE project</li> <li>- Validated numerical models are needed for environmental consenting</li> <li>- Organization/policy guidance is needed to interpret potential environmental risk and manage uncertainty</li> <li>- Regulators/advisors need to be knowledgeable and trained on MRE technologies, environmental interactions, etc.</li> <li>- Additional monitoring methods, instruments, etc. are needed to document environmental interactions</li> </ul>
11	<p>How challenging are the following MRE environmental effects when consenting <b>large arrays (greater than 6 devices)</b>? Rank the below options from 1 (most challenging) to 9 (least challenging).</p>	<ul style="list-style-type: none"> <li>- Effects of electromagnetic field emissions from underwater cables and other electrical infrastructure on marine animals</li> <li>- Attraction, avoidance, or displacement of marine animals</li> <li>- Changes to habitats</li> <li>- Effects of underwater noise from devices on marine animals</li> <li>- Risk of marine animals colliding with turbine blades</li> <li>- Changes in oceanographic systems (e.g., energy removal, sediment transport, etc.)</li> <li>- Entanglement of large marine animals with mooring lines and underwater cables</li> <li>- Cumulative effects with other anthropogenic activities/marine developments, including other MRE projects</li> <li>- Ecosystem-wide effects</li> </ul>
12	<p>Based on your top-ranked response from Question 11, how strongly do you agree or disagree with the following statements for <b>large arrays (greater than 6 devices)</b>?</p>	<ul style="list-style-type: none"> <li>- Additional research/studies are needed to better understand the likely risk</li> <li>- Field data are needed to determine the risk and uncertainty of an MRE project</li> <li>- Validated numerical models are needed for environmental consenting</li> </ul>

		<ul style="list-style-type: none"> <li>- Organization/policy guidance is needed to interpret potential environmental risk and manage uncertainty</li> <li>- Regulators/advisors need to be knowledgeable and trained on technologies, environmental interactions, etc.</li> <li>- Additional monitoring methods, instruments, etc. are needed to document environmental interactions</li> </ul>
13	Do any of the following statements describe a barrier to consenting for you or your organization regarding environmental effects of MRE projects? Select all that apply.	<ul style="list-style-type: none"> <li>- Insufficient guidance for managing environmental risks</li> <li>- Limited availability of research or environmental monitoring data</li> <li>- Inadequate technical knowledge of MRE devices</li> <li>- Lack of expertise and/or access to subject matter experts</li> <li>- Difficulty accessing information/data from other MRE projects or jurisdictions/locations</li> <li>- Scientific uncertainty regarding environmental effect</li> <li>- Low social acceptance or public opposition to MRE projects</li> </ul>
14	Can environmental data collected at other locations be used to inform consenting processes for proposed MRE developments within your jurisdiction?	<ul style="list-style-type: none"> <li>- Never</li> <li>- Maybe</li> <li>- Absolutely</li> <li>- Comment box: Please explain your answer.</li> </ul>
15	Risk retirement is a process by which available data and information are examined to identify environmental effects that are unlikely to cause significant effects on marine habitats, animals, or ecosystem processes. These effects can therefore be retired and may not require extensive investigation for each new MRE project. Can any of the following potential risks be retired for <b>small arrays (1-6 devices)</b> in your jurisdiction? (Strongly disagree, disagree, neutral, agree, strongly agree)	<ul style="list-style-type: none"> <li>- Effects of electromagnetic field emissions from underwater cables or other electrical infrastructure on marine animals</li> <li>- Changes to habitats</li> <li>- Attraction, avoidance, and displacement of marine animals</li> <li>- Effects of underwater noise from devices on marine animals</li> <li>- Risk of marine animals colliding with turbine blades</li> <li>- Changes in oceanographic systems (e.g., energy removal, sediment transport, etc.)</li> <li>- Entanglement of large marine animals with mooring lines and underwater cables</li> <li>- Comment box: For environmental effects that cannot be retired, please explain</li> </ul>
16	Which of the following approaches best describes your strategy for managing environmental risks and uncertainties during the consenting process when moving from small arrays (1-6 devices) to large arrays (greater than 6 devices)? (Choose one)	<ul style="list-style-type: none"> <li>- Precautionary principle. Potential environmental risks should be avoided through preventative measures and consideration of alternatives to avoid unacceptable impact, particularly when there is scientific uncertainty. Project proponents are responsible for proving that a risk will not cause irreversible environmental harm.</li> <li>- Mitigation hierarchy. Potential environmental risks should be systematically limited by taking actions to avoid, minimize, mitigate and/or compensate for risks through siting and/or mitigation measures.</li> <li>- Adaptive management. Potential environmental risks and scientific uncertainty can be managed through a flexible, learning-based approach that includes adapting monitoring and mitigation over time to understand risks, decrease uncertainty, and mitigate impacts.</li> <li>- Survey, deploy, monitor. Potential environmental risk level should be identified through surveys or available data at a proposed project site. If low risk, consenting may be fast-tracked. If high risk, the project may require additional surveys. Surveys and post-deployment monitoring</li> </ul>

		<p>should be based on a risk-based approach and proportionate to the project scale.</p> <ul style="list-style-type: none"> <li>- Comment box: Please explain your answer or note a different approach used.</li> </ul>
17	MRE devices are being designed for uses other than supplying electricity to the national grid. These systems are likely to consist of fewer and/or smaller-scale devices, to provide power to remote, coastal, or island communities or at-sea applications such as aquaculture, ocean observations, and navigation. Would the consenting process for these smaller MRE projects differ from national grid scale projects in your jurisdiction?	<ul style="list-style-type: none"> <li>- Open comment box</li> </ul>
18	Tethys ( <a href="https://tethys.pnnl.gov/">https://tethys.pnnl.gov/</a> ) is an online knowledge hub with information and resources on the environmental effects of MRE. Have you heard of Tethys?	<ul style="list-style-type: none"> <li>- Yes</li> <li>- No</li> </ul>
19	After learning about Tethys, is it likely that you will explore it further?	<ul style="list-style-type: none"> <li>- Yes</li> <li>- No</li> <li>- Maybe</li> </ul>
20	Do you find Tethys useful?	<ul style="list-style-type: none"> <li>- Not useful</li> <li>- Somewhat useful</li> <li>- Very useful</li> </ul>
21	How do you use Tethys? Indicate all that apply.	<ul style="list-style-type: none"> <li>- To find papers and reports on environmental effects of MRE</li> <li>- To view live or archived webinars and expert forums</li> <li>- To receive the Tethys Blast newsletter</li> <li>- To find project information (e.g., OES-Environmental metadata)</li> <li>- To use tools and resources (e.g., data discoverability matrix, management measures tool, etc.)</li> <li>- Other (please specify)</li> </ul>
22	What resources or methods do you use to find information on the environmental effects of MRE and support consenting? (check all that apply)	<ul style="list-style-type: none"> <li>- Other regulators/colleagues</li> <li>- MRE project developers</li> <li>- Conferences/workshops</li> <li>- Newsletters</li> <li>- Scientific journals</li> <li>- Government organization reports</li> <li>- Tethys</li> <li>- Other (please specify)</li> </ul>