

Management Measures Tool for Marine Renewable Energy – Instructions

The [Management Measures Tool for Marine Renewable Energy](#) is a searchable online tool which presents management measures that have been used for current and previous marine renewable energy (MRE) projects. This document describes instructions for using the Management Measures Tool and additional information that can be found by downloading the tool contents. Management measures, or mitigation measures, are measures to be applied throughout the MRE development process to address and decrease or remove potential impacts from a project. Within the tool they are categorized as those pertaining to compliance, a design feature, mitigation, or monitoring.

For each management measure, the tool includes the following information:

- **Technology**, the type of device.
- **Project Phase**, the phase in which the management measure occurs in.
- **Stressor**, the parts of a device, result of a device's functioning, or interaction with the device (also called stressor-receptor interactions) that may cause harm or stress to a marine animal, habitat, or ecosystem process.¹
- **Receptor**, the marine animals, habitats, and ecosystems processes that may be affected by stressors.
- **Implications of Measure**, description of any changes that may occur in response to the management measure being in place.
- **Advantages**, positive effects that could occur due to management measure being in place.
- **Challenges**, undesirable effects that could occur due to management measure being in place.
- **Project Documents**, reference documents with more details on the management measure and links to [metadata](#) with more information on the MRE project.

Technology	Project Phase	Stressor	Receptor	Management Measure	Implications of Measure	Advantages	Challenges	Project Documents
Wave	Operation & Maintenance	Dissipation of wave energy The potential wider or secondary effects on protected or sensitive sub-littoral seabed due to removal or alteration of energy flow arising from devices and moorings or support structures.	Benthic Benthic invertebrates	Monitoring Benthic and intertidal surveys focused on indicator species, species assemblage, community structure and ecosystem function.	Would result in a reduction of scientific uncertainty around the interaction, however determining impacts against natural variability may be difficult.	Reduce scientific uncertainty	Determining impacts against natural variability may be difficult.	European Marine Energy Centre (EMEC) 2019 , European Marine Energy Centre (EMEC) 2011 , Xodus Group 2012 , McGrath 2013 , The Marine Institute 2016
Wave, Tidal	Operation & Maintenance	Habitat creation The introduction of infrastructure and artificial substrates will provide habitat and artificial refuges.	Benthic All receptors	Monitoring Monitor near-field behaviours.	Informs understanding of potential positive impacts from colonization and use of the project infrastructure which could benefit future project applications, however there is a cost implication associated with monitoring.	Reduces scientific uncertainty around collision risk, displacement and other impacts. Increased value/fecundity of commercially important species.	This type of monitoring can be expensive and difficult to deliver in practice. May require additional licensing (e.g. echosounders).	Foubister 2005 , Magallanes Renovables 2020 , Orbital Marine Power 2018

¹ For stressors, receptors, and management measures, bold text shown in the tool indicates general categories with text below providing more specific information.

At the top of the tool there are a series of filters with drop-down options to help narrow down your search. These filters include technology, management measure, project phase, stressor, and receptor. Clicking the down arrow (circled below in red) opens the drop-down options to allow you to search for more specific information throughout the tool. There is also an open search box to type in specific text to search. The search returns results that match all words in any of the displayed fields, so it is advised to limit searches to several words or small phrases.

Filter by Technology: - Any - 	Management Measure: - Any - 	Project Phase: - Any - 	Stressor: - Any - 
Receptor: - Any - 	Search: <input type="text"/>		

The online tool shows the main information available for each management measure, however additional information is available by downloading the excel file as shown in the image below. The download file includes comments from stakeholders on

- **Past experience**, any comment on previous history or past experience with the management measure.
- **Cost of management measures**, high-level identification (low/medium/high) of costs incurred.
- **When a management measure is needed**, description of specific times when a particular management measure is needed (e.g., when sensitive species are at a site).



Home » Content » Management Measures Tool for Marine Energy

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Accessing Management Measures that Support Deployment of Wave and Tidal Energy Devices

As the marine renewable energy (MRE) industry moves beyond deployment of individual wave and tidal energy devices towards arrays, certain risks of MRE devices on the marine environment are not well understood and have led to onerous monitoring requirements placed on device developers. In consultation with the research and regulatory communities, it was agreed that applying a set of robust management measures could act as safeguards for marine animals and habitats until available monitoring data allows for determining the level of risk from MRE devices. At that point, measures could be dialed back or removed, if warranted.

A workshop was held in May 2017 with researchers, regulators, and developers to create the basis for the tool shown here. More information on the workshop and input for the tool can be found [here](#).

In addition to the searchable tool below, the information below can be [downloaded here](#). The download file includes additional details not shown below, including comments from stakeholders on past experience, cost of management measures, and when a management measure is needed.

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Displaying 1 - 100 of 532 management measures

Filter by Technology: Tidal 	Management Measure: - Any - 	Project Phase: - Any - 	Stressor: - Any - 	Receptor: - Any - 
Search: <input type="text"/>				