

Identifying pilot Highly Protected Marine Areas in English waters: Ecological principles and criteria guidance note

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Executive summary

In June 2020, the UK government-sponsored [Benyon Review](#) recommended the introduction of a number of pilot Highly Protected Marine Areas (HPMAs). In June 2021, UK Government accepted the majority of the recommendations set out in the Benyon Review and [made a commitment](#) to identify and designate pilot HPMAs as a complement to the existing MPA network in English waters, with designation set to take place in 2022.

HPMAs are intended to be areas of the sea set aside for the protection and recovery of marine ecosystems. They will prohibit extractive, destructive, and depositional uses, allowing only non-damaging levels of other activities to the extent permitted by international law. By setting aside some areas of sea with high levels of protection, HPMAs will allow nature to recover to a more natural state, allowing the ecosystem to thrive in the absence of damaging activities.

Government will identify pilot HPMAs, based on ecological, social and economic criteria, to select locations that provide the maximum biodiversity benefits while seeking to minimise impacts on sea users. The first step in the process is to develop and apply ecological criteria to a long list of potential locations for pilot HPMAs, followed by application of socio-economic criteria. The purpose of this document is to set out how we will identify pilot HPMAs based on ecological principles and criteria.

As part of the start of the process, Natural England and JNCC have established a mechanism for third-parties to propose locations on ecological grounds they would like to be considered as pilot HPMAs. To support this, we have produced a [third-party proposals guidance document](#) and associated [submissions template](#). The deadline for submissions is 31st August.

JNCC and Natural England will consider the ecological merit of any third-party proposal submissions alongside our own identified locations. We will do this by using the evidence standards set out in this guidance document. We will then recommend a list of locations, based on ecological criteria, to Defra who will work with the Marine Management Organisation and the Association of Inshore Fisheries and Conservation Authorities to apply socio-economic criteria.

This document complements a wider suite of forthcoming guidance that will provide a comprehensive overview of the process and will be available via the [HPMA webpage](#).

1. Background

- 1.1. In June 2021, UK Government [made a commitment](#) to identify and designate pilot Highly Protected Marine Areas (HPMAs) as a complement to the existing MPA network in English waters.
- 1.2. The purpose of this document is to set out how pilot HPMAs will be identified based on ecological criteria, developed by Defra's Statutory Nature Conservation Bodies (SNCBs), and building upon the ecological principles set out in the [Benyon Review](#).
- 1.3. The Joint Nature Conservation Committee (JNCC) and Natural England, with support from the Centre for Environment, Fisheries and Aquaculture Science (Cefas), will take the leading role at the start of the HPMa pilot process in applying the ecological principles and criteria to identify locations that will be considered as potential pilot HPMAs.
- 1.4. It will then be for Defra, in collaboration with the Marine Management Organisation and the Association of Inshore Fisheries and Conservation Authorities, to apply socio-economic criteria to refine a shortlist of potential pilot HPMAs that will be the subject of public consultation in 2022.
- 1.5. The overarching process for identifying and recommending pilot HPMAs to Ministers is set out in Figure 1. This first guidance note focusses on application of the ecological principles and criteria only.
- 1.6. As part of the process to identify pilot HPMAs, there will be an opportunity for stakeholders to propose locations on ecological grounds for further consideration as pilot HPMAs. Further details are provided in Section 6 of this guidance note, with the accompanying [third-party proposals guidance document](#) and [submission template](#) provided on JNCC's website.
- 1.7. The work of JNCC and Natural England and submissions by third parties will be subject to the same assessment process. This is set out in the final column of [Table 2](#) of this guidance note.

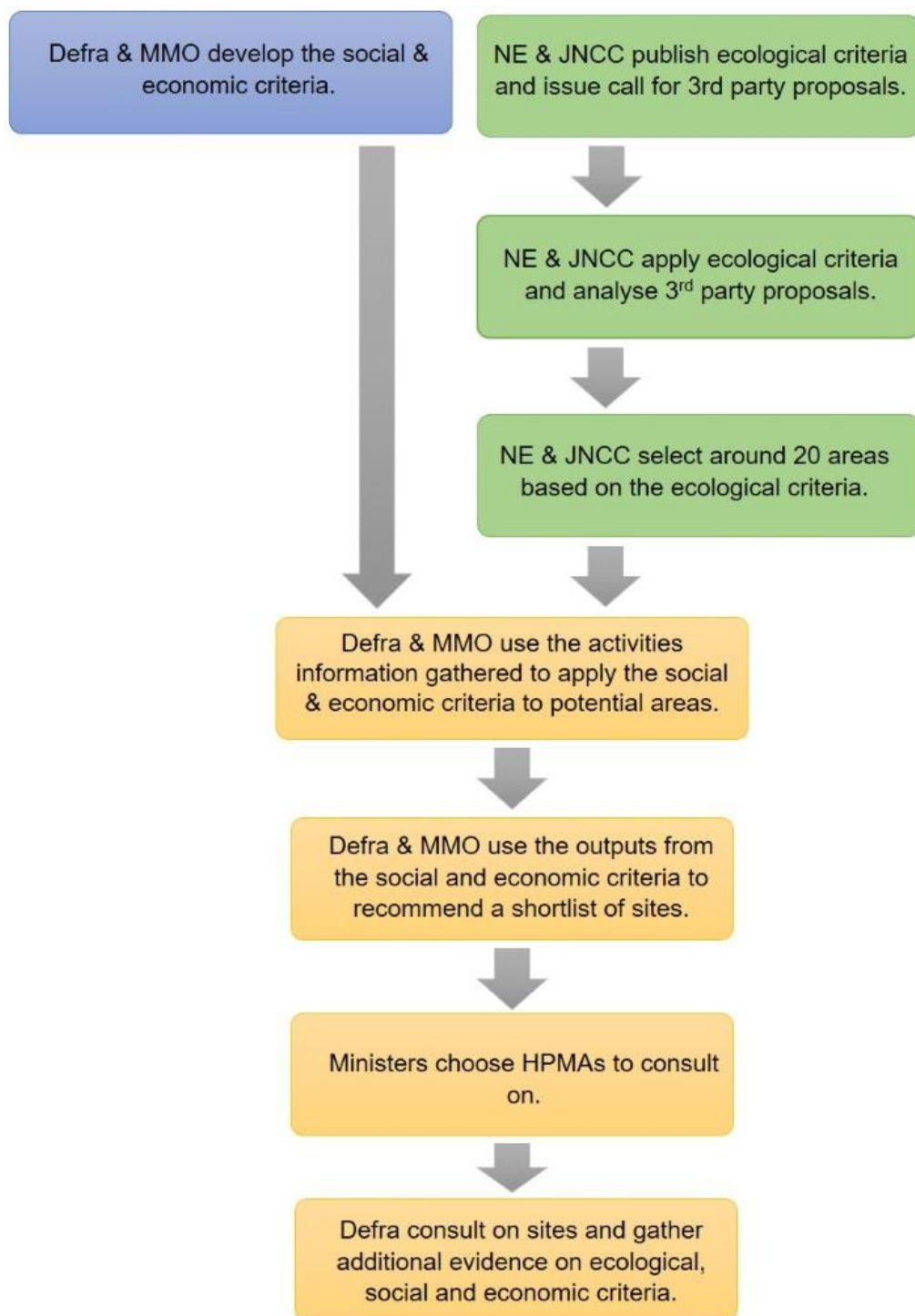


Figure 1 Overview of key stages in the pilot HPMA selection process to the point of public consultation.

2. Purpose and objectives of pilot HPMAs

- 2.1. The purpose of HPMAs is set out in the [Government response](#) to the [Benyon Review into HPMAs](#) and is that *HPMAs are for the protection and recovery of marine ecosystems*. In addition, Government has defined HPMAs as *areas of the sea that allow the protection and recovery of marine ecosystems by prohibiting extractive, destructive and depositional uses and allowing only non-damaging levels of other activities to the extent permitted by international law*.
- 2.2. To achieve the purpose set out above, JNCC and Natural England consider the key ecological objectives of HPMAs are:
- to enable recovery of marine ecosystems and enhance resilience, thus delivering direct biodiversity benefits both within and outside their boundaries;
 - to enhance understanding of how marine ecosystems recover and of recovery timescales; and
 - to help us understand how less impacted ecosystems exist and develop in the absence of damaging human activities.

3. Ecological principles for the selection of pilot HPMAs

- 3.1. The three ecological principles recommended by the Benyon Review will guide the selection of HPMAs:
- *Ecological importance*

The Benyon Review considered the structure and functioning of an ecosystem within an HPMA to be of key ecological importance. The Review concluded that application of this principle would ensure that decision makers recognise these essential structures and functions during an HPMA identification process.
 - *Naturalness, sensitivity and potential to recover*

The Benyon Review concluded that degradation of marine ecosystems occurs when the habitats and species they contain are more sensitive to the human pressures they are subject to (e.g. when cumulative impacts of damaging activities limit or prevent recovery). It highlighted that HPMAs can help us understand how ecosystems exist in the absence of damaging human activities, as well as increasing understanding of the process and timescales for recovery. This principle was proposed to enable identification of locations that demonstrate how recovery and/or change occurs in the absence of damaging human activities.
 - *Ecosystem services*

The Benyon Review recognised the valuable ecosystem services provided by the marine environment, such as the ability to provide resilience to climate change, shoreline protection, and food. The review recommended that the capacity to protect blue carbon habitats and other important ecosystem services should be an underlying principle for site selection.

4. Ecological criteria for the selection of pilot HPMAs

4.1. To assess the potential of a location to meet the ecological principles as set out in Section 3, Natural England and JNCC have developed ecological selection criteria (Table 1). These selection criteria will be used to assess a location against the ecological principles and result in the production of a shortlist of locations to which socio-economic criteria will then be applied.

Table 1 Ecological selection principles and criteria for pilot HPMAs

Ecological principle	Selection criteria
1 - Ecological importance	1a The location has, or has had, relatively higher levels of biological diversity. 1b The location is known to contain multiple species and / or habitats of national, regional or global importance, or of regional distinctiveness. 1c The location is of importance to the key life cycle stages and / or behaviours of marine species.
2 - Naturalness, sensitivity and potential to recover	2a The location represents a relatively natural ecosystem. 2b The location represents a relatively degraded ecosystem.
3 - Ecosystem services	3a The location includes habitats considered to be of importance to the long-term storage of carbon. 3b The location is of importance to the key life cycle stages of commercially important marine species. 3c The location includes, or supports, habitats that are important in the provision of flood / erosion protection.

4.2. The identification of locations for further consideration as pilot HPMAs will be based on the best-available evidence. Table 2 sets out what constitutes high, moderate and low-quality evidence in relation to each of the ecological criteria.

Table 2 Pilot HPMA ecological principles, criteria, and evidence assessment standards

Ecological principle	Criteria	Types of evidence sources available	Evidence assessment standards
<p>1 - Ecological importance</p>	<p>1a - The location has, or has had, relatively higher levels of biological diversity</p>	<p>Ground-truthed survey datasets, modelled data products</p>	<p>High – There is a significant body of reliable, empirically based evidence supporting the conclusion that the location currently contains, or has historical evidence of, relatively high levels of biological diversity (when considering the data in the context of the wider marine environment).</p> <p>This evidence is from more than one independent source of information with associated high levels of confidence (e.g. evidence derived from ground-truthed survey data). Evidence is ideally over a long time-series. There is also strong evidence that the location is, or has been, of ecological importance overall as a functional ecosystem.</p> <p>Moderate – There is some evidence that the location currently contains, or has historical evidence of, relatively high levels of biological diversity (when considering the data in the context of the wider marine environment).</p> <p>Evidence is based on one or more data sources, the reliability of which may be open to question due to e.g. shorter time span of data, lack of corroborative information, limited quality assurance and/or lower confidence in the analysis. The case that the location has relatively high levels of biodiversity is less compelling. For example, a range of habitat types are present within the area, however data limitations may exist. There may be some inferences that the location is of ecological importance overall.</p> <p>Low – There is limited evidence that the location currently contains, or has historical evidence of, relatively high levels of biological diversity (when considering the data in the context of the wider marine environment).</p> <p>Evidence is based only on a single data source, or expert judgement, or modelled data. Data sources may be of low/unknown quality, or low/unknown reliability, or represent a single point in time. The case that the location has</p>

Ecological principle	Criteria	Types of evidence sources available	Evidence assessment standards
			<p>relatively high levels of biological diversity is not compelling. There is limited evidence to suggest that the location is of ecological importance overall.</p> <p>Not met – Suitable evidence is not available to show that the location has, or had, relatively high biodiversity (when considering the data in the context of the wider marine environment), or the evidence is insufficient to allow such a conclusion to be reached. Evidence is not available to support the ecological importance of the location overall.</p>
<p>1 - Ecological importance</p>	<p>1b - The location is known to contain multiple species and / or habitats of national, regional or global importance, or of regional distinctiveness</p>	<p>Ground-truthed survey datasets, modelled data products</p>	<p>High – There is a significant body of reliable, empirically based evidence supporting the conclusion that the location contains multiple species and/or habitats of national, regional, or global importance or of regional distinctiveness, supported by multiple data records.</p> <p>This evidence is based on more than one high quality source of data, with high confidence derived from more than one independent source of information. Evidence is available over a long time-series. There is a strong case that the proposed location has species and/or habitats of national, regional, or global importance or of regional distinctiveness. For example, multiple types of species or habitats of importance are present.</p> <p>Moderate – There is some evidence that the location contains species and/or habitats of national, regional, or global importance or of regional distinctiveness.</p> <p>Evidence is based on one or more data sources, the reliability of which may be open to question due to e.g. shorter time span of data, lack of corroborative information, limited quality assurance and/or lower confidence in the analysis. The case that the location has species and/or habitats of global or national importance is less compelling. For example, only a limited number of species or habitats of importance are present.</p> <p>Low – There is limited evidence that the location contains species and/or habitats of national, regional, or global importance or of regional distinctiveness.</p>

Ecological principle	Criteria	Types of evidence sources available	Evidence assessment standards
			<p>Evidence is based only on a single data source, or expert judgement, or modelled data. Data sources may be of low/unknown quality, or low/unknown reliability, or are short-term and/or of greater age.</p> <p>Not met – There is no suitable evidence to show that the location contains species and/or habitats of national, regional, or global importance or of regional distinctiveness, or the evidence is insufficient to allow such a conclusion to be reached.</p>
<p>1 - Ecological importance</p>	<p>1c - The location is of importance to the key life cycle stages and / or behaviours of marine species</p>	<p>Types of evidence could include relevant reports, habitat or species information from survey datasets, modelled data products.</p>	<p>High – There is a significant body of reliable evidence supporting the conclusion that the proposed location is important for key life cycle stages and/or behaviours of a wide range of marine species.</p> <p>Evidence is ideally derived from more than one independent source of information with associated high levels of confidence. Evidence is available over a long time-series. There is a strong case that the proposed location is important for key life cycle stages and/or behaviours of marine species. For example, there is strong evidence that the proposed location is a nursery area or foraging ground for a suite of marine species.</p> <p>Moderate – There is some evidence supporting the conclusion that the location is important for key life cycle stages and/or behaviours of marine species.</p> <p>Evidence is based on one or more data sources, the reliability of which may be open to question due to e.g. shorter time span of data, lack of corroborative information, limited quality assurance and/or lower confidence in the analysis. The case that the proposed location is important for key life cycle stages and/or behaviours of marine species is less compelling. For example, strong evidence is limited to a single species or evidence on a wider range of species is less convincing.</p>

Ecological principle	Criteria	Types of evidence sources available	Evidence assessment standards
			<p>Low – There is limited evidence supporting the conclusion that the proposed location is important for key life cycle stages and/or behaviours of marine species.</p> <p>Evidence is based only on a single data source, or expert judgement, or modelled data. Data sources may be of low/unknown quality, or low/unknown reliability. The case that the proposed location is important for key life cycle stages and/or behaviours of marine species is not compelling. For example, evidence is based on a single source or low / unknown quality or reliability.</p> <p>Not met – There is no evidence to support the case that the proposed location is important for key life cycle stages and/or behaviours of marine species.</p>
<p>2 - Naturalness, sensitivity and potential to recover</p>	<p>2a - The location represents a relatively natural ecosystem.</p> <p>and/or</p> <p>2b - The location represents a relatively degraded ecosystem.</p>	<p>Recovery information (e.g. MarESA resilience scores), vulnerability assessments, presence of human activities/pressure, ground-truthed evidence of current condition of the location.</p>	<p>High – There is a significant body of reliable, empirically-based evidence supporting the conclusion that the location is either in a relatively natural state, and/or is relatively degraded (when considering the data in the context of the wider marine environment).</p> <p>For degraded locations, evidence shows that the habitats and/or species have the potential to recover, for example, evidence that the area had higher levels of biodiversity in the past, or a more complex ecosystem, or evidence showing signs of recovery. Evidence that habitats and/or species are sensitive to pressures from human activities is also acceptable. This evidence is based on more than one high quality source of data, with high confidence and ideally derived from more than one independent source of information. Evidence is available over a long time-series. There is a strong case that the location is either relatively natural and/or is relatively degraded, with the potential for recovery. For example, there are multiple pressures acting on a habitat, with ground-truthed data showing a degraded habitat condition, however the habitat has the potential to recover following the removal of pressures.</p>

Ecological principle	Criteria	Types of evidence sources available	Evidence assessment standards
			<p>Moderate – There is some evidence that the location is either in a relatively natural state and/or is relatively degraded (when considering the data in the context of the wider marine environment).</p> <p>For degraded locations, evidence shows that the habitats and/or species have the potential to recover. Evidence is based on one or more data sources, the reliability of which may be open to question due to e.g. shorter time span of data, lack of corroborative information, limited quality assurance and/or lower confidence in the analysis. The case that the location is either relatively natural or is relatively degraded, with the potential for recovery, is less compelling. For example, ground-truthed data shows a degraded habitat condition, however data may have confidence or age limitations.</p> <p>Low – There is limited evidence that the location is in a relatively natural state and/or is relatively degraded (when considering the data in the context of the wider marine environment).</p> <p>For degraded locations, evidence shows that the habitats and/or species have the potential to recover. Evidence is based only on a single data source, or expert judgement, or modelled data. Data sources may be of low/unknown quality, or low/unknown reliability, or are short-term. The case that the location is either relatively natural and/or is relatively degraded, with the potential for recovery, is not compelling. For example, there is no ground-truth data showing the habitat condition and evidence is based on a vulnerability assessment alone.</p> <p>Not met – There is no suitable evidence to show that the location is in a relatively natural state and/or is relatively degraded (when considering the data in the context of the wider marine environment).</p>
3 - Ecosystem services	3a - The location includes habitats considered to	Habitats considered to be of importance in the long-term storage of carbon include	High – There is a significant body of reliable evidence supporting the conclusion that the proposed location provides ecosystem benefits in the form of carbon storage.

Ecological principle	Criteria	Types of evidence sources available	Evidence assessment standards
	<p>be of importance to the long-term storage of carbon.</p>	<p>saltmarsh, intertidal mud, seagrass, kelp, subtidal mud and continental slopes.</p> <p>Types of evidence could include: habitat information from ground-truthed survey datasets and modelled data products.</p> <p>Links for further information: Cefas blue carbon stocks and fluxes, JNCC climate smart MPA project</p>	<p>Evidence on the presence and extent of relevant habitats is ideally derived from more than one independent source of information with associated high levels of confidence. Evidence is available over a long time-series. There is a strong case that the proposed location contains habitat that is important for carbon storage. For example, there is strong evidence that the location contains large areas of habitats known to provide this service.</p> <p>Moderate – There is some evidence supporting the conclusion that the proposed location provides ecosystem benefits in the form of carbon storage. Evidence for the presence of relevant habitats is based on one or more data sources, the reliability of which may be open to question due to e.g. shorter time span of data, lack of corroborative information, limited quality assurance and/or lower confidence in the analysis. The case that the proposed location is important for storage is less compelling. For example, it contains only small areas of habitat known to provide this service, or it contains large areas of habitats where the carbon storage benefits are less clear.</p> <p>Low – There is limited evidence supporting the conclusion that the proposed location provides ecosystem benefits in the form of carbon storage.</p> <p>Evidence on the presence of habitats is based only on a single data source, or expert judgement, or modelled data. Data sources may be of low/unknown quality, or low/unknown reliability, or are short-term and/or of greater age. The case that the proposed location is important for carbon storage is less compelling. For example, the location contains only small areas of habitat where carbon storage benefits are less clear, or there is low confidence in the habitat data linked to benefits from this service.</p> <p>Not met – There is no suitable evidence to support the case that the location includes habitats considered to be of importance for the storage of carbon.</p>

Ecological principle	Criteria	Types of evidence sources available	Evidence assessment standards
	<p>3b - The location is of importance to the key life cycle stages of commercially important marine species</p>	<p>Types of evidence could include relevant reports, habitat or species information from survey datasets, and modelled data products</p>	<p>High – There is a significant body of reliable evidence supporting the conclusion that the proposed location is important for key life cycle stages of a wide range of commercially important marine species.</p> <p>Evidence is ideally derived from more than one independent source of information with associated high levels of confidence. Evidence is available over a long time-series and includes the most recent data. There is a strong case that the proposed location is important for key life cycle stages of commercially important marine species. For example, there is strong evidence that the proposed location is a nursery area for a suite of marine species.</p> <p>Moderate – There is some evidence supporting the conclusion that the location is important for key life cycle stages of commercially important marine species.</p> <p>Evidence is based on one or more data sources, the reliability of which may be open to question due to e.g. shorter time span of data, lack of corroborative information, limited quality assurance and/or lower confidence in the analysis. The case that the proposed location is important for key life cycle stages and/or behaviours of commercially important marine species less compelling. For example, strong evidence is limited to a single species or evidence on a wider range of species is less convincing.</p> <p>Low – There is limited evidence supporting the conclusion that the proposed location is important for key life cycle stages of commercially important marine species.</p> <p>Evidence is based only on a single data source, or expert judgement, or modelled data. Data sources may be of low/unknown quality, or low/unknown reliability, or are short-term. The case that the proposed location is important for key life cycle stages and/or behaviours of commercially important marine species is not compelling. For example, evidence is based on a single source or low / unknown quality or reliability</p>

Ecological principle	Criteria	Types of evidence sources available	Evidence assessment standards
			<p>Not met – There is no suitable evidence to support the case that the proposed location is important for key life cycle stages of commercially important marine species.</p>
	<p>3c - The location includes, or supports, habitats that are important in the provision of flood / erosion protection.</p>	<p>The main important habitats are saltmarsh, coastal dunes and shingle banks. The importance of other habitats will be considered.</p> <p>Types of evidence could include ground-truthed survey datasets and modelled data products.</p>	<p>High – There is a relatively strong case that the proposed location either contains or is supporting habitats that are providing flood / erosion protection.</p> <p>Evidence on the presence of habitats is ideally derived from more than one independent source of information with associated high levels of confidence. Evidence is ideally over a long time-series.</p> <p>Moderate – The case that the proposed location either contains or is supporting habitats that are providing flood / erosion protection is less compelling.</p> <p>Important habitats may be present but at a smaller scale. The reliability of evidence on the presence or extent of habitats may be lower. For instance, shorter time span of data, lack of corroborative information, limited quality assurance, lower confidence in the analysis, and in some cases the age of the underlying data.</p> <p>Low – The case that the proposed location either contains or is supporting habitats that are providing flood / erosion protection is not compelling.</p> <p>Evidence of habitats is based only on a single data source, or expert judgement, or modelled data. Data sources may be of low/unknown quality, or low/unknown reliability, or are short-term.</p> <p>Not met – There is no suitable evidence to support the case that the proposed location is important for flood / erosion protection.</p>

5. Practical considerations of an ecological nature

- 5.1. In addition to the ecological criteria set out in Section 4, we will consider a variety of practical considerations of an ecological nature. These include the design principles from the [Ecological Network Guidance](#) (ENG) and the [MCZ highly mobile species supplementary principles](#).
- 5.2. While all the ENG design principles and guidelines apply to MPAs more generally, only some of them apply to the selection of pilot HPMA due to the small number of pilot sites being considered. Full details of how JNCC and Natural England have interpreted the ENG design principles and guidelines in the context of HPMA are set out in Annex 1.
- 5.3. Natural England and JNCC will consider the practical considerations set out in Table 3 when making recommendations to Defra to inform the subsequent socio-economic assessment.

Table 3 Practical considerations of an ecological nature for the selection of pilot HPMA

Factor	Practical consideration	Reason for inclusion
ENG - Representativity	<ul style="list-style-type: none"> • Biogeographic region • Inshore / offshore • Ecology 	Pilot HPMA should be well distributed in English waters and represent a range of biogeographic regions, inshore and offshore areas and ecology.
ENG - Viability	Minimum size of 5km diameter	Pilot HPMA need to be of a minimum size to ensure the ecological integrity of all components of marine biodiversity within their boundaries, in accordance with a whole-sites approach. To meet the ENG guidelines for MCZs, pilot HPMA should be no smaller than 5km in diameter.
ENG - Connectivity	Connectivity between pilot HPMA and the existing MPA network	Connections between pilot HPMA and existing MPAs are important for thriving populations of species.
ENG - Scientific value (for research and monitoring)	<ul style="list-style-type: none"> • Monitoring • Supporting scientific understanding of recovery and condition 	It is important to ensure pilot HPMA can be readily monitored so that an assessment can be made of the degree to which the stated objective(s) of a pilot HPMA are met. Linked to this, it is important to consider the value of pilot HPMA in supporting the development of our understanding of what recovery and condition looks like for a range of marine habitats and species.
ENG - Boundaries	Boundaries	The boundaries of pilot HPMA should be drawn to ensure they encompass the ecological integrity of all marine biodiversity components in the location being considered, in accordance with a whole-site approach to pilot HPMA identification.

6. Third-party proposals for pilot HPMA

6.1. As part of the process for selecting pilot HPMA, we want to give stakeholders the opportunity to suggest locations for further consideration on ecological grounds.

6.2. To put forward a location for consideration as a pilot HPMA, you will need to complete a [submission form](#) and provide any supporting data to JNCC and Natural England by email to offshorempas@jncc.gov.uk including 'pilot HPMA proposal' in the subject line. The deadline for submissions is 31st August 2021.

6.3. To help you do this, we have developed a [third-party proposal guidance document](#). The third-party proposal guidance document sets out expectations in terms of the information and data you need to submit for further consideration by JNCC and Natural England.

6.4. JNCC and Natural England will assess the ecological merit of our own proposals and any third-party proposals received against the same evidence assessment standards. These are listed in the final column of [Table 2](#).

ANNEX 1: JNCC and Natural England interpretation of the Ecological Network Guidance design principles and further considerations in the context of Highly Protected Marine Areas

Ecological Network Guidance Design Principles

- *Representativity* – This design principle relates to identifying MCZs in each region that each feature of conservation importance (FOCI) occurs within. Sites should be selected in each region where there is sufficient information. As HPMAAs will form part of the existing MPA network this principle does not apply separately to HPMAAs. During the selection of pilot HPMAAs we will consider how best to represent different biogeographic regions, inshore and offshore areas and a range of ecology where practicable.
- *Replication* – This design principle relates to ensuring there are enough different MCZs for the same feature. This guideline recommends replication of sites in each relevant biogeographic unit, provided there is sufficient information. This principle is important in a network context because it offers some resilience to safeguard the contribution those areas make to the conservation of species and/or habitats. This principle does not apply separately to HPMAAs as they form part of the existing MPA network.
- *Adequacy* – This principle relates to ensuring sufficient proportions of a given feature are within the network of MCZs. Adequacy is determined by considering whether replication, connectivity and viability targets are met and so this design principle cannot be met for the pilot HPMAAs due to the small number of sites proposed. This principle does not apply separately to HPMAAs as they form part of the existing MPA network.
- *Viability* – The Ecological Network Guidance defines viability for an individual MPA such that it must be able to maintain the integrity of its features (either the population of a species or the condition and extent of the habitat), and be self-sustaining throughout natural cycles of variation. It recommends that MCZs for broad-scale habitats should be at least 5 km in diameter and, on average, 10-20 km in diameter. The ENG also makes recommendations on minimum patch diameter for both habitat and species Features of Conservation Interest (FOCI). For HPMAAs (including the pilot sites), where all habitats and species features within the boundary are protected, the size guidelines for broad-scale habitats will apply for both the pilot HPMAAs and HPMAAs more widely.
- *Connectivity* – Connectivity is defined as the extent to which populations in different parts of a species' range are linked by the movement of eggs, larvae or other propagules, juveniles or adults as well as ensuring critical areas to the life-history of a species population are included within the network. Depending on the purpose of a particular HPMA, including the pilots, connectivity will be more, or less, important. For example, pilot HPMAAs may be located to demonstrate connections between similar habitats in that site and another MPAs in the network. The connectivity guidelines apply to HPMAAs generally and to the HPMA pilot sites.
- *Protection* – HPMAAs will provide the highest levels of protection within the MPA network, will enhance the recovery of features and of the whole site and will safeguard more natural systems (in addition to recovering sites). The ENG guideline is that each broad-scale habitat type and FOCI should have at least one viable

reference (or highly protected) area within each “region” where all extraction, deposition or human-derived disturbance is removed or prevented. The ENG guidelines for broadscale habitats will apply to HPMA but cannot be met within the small number of HPMA pilot sites proposed.

- *Best available evidence* - In the context of HPMA, the use of best available evidence is highly relevant. All the guidelines under this design principle apply to HPMA.

Ecological Network Guidance ecological and practical considerations

- **Areas of additional ecological importance** – This is important in the context of both the HPMA pilots and HPMA more generally. It includes considerations of areas for key life cycle stages and behaviours, areas of high biodiversity and areas of high productivity. Assessment of the ecological importance of the HPMA pilots will be through the HPMA ecological selection principle of Ecological Importance.
- **Impacts and feature vulnerability** – Unlike for MPAs more generally, the HPMA pilot sites may seek to include sites with a range of levels of degradation, as defined in the Benyon Review ecological principles, to test whether the HPMA approach delivers recovery and to enhance our understanding of recovery. Therefore, impacts and features vulnerability will be important considerations and will link to the HPMA ecological selection principle of Naturalness, Sensitivity & Potential to recover.
- **Scientific value (for research and monitoring)** – One of the main aims of HPMA and of the HPMA pilots in particular is to enhance our understanding of what good condition looks like and of how marine ecosystems recover and over what timescales. Assessment of the scientific value guideline will be through the HPMA selection practical considerations.
- **Boundaries** – The ENG recommends that MCZ boundaries are drawn with a minimum number of straight lines, be as compact in shape as possible, incorporate margins (where appropriate) to ensure conservation of the designated features, combining adjoining discrete locations into one MCZ and considering predicted changes in feature extent. The ENG guidelines on boundaries apply to HPMA, including the pilot sites but, because HPMA are taking a whole site approach, we may need to draw boundaries more widely to encompass entire marine ecosystems.