

# MRE Regulator Survey: *UNITED KINGDOM*



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## Introduction

As marine renewable energy (MRE) is still a new industry, there are many unknowns about the potential environmental effects of MRE deployments. These concerns are largely based in the uncertainty of how wave and tidal devices interact with the environment, or how marine animals behave around devices. This uncertainty makes consenting processes for MRE projects difficult, often requiring extensive monitoring and data collection. This cautious approach may limit the implementation of MRE technologies or create financial barriers to development.

To better understand the viewpoint of regulators involved in consenting MRE devices, a survey was conducted among multiple OES Environmental countries. The survey was intended to understand the familiarity of regulators with MRE technologies, their perceptions of environmental risk, and their recommendations on best approaches to MRE development, including consenting and the potential for data transferability. The survey also included some questions to gather *Tethys* user data. This report summarizes the results from the survey of regulators in the United Kingdom (UK).

## Participants

Email invitations to complete the 2018 Survey on Regulatory Needs for the Environmental Effects of Consenting Marine Energy in the UK were sent to 19 individuals known to be involved in consenting MRE. Out of 9 total responses received, only 7 responses were retained for analysis due to a significant portion of incomplete data in 2 of the responses.

Figure 1 shows the distribution of participants by the jurisdiction they self-identified as representing ( $n = 7$ ). All respondents ( $n = 7$ ) have directly participated in environmental consenting and licensing of an MRE project.

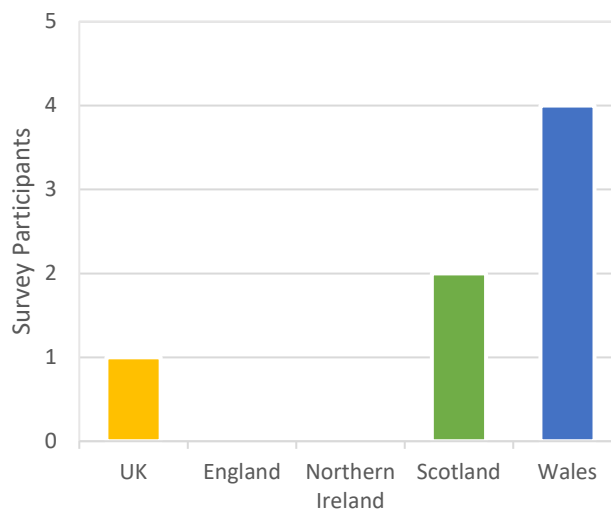


Figure 1. Jurisdiction of survey participants. ( $n = 7$ )

Participants were also asked to indicate their own role in consenting MRE developments and the top focus of their agency. These results are summarized in Figure 2 and Figure 3, respectively. Most participants (5 out of 7) are directly involved with consenting and licensing (Figure 2). The top priorities for the agencies represented were marine mammals, fish ecology, marine ornithology, physical processes, coastal ecology, and benthic ecology (Figure 3).

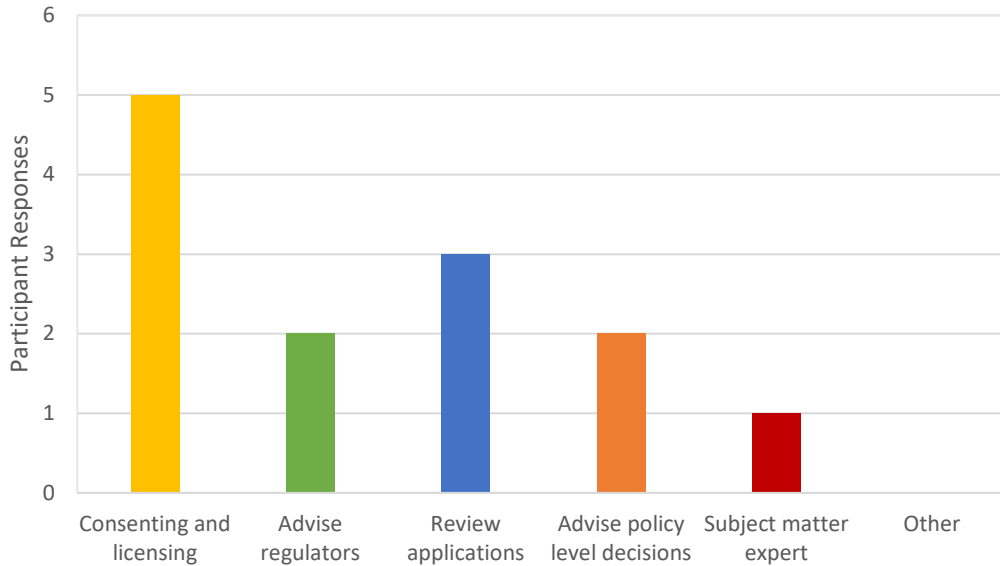


Figure 2. Individual role in marine energy project consenting. (n = 7)

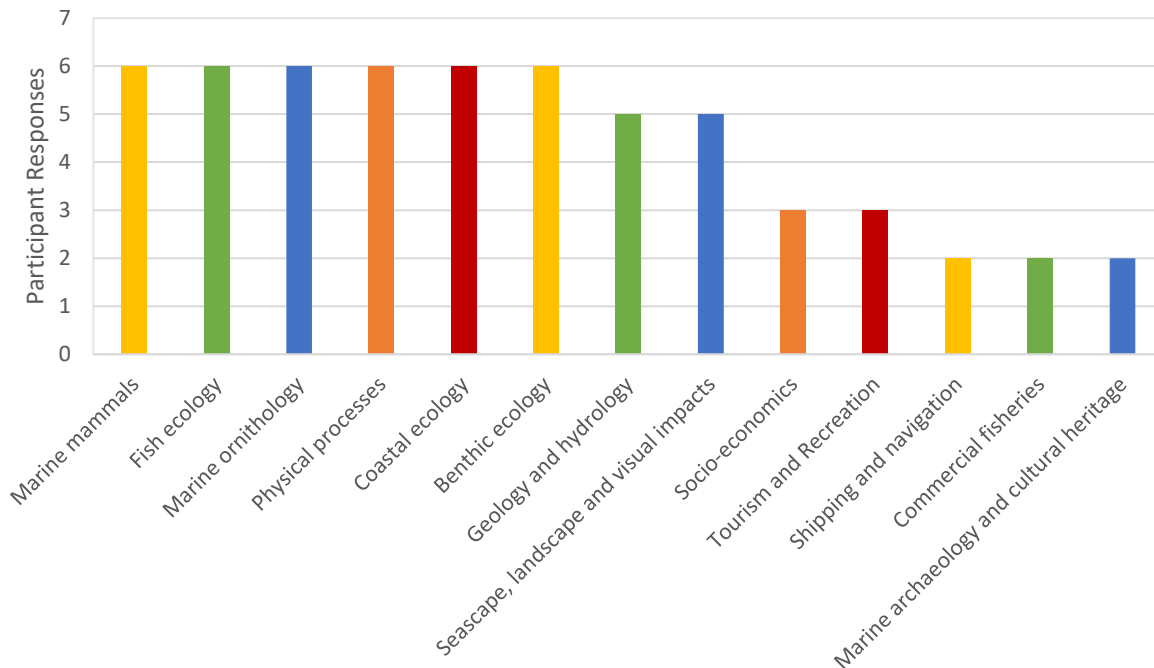


Figure 2. Agency top focus in consenting marine energy projects. (n = 6)

## Familiarity with MRE Technologies

Regulators were asked to rate their familiarity with tidal energy and wave energy technologies on a scale of 1 (not familiar) to 5 (very familiar). They were provided with explanations of all of the terms presented from <http://www.emec.org.uk/marine-energy/tidal-devices/> for tidal devices and <http://www.emec.org.uk/marine-energy/wave-devices/> for wave devices. The results are presented in Figure 4.

Most regulators consider themselves at least somewhat familiar with all the technologies, although they are less familiar with wave technologies than tidal, and rotating mass is the least familiar technology (n = 7) (Figure 4).

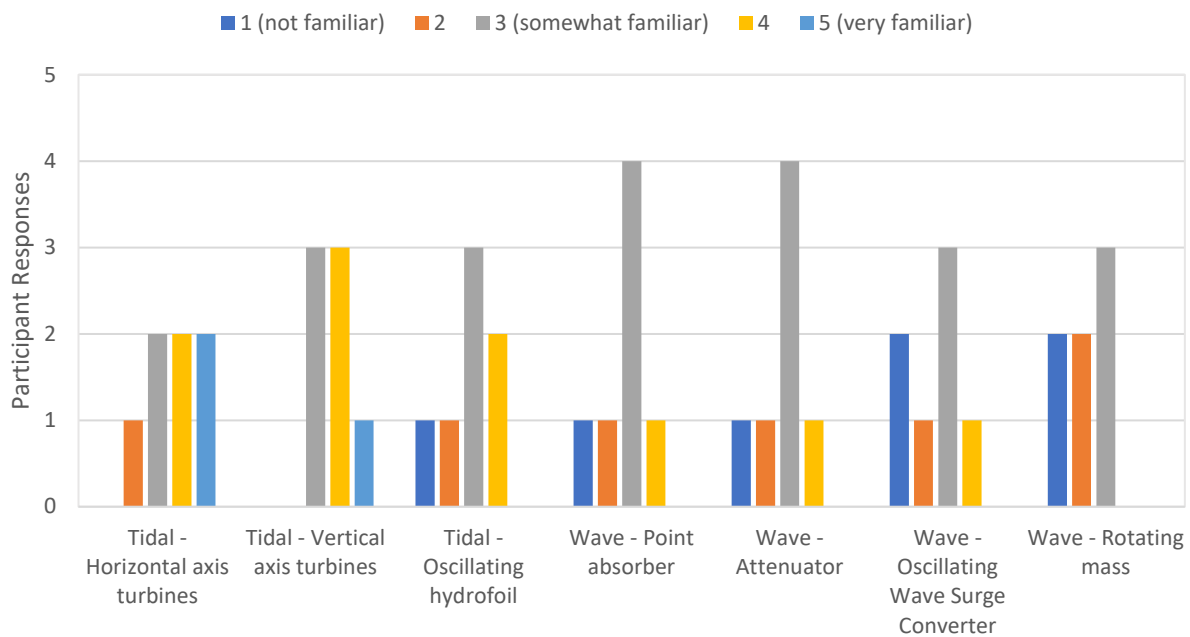


Figure 3. Familiarity with wave and tidal energy technologies. (n = 7)

## Top Challenges and Perceptions

Regulators were asked to rank the following challenges from 1 (most important) to 7 (least important) for consenting projects with single marine energy devices and for arrays.

- Chemical releases and water quality degradation
- Electromagnetic field (EMF) effect on animals
- Benthic/habitat disturbance
- Risk of animals colliding with tidal energy converters
- Risk of animals colliding with wave energy converters
- Effects of underwater sound emissions from devices on animals
- Avoidance, attraction, and/or displacement of animals

- Energy removal and effects of changes in flow on the ecosystem
- Entanglement of animals with lines and cables of tidal energy converters
- Entanglement of animals with lines and cables of wave energy converters

The average ranking of each challenge was calculated by Survey Monkey, such that the answer choice with the largest average ranking is the top challenge.<sup>1</sup>

### Single Device

The results for **single devices** are shown in Figure 5 (n = 6). The top 2 challenges of regulators in the UK for a single device are collision with tidal energy devices and avoidance, attraction, or displacement of marine animals.

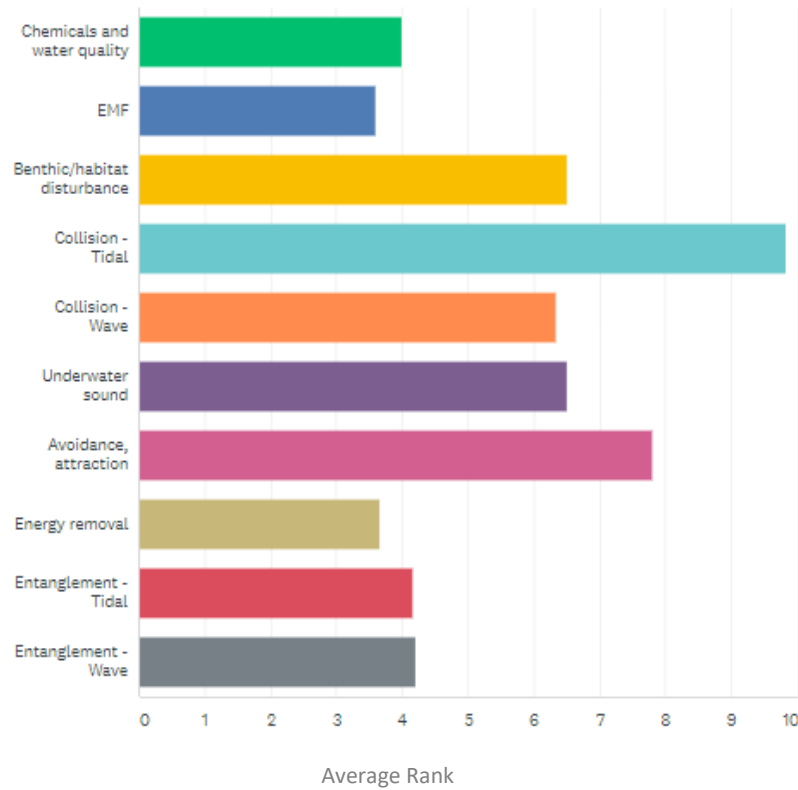


Figure 4. Ranking of challenges to consenting **single devices**. (n = 6)

<sup>1</sup> Method used to calculate average rank uses the equation below, where w is the weight of the ranked position and x is the response count for each answer choice.

$$\frac{x_1w_1 + x_2w_2 + x_3w_3 \dots x_nw_n}{Total\ Response\ Count\ (n)}$$

Regulators were also asked to respond to several statements about consenting for **single devices** with respect to their top ranked challenge.

1. More field data are needed to determine risks and reduce uncertainty of marine energy projects.
2. Numerical models play an important role in environmental consenting.
3. Guidance is needed to interpret risk and uncertainty
4. Regulators, advisors and stakeholders need to be knowledgeable and trained on technologies, projects, interactions, etc.

The results of this question are summarized in the heat map below (Table 1). All participants were either neutral or in agreement (agreed or strongly agreed) with all statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<b>1. More field data</b>	0	0	0	3	3
<b>2. Numerical models</b>	0	0	2	4	0
<b>3. Guidance</b>	0	0	1	2	3
<b>4. Training</b>	0	0	0	3	3

Table 1. Regulator perceptions of *single device* statements. (n = 6)

### Arrays

The results for device **arrays** are shown in Figure 6 (n = 6). The ranking of top challenges changes slightly with arrays, though collision with tidal energy devices remains the top concern. The second ranked challenge for arrays is underwater sound.

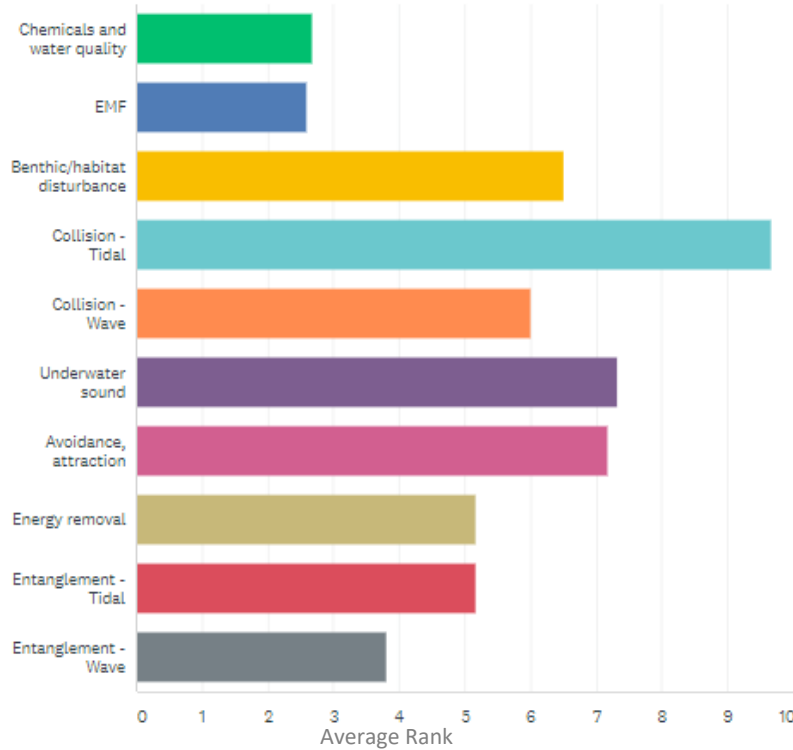


Figure 5. Ranking of challenges to consenting arrays. (n = 6)

Regulators were also asked to respond to the same statements as previously, but this time about consenting for an **array** of devices with respect to their top ranked challenge.

1. More field data are needed to determine risks and reduce uncertainty of marine energy projects.
2. Numerical models play an important role in environmental consenting.
3. Guidance is needed to interpret risk and uncertainty
4. Regulators, advisors and stakeholders need to be knowledgeable and trained on technologies, projects, interactions, etc.

The results of this question are summarized in the heat map below (Table 2). All participants were either neutral or in agreement (agreed or strongly agreed) with all statements (n = 6). More participants support the statement about numerical models for arrays, while the responses for field data, guidance, and training remain approximately the same.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<b>1. More field data</b>	0	0	0	3	3
<b>2. Numerical models</b>	0	0	1	2	3
<b>3. Guidance</b>	0	0	0	3	3
<b>4. Training</b>	0	0	0	5	1

Table 2. Regulator perceptions of device array statements. (n = 6)



## Data Transferability

Regulators were asked to respond to the question: “Can data be collected from other locations be applied towards consenting and licensing marine energy projects within your jurisdiction?” Participants were given the option of ‘Never’, ‘Maybe’, and ‘Absolutely’. All participants that answered this question (n = 6) stated ‘Maybe’.

Additional comments left in response to this question include:

- “It depends on the device type and the applicability of the data collected”
- “Dependent on the comparability with the receiving environment”
- “Data would need to be transferable and suitable for that technology type and the receiving environment. Does not negate the need for site specific data collection on key receptors and interpretation of data to reduce scientific uncertainties.”

## Best Approach to MRE Development

Regulators were asked, “Which of the following approaches best describes your vision of how the MRE industry should develop? (Choose one)”. The options, as provided to regulators in the survey, are as listed below:

- *Precautionary Principle*: There is a high degree of uncertainty and potentially negative outcomes associated with marine energy project deployment and operation. Measures should be taken to avoid the negative outcome by proceeding very cautiously or not pursuing projects at all.
- *Mitigation Hierarchy*: Impacts or risks should be systematically limited by taking actions to avoid, minimize, mitigate and/or compensate for risks through siting and/or mitigation measures.
- *Phased Approach*: A small number of devices should be deployed first, followed by slowly ramping up to larger array scale after potential risks are better understood and managed.
- *Adaptive Management*: A learning-based management approach should be applied that includes adapting monitoring and mitigation over time to understand risks, decrease uncertainty, and mitigate for impacts.
- *Survey, Deploy, Monitor*: Enables a strategic adaptive management approach through demonstration that decision making regarding pre-consent survey effort/design is risk-based and proportionate.
- *Just do it*: Risks to the marine environment are almost certainly low, so projects should be able to move forward.

Results from this question are described in Figure 7. An adaptive management approach is favored for both wave and tidal energy development, though there is more diversity in the secondary options for wave energy.

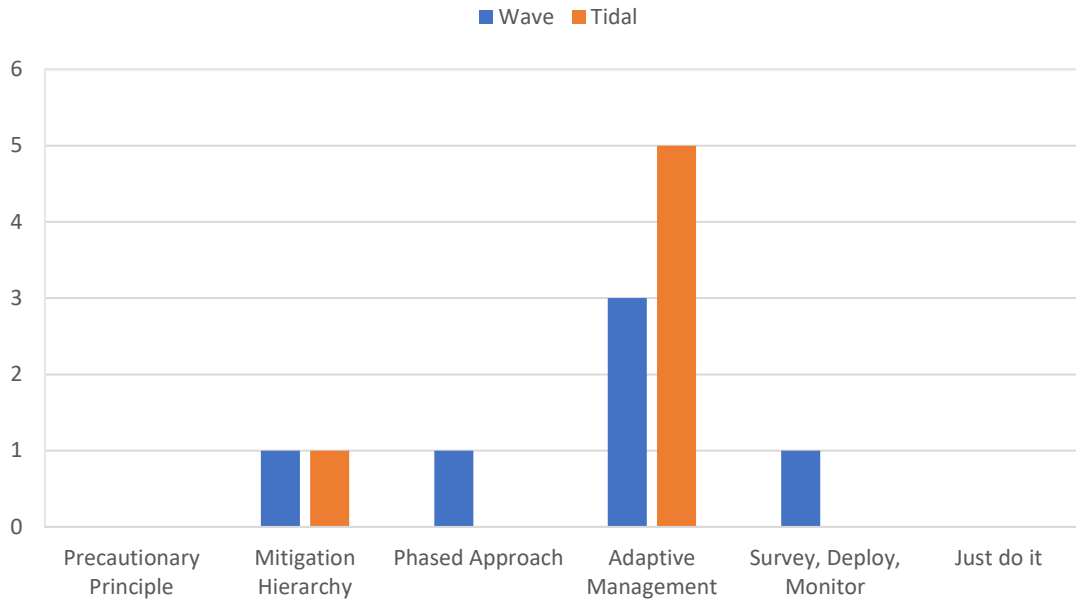


Figure 6. Regulator perspectives on management approaches. (n = 6)

### Use of *Tethys*

In addition to questions about consenting of MRE devices, regulators were asked about their awareness and use of the *Tethys* database. The results are summarized below in Figures 8, 9, and 10.

#### Awareness

Most participants (5 out of 6) are aware of *Tethys* and have been using it for more than a year.

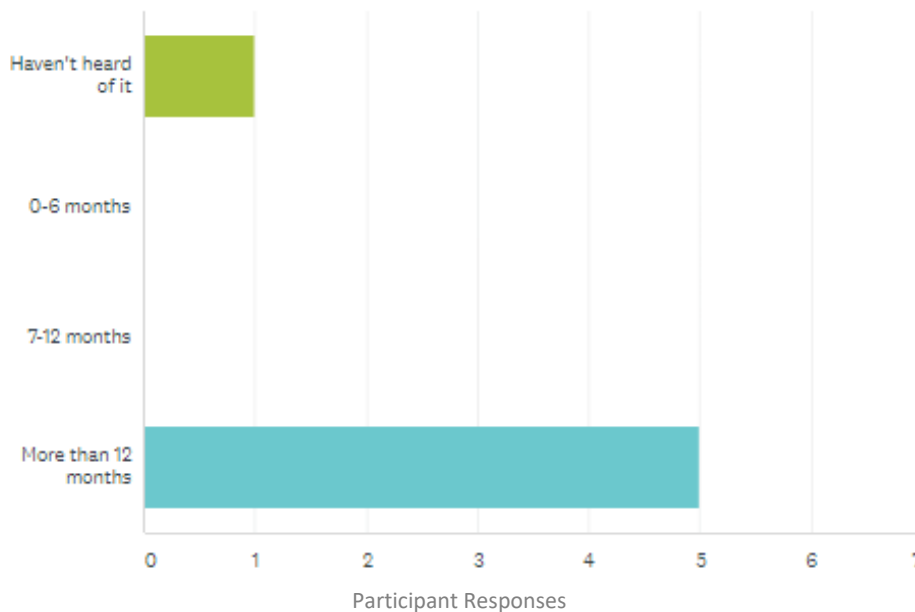


Figure 7. How long have you been aware of *Tethys*? (n = 6)

## Purpose

Respondents were asked to indicate how they use *Tethys* by indicating all uses that apply from the following list:

- To find papers and reports on marine energy environmental issues
- To learn more about environmental effects of the marine energy industry
- To participate in webinars and expert forums
- To review archived webinars and expert forums
- To receive the *Tethys Blast* newsletter
- To search the *Tethys* event calendar

The responses are summarized in Figure 10.

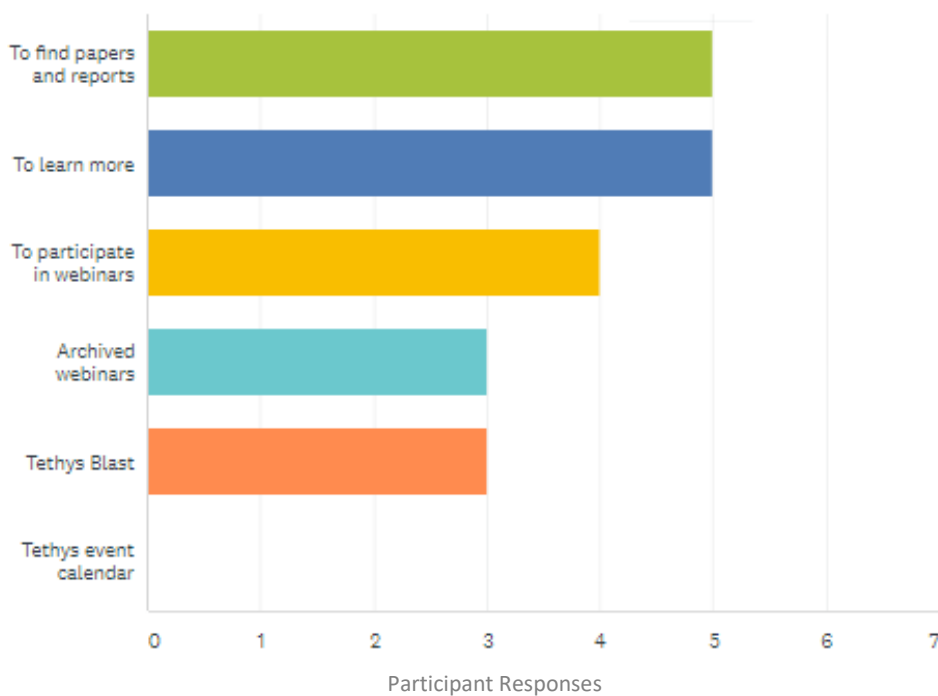


Figure 8. How do you use *Tethys*? (n = 6)

Most participants use *Tethys* to find papers and reports and learn more about the environmental effects of marine energy devices. Over half have participated in a webinar or viewed an archived webinar, and half receive *Tethys Blasts*. None of the participants use the *Tethys* event calendar.

## Usefulness

Of those who responded (n = 5), all participants consider *Tethys* to be at least moderately useful (Figure 11).

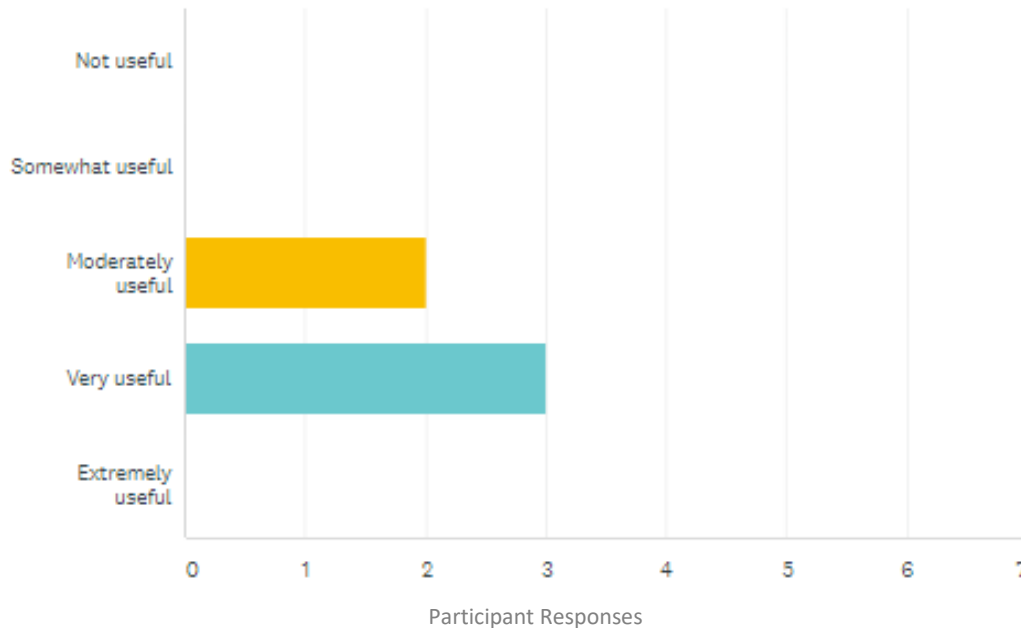


Figure 9. How useful is *Tethys* for providing information on the environmental effects of marine energy projects? (n=5)

## Conclusion

The UK regulators that participated in this survey have experience consenting MRE and are most familiar with tidal devices. The agencies they represent focus on the effects to marine mammals, fish, birds, and ecology with less focus on economic or social effects. Their main concerns in consenting MRE developments, for both single devices and arrays, are centered around collision with tidal devices. In general, regulators are open to transferring data to consent projects, but note that it depends on the applicability of the data to the specific site. Most of them prefer an adaptive management approach for both tidal and wave projects as a means to move the MRE industry forward from a consenting perspective.

Regarding *Tethys* use, most regulators have been using *Tethys* for a while to gather information about environmental effects and have found it moderately to very useful. Going forward, the use of *Tethys* as a platform for additional webinars and trainings seems useful and likely to be successful for regulators in the UK.