SNCBs' MCZ Advice Project Technical protocol F – Assessing scientific confidence of feature condition

Version control

Built status:

Version	Date	Author	Reason/Comments
5.0	03.01.2012	Laura Cornick	Incorporation of comments from Jane Hawkridge & James Marsden
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1.8	02.11.2011	Ana Jesus and Laura Cornick	Incorporation of comments.
1.7	01.11.2011	Ana Jesus and Laura Cornick	Incorporation of comments.
1.6	27.10.2011	Ana Jesus and Laura Cornick	Incorporation of comments from MPA Technical Group and Defra (due to time restrictions it was only possible to incorporate some and not all of Defra's comments); refinement of the method when using direct evidence; and further development of the criteria to potentially raise scientific confidence of feature condition derived from a VA above 'low'.
1.5	03.10.2011	Ana Jesus and Laura Cornick	Incorporation of comments.
1.4	29.09.2011	Ana Jesus and Laura Cornick	Incorporation of comments.
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electronic	1.8	02.11.2011	Jon Davies, Laura Cornick, Cristina Herbon, Beth Stoker
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electronic	1.5	04.10.2011	MPA Technical Group, Paul McLeod.
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electronic	1.3	28.09.2011	Laura Cornick.
electronic	1.2	13.09.2011	Cristina Vina-Herbon, Sarah Wiggins, Laura Cornick, Amy Ridgeway, Jen Ashworth, Beth Stoker, Aisling Lannin, John Bleach, Eddy Mayhew, Helen Stevens, Tom. Blasdale, Jon Davies, Mark Tasker.
electronic	1.1	12.09.2011	Cristina Vina-Herbon, Laura Cornick.

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Part 1: About this protocol

Introduction

On the 8th September 2011, the regional Marine Conservation Zone (MCZ) projects published their final recommendations. Their proposals included information on the features to be protected within each recommended MCZ (rMCZ) and their draft Conservation Objectives (COs).

A CO is a statement describing the desired ecological/geological state (quality) of a feature[1] for which a Marine Protected Area (MPA) is designated. The CO reflects whether the feature is regarded as currently meeting the desired state and should be *maintained*, or is falling below it and should be *recovered* to favourable condition (see Annex 1 for condition scales for MPAs). For MCZs 'favourable condition' is the state of MCZ features within a site when all requirements to meet site-specific CO have been achieved[2]. In reference areas the aim is for features to achieve reference condition, which is at the upper end of favourable condition.

Ideally, direct measurements (from monitoring information taken at the site) indicating the state of the feature should be available to enable the assessment of the current condition of features in rMCZs and to set draft COs accordingly. However, such data were not available for the majority of rMCZs because there are currently no monitoring or surveillance programmes that are comprehensive enough to provide the required information to assess feature condition.

Consequently, where direct evidence was not available the regional MCZ projects (or in some instances the regional stakeholder groups themselves), with the permission of regional stakeholder groups and support and guidance of Natural England and the Joint Nature Conservation Committee (JNCC), used information on feature sensitivity and their exposure to pressures from human activities to assess likely feature condition. See Figure 1 below outlining the process that was used to set draft COs.

This process follows the approach taken for European Marine Sites[3] that considers information on the feature's sensitivity to pressures (ABPMer 2010), combined with evidence (including local knowledge) of current exposure to activities associated with those pressures[4], to derive the feature's vulnerability to damage or deterioration. This is known as a Vulnerability Assessment (VA).

A feature's vulnerability to damage or deterioration is an indicator of current likely condition. This should not to be interpreted as a statement of fact that the feature is known to be damaged or deteriorated or otherwise. The VA process provides a proxy of feature condition; there are inherent assumptions made and steps involving expert judgment which introduce levels of uncertainty into the assessment of feature condition. In the absence of direct evidence of feature condition, a VA is the best available evidence.

[1] A feature can be a habitat, a species, a geological formation or a geomorphological process.
[2] See Annex 2 for a description of what favourable condition means for each category of MCZ features.
[3] Special Areas of Conservation and Special Protection Areas
[4] JNCC, 2010. Pressures-activities matrix.

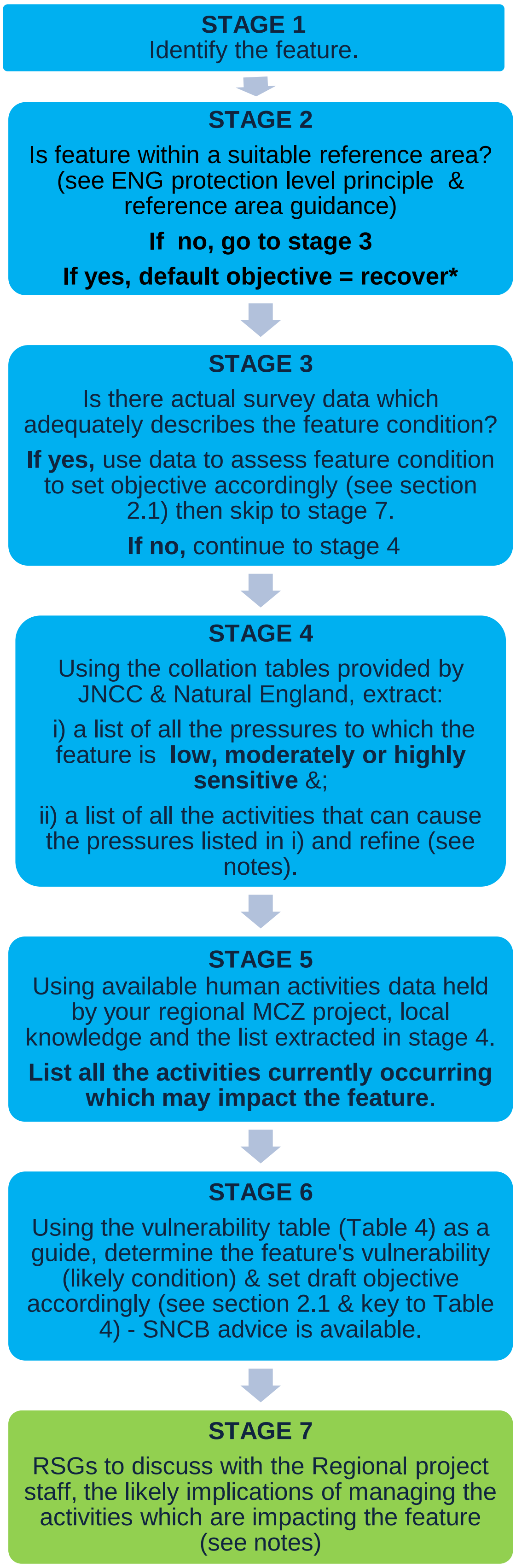

Figure 1: Flow diagram of the process used to set draft COs for MCZ features, taken from MCZ Conservation Objective Guidance (COG) (Natural England & JNCC 2011).

The regional stakeholder groups then discussed the draft COs and resulting potential management measures, to determine levels of support for features and sites and recommend alternative COs if felt appropriate. In June 2011, Natural England and JNCC provided feedback on these COs checking consistency between project areas and that the process described in the COG had been followed and recorded. We provided this feedback to the regional MCZ project staff to consider in the development of the final recommendations. For a list of related useful definitions see Annex 2.

Where we do not have a full understanding of the condition of a site, we will assume that its features need to function unimpaired in order to be in favourable condition. We also know that damage (natural or otherwise) to a feature can affect its functioning. Therefore, observed signs of damage will be treated as an indicator of unfavourable feature condition.

What does this protocol cover?

Defra has requested that our (Natural England and JNCC) advice include an assessment of scientific certainty of COs, making use of the VAs which were undertaken to assess feature condition and set the COs. This protocol describes a methodology to assess the scientific confidence of feature condition as a proxy of scientific certainty of COs. Assessments of feature condition undertaken earlier in 2011 underpinned the draft COs in the final recommendations, and so we will assess scientific certainty, or rather, our confidence in the assessment of feature condition in our advice.

This protocol covers a method to assess our confidence in the assessments of feature condition whether they were undertaken using available direct evidence or a VA approach, or indeed, a combination of both. This method provides high, moderate or low confidence scores for the assessment of feature condition undertaken for features in rMCZs. A summary key to the method is provided at the end of the protocol**.**

Defra will use the outcomes of this confidence assessment in combination with other information requested of Natural England and JNCC, the regional MCZ projects and the Science Advisory Panel, as well as any other information which Natural England and JNCC consider appropriate, to inform ministers' decision-making on which MCZs to designate in 2013, after public consultation at the end of 2012. The protocol has been developed in such a way as to not pre-empt ministers' decisions.

What the protocol does not cover

The protocol does not cover the revision of draft COs. It is an assessment of our confidence in how they were set, whether it was through the use of direct evidence of feature condition, a vulnerability assessment or a combination of both.

Our advice may differ from the feature condition assessments provided in the regional MCZ project final recommendations. We will provide a confidence score for both the assessment of feature condition provided in the final recommendations and our advice, should they differ, after taking account of any further evidence.

The current condition of a feature underpins the setting of its CO. However, as explained in the (COG), draft COs set for reference areas were not based on an assessment of feature condition. Reference areas were selected to understand how a feature might change if left un-impacted by direct human intervention and pressure from those activities. Therefore, since COs for features in reference areas were not set using an assessment of feature condition they are not covered in this protocol.

This protocol does not set the standard for any future monitoring or assessment requirements for protected sites' COs[5]. The protocol is providing a method specifically to assess our confidence in the assessment of rMCZ feature condition. Direct evidence in this instance was opportunistic, collated from many sources as opposed to direct evidence gathered in a targeted manner (e.g. surveys aimed at assessing feature condition). For this reason, this protocol is not intended to be prescriptive for future assessments.

Who is this protocol for?

This protocol applies to everyone in Natural England and JNCC who are directly engaged in the production of the MCZ advice and, in particular, in the assessment of scientific certainty of feature condition. The protocol is also provided for public reference in order that our advice and the ways in which we make our decisions are made transparent and accountable.

Part 2: The protocol

Methodological steps

1. Feature extent

To assess the scientific confidence of feature condition within rMCZs, you must first consider the evidence underpinning knowledge of feature extent. How sure you are that the feature is where you think it is and is the size you think it is. It is then easier to make judgments about a feature's likely condition because you can see whether activities are happening over or away from the feature. You can also make a more informed judgment as to the level of exposure of the feature to any pressures from activities.

When undertaking a VA, you would need to be relatively certain of the where the feature is and how big it is to be able to confirm whether an activity is occurring on it/overlapping with it. This is true regardless of how certain you are of where an activity is occurring. Put another way, you can know exactly where an activity is occurring (its footprint) but if you are uncertain about where the feature is within the site, you cannot know with any certainty if the feature is lying under the activity and potentially exposed to damage or deterioration. In exceptional circumstances, we could have site-specific information that proves the exact location of an activity and the activity operating evenly across the whole of the recommended feature.

Now apply the same thinking to the use of direct evidence. For example, you have a feature with signs of damage (e.g. coral rubble). You are certain the feature is damaged but you need to know by how much. To make a judgment about how much of the feature is damaged and how severe the damage is, you will need to know with some confidence how big the feature is, or its extent. In applying this approach, it is necessary to assume that a feature will cope better with a relatively small area of damage but may fail to cope with a greater amount, regardless of overall vulnerability to a pressure. If you are uncertain about how big the feature is, it is difficult to say whether the damage covers a relatively small or large area. If, however, you

[5] Further work is being undertaken, led by JNCC with the country conservation bodies, to provide governments with options for a comprehensive marine biodiversity monitoring[1] scheme across UK waters, and this work will complete in phases, with habitats likely to complete in 2015 or 2016. However, monitoring of MCZs is likely to start before this date to verify features and begin to set baselines, so will make best use of current and evolving methods to do so. For current marine monitoring programmes follow Common Standards Guidance http://jncc.defra.gov.uk/default.aspx?page=2217

are fairly certain that the damaged area was relatively large in comparison to the feature then you can infer that the feature may not be able to continue functioning very well and you can be confident that the feature is not likely to be in favourable condition. In contrast, if the damage covers a small portion of the feature, your confidence in the feature not being in unfavourable condition would be lower. Without a good idea of where and how big the feature is/its extent, it is only possible to have low confidence in judgments of condition of the feature.[6] These instances are represented as greyed out cells in figure 2 below.

For the reason given above, confidence in feature condition cannot exceed confidence in feature extent, regardless of whether feature condition has been assessed using direct evidence or a VA or a combination of both.

Where confidence in feature extent is higher, you can make informed judgments about feature condition and you can have more confidence in your assessment, whether you are using direct evidence or a VA, see figure 2 below.

[6] Please note that, as explained above, exceptional circumstances could occur when we are certain of the exact location of an activity occurring evenly across the whole of the recommended feature.

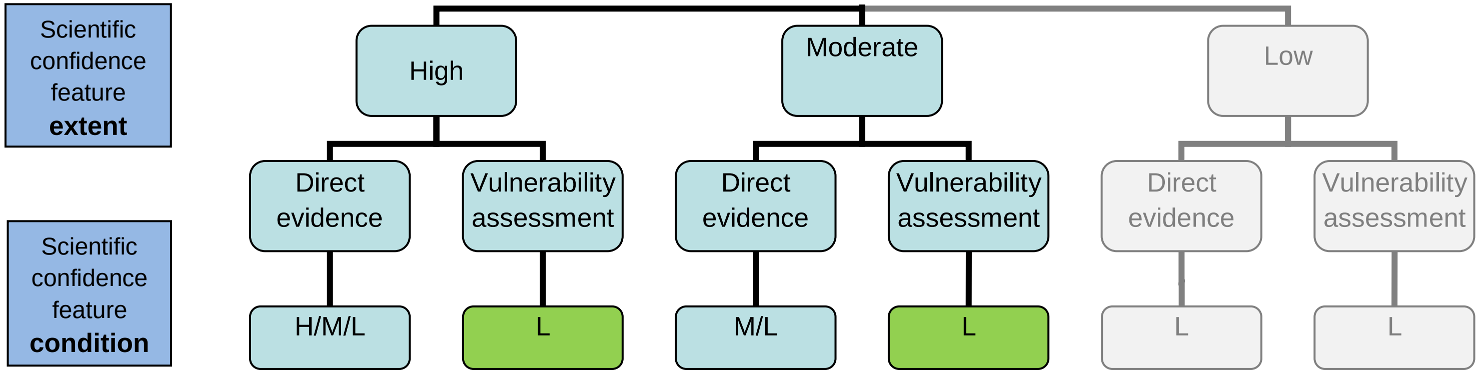

Figure 2. Decision tree to assess scientific confidence of feature condition within rMCZ. Greyed out cells represent instances where our limited knowledge of feature extent *a priori* restricts confidence of feature condition to 'low'. Green cells highlight the occasions where scientific confidence of feature condition derived from a VA could be raised above 'low

The methodology to assess scientific confidence in the extent of features in rMCZs is covered by a separate protocol[7]. The output of the assessments undertaken under that protocol will be a confidence score for the extent of each feature within each rMCZ, given as high, moderate or low. This score will form the starting point in the assessment of confidence of feature condition, see figure 2 above.

2. How was feature condition assessed - direct evidence or VA?

To assess the scientific confidence of feature condition within rMCZs, you must next consider if:

i. there is direct evidence available to inform the assessment; or
ii. the assessment of feature condition was undertaken using a (VA) alone; or
iii. a combination of direct evidence and a VA was used.

As stated in the COG, there was no pre-requisite that a VA needed to accompany direct evidence in order to inform feature condition and set the draft CO. However, where time and resources allowed, both may have been undertaken. Clearly, the best option is to have undertaken both, as this could increase your confidence in the assessment of feature condition where they agree and also provide an indication as to the activities likely to require consideration for management.

The next section describes the three methods to qualitatively assess scientific confidence of feature condition, depending on the three scenarios above:

A. Use direct measurements (from opportunistic site-based information collated from various sources) that inform the ‘state’ of the feature and include evidence of damage (e.g. trawl marks, coral rubble). In very few instances will survey information be available which can adequately describe a feature’s condition. However, should such survey information be available, you should assess confidence in it using similar criteria to those outlined in section 3A.

B. Undertake a VA as a proxy of feature condition, based on best available information on the sensitivity of the feature to pressures**Error! Bookmark not defined.** associated with human activities**Error! Bookmark not defined.**, combined with evidence of current exposure to those pressures; or

C. Use a combination of direct evidence and a VA.

3. Assessment methodology

A. How to assess confidence in feature condition using direct evidence

- **Representativity**

To assess confidence in feature condition using direct evidence you must first consider how representative it is of the feature; does the evidence cover a relatively small or large proportion of the feature? If it covers a large proportion, you would have a better picture of the feature’s condition and this could increase your confidence in your assessment. Remembering, however, that to make this judgment, you need to be relatively confident in the feature’s extent.

[7] Assessing the scientific confidence of the presence and extent of features in recommended marine conservation zones (Technical Protocol E). Note in this protocol, feature extent is a function of presence.

For each feature within an rMCZ, we will not know what exactly favourable condition looks like for some time to come. We need to understand how features naturally change with time and distinguish this from changes resulting from human impacts. Reference areas may help us understand this, as well as long-term monitoring outside of reference areas. We do understand, however, that a feature needs to function unimpaired in order to be in favourable condition and we also know that damage (natural or otherwise) to a feature can affect its functioning. Therefore, observed signs of damage will be treated as an indicator of unfavourable feature condition.

- **Reliability**

You now need to consider how reliable the direct evidence you are using is; how old is it and were appropriate standards in place when sampling and analysis were undertaken? If the evidence on which you are basing your assessment is relatively old, the feature may have since recovered from any observed damage or indeed been damaged since. Confidence in your assessment would therefore be improved by using more recent information.

The criterion ‘age of data’ proposes a six-year scale to reflect the six-year reporting cycle for the Marine and Coastal Access Act 2009, the Article 17 reporting under the Habitats Directive and the reporting requirements of Marine Strategy Framework Directive (MSFD). However, where features are characterised by long recovery times such as *Lophelia* or maerl beds, even if the data are older than 12 years, if the evidence indicates signs of damage, we still can be confident that the features will not have had enough time to allow recovery and therefore will be in unfavourable condition.

In instances where you know certain QA standards were in place to ensure the sampling and analysis had been undertaken in a way which was relatively robust to challenge, confidence in your assessment would again be improved. Age and data source & QA are therefore two additional criteria by which confidence in feature condition derived using direct evidence can be assessed.

The following criteria are to be used in the assessment of scientific confidence of feature condition derived using direct evidence:

i. Severity of damage;
ii. Scale of damage;
iii. Age of data; and
iv. Data source and Quality Assurance (QA) procedures used.

An overall confidence score can then be calculated by combining scores for the above four criteria (see Table 1). It is possible that a feature showing less severe and widespread damage than another, could, in fact, score higher overall in terms of confidence in feature condition, if it scores well in terms of data reliability. Scale and severity of damage may, however, be the more important criteria in determining confidence in feature condition. Severity of damage is linked to the sensitivity of features (e.g. see ABPMer 2010 for further information). Unfortunately, there is currently no clear justification for assigning quantitative weighting to any of the criteria. So for the purposes of this assessment, the four criteria are treated as contributing equally to the overall confidence score in feature condition derived using direct evidence.

There are potentially a range of sources and types of information which can be used to inform feature condition. For example:

- Water Framework Directive (WFD) monitoring, compliance monitoring and pilot characterisation surveys;
- Environmental Statements (ESs) produced as part of the Environmental Impact Assessment (EIA) process;
- Condition assessment surveys for existing MPAs;
- Collaborative surveys, such as International Bottom Trawling Surveys.

Any assessment of confidence in feature condition which has used such information needs to take account of feature extent and the coverage of the feature, data age and QA, similarly to signs of damage.

The criteria and categories were developed taking into consideration the guidance on site integrity developed by Chapman (2004), the Confidence Assessment Scoring System developed by the MESH (Mapping European Seabed Habitats) Project (MESH Project 2007) and the work developed by Ramsay *et al.* (2011) on data confidence. We acknowledge, however, that there are limitations to this approach as the short exposure to some pressures (e.g. water quality changes) may not result in evidence of damage but potentially result in deterioration which is more difficult to measure.

Table 1. Criteria for assessing scientific confidence of feature condition derived using evidence of damage. The overall score is given by the sum of the individual scores attributed to each of the four criteria. (This method should not be applied in cases where the scientific confidence of feature extent is 'low'). High confidence 10-12, Moderate confidence 7-9, Low confidence 4-6.

	Criteria							
	Evidence of damage				**Reliability**			
	Severity of damage		**Scale of damage (Representativity)**		**Age of data**		**Data source and QA procedure**	
	Description	**Score**	**Description**	**Score**	**Description**	**Score**	**Description**	**Score**
High confidence *(can only apply in instances where confidence in feature extent is high)*	Evidence of severe damage, resulting in partial loss of feature or long-term damage.	3	Evidence of widespread/broad-scale damage/disturbance across the feature.	3	< 6 years old	3	Appropriate internal (and / or external) QA procedures in place during data collection and post processing and are well documented.	3
Moderate confidence *(usually apply in instances where confidence in feature extent is moderate or high)*	Evidence of damage / disturbance. Feature may take years to recover.	2	Evidence of patchy/localised damage/disturbance across the feature.	2	6 to 12 years old	2	Some internal (or external) QA procedures in place during data collection and possibly post processing. Generally, QA procedures applied on a more ad hoc basis, and not necessarily well documented or standardized.	2
Low confidence	Evidence of minor damage / disturbance. Feature may take months to recover.	1	Evidence of localised / small-scale damage/disturbance restricted to a proportion of the feature.	1	> 12 years old	1	No QA procedures in place, ad hoc QA unlikely.	1

B. How to assess confidence in feature condition derived from a Vulnerability Assessment (VA)

To assess scientific confidence of feature condition, which has been assessed by undertaking a VA, take account of your confidence in the following:

- ***Information*** used:
  - feature's extent;
  - the feature's sensitivities to pressures;
  - the pressures associated with activities;
  - human activities data (e.g. reliability and suitability of scale);
  - biological data
- ***Process*** of combining and interpreting available information on feature's sensitivities to pressures with current exposure to pressures to derive feature vulnerability to pressures and therefore likely current condition.

Irrespective of how good your confidence in the underlying ***information*** might be, the majority of the uncertainty in feature condition when derived by undertaking a VA is driven by the ***process*** itself; how you use and interpret the available information and how precautionary you are in your decision-making. The uncertainty is likely to be a consequence of an incomplete understanding of the effects that the pressures associated with human activities can have on the marine environment, particularly if two or more activities occur at the same time, as can often be the case. By far, the greatest uncertainty lies in the fact that any past impacts from historical activity that has since ceased are not incorporated into a VA, as information is generally not available for the assessment (Natural England & JNCC 2010). A VA is merely a 'snapshot' in time and can only provide you with an indication of likely current condition. See the table in Annex 2 which provides a brief list of the major uncertainties inherent in any VA.

> *Given the underlying uncertainties in the VA process, summarised briefly in* **Error! Reference source not found.***, you need to assign 'low' scientific confidence for feature condition derived from a VA, except where additional criteria are satisfied. In such instances, it might be possible to offer greater confidence in feature condition.*

Where there is a moderate or high confidence in a feature's extent, your scientific confidence of feature condition derived from a VA could potentially be higher, as mentioned previously (see figure 2). This is because you have more confidence in the location and size of the feature.

Confidence in feature condition derived from a VA can be raised to moderate where we **know an activity is occurring over a feature** which exposes it to pressures to which **we know it is highly sensitive**. Therefore, confidence in feature condition can be assessed as moderate when both of the following two criteria are met:

i. The feature is highly sensitive, with moderate or high confidence.

To know with any confidence that a feature is highly sensitive to a pressure, you need to refer to the confidence scores provided in the MB0102 matrix. According to guidance in the COG, a feature must be moderately or highly vulnerable to at least one pressure to be assessed in a VA as likely to be in unfavourable condition.

Vulnerability to any given pressure is calculated by taking account of both the feature's sensitivity to and exposure to the pressure. Therefore, a higher confidence score on the sensitivity of the feature will contribute to increasing the confidence in the vulnerability score and hence assessment of feature condition.

Confidence in feature condition cannot be raised in those instances where the MB0102 matrix has provided a sensitivity range to a pressure, as opposed to a single value. In such instances, as explained in the COG, the highest value of the range would have been adopted to represent the entire feature's sensitivity to the pressure. For example, if a feature's sensitivity to a pressure was given as L-H, and the confidence score provided was M, the sensitivity adopted for the purposes of the VA would have been H but then confidence (M) would no longer be applicable.

ii. There is compatibility of scale between the feature extent and the activity 'footprint'.

By compatibility of scale we simply mean, you can confirm the activities, which are currently occurring, are actually happening over the feature, see figure 3 below. If the feature is relatively small e.g. a point location for a species (**a**), some activity datasets are provided in too coarse a spatial resolution to be able to confirm if the activity is occurring over or away from the feature, in which case confidence in feature condition would necessarily be lower. For larger features (**b**) e.g. generally broad-scale habitats, this is less of an issue and you can often confirm that an activity is actually occurring on a feature.

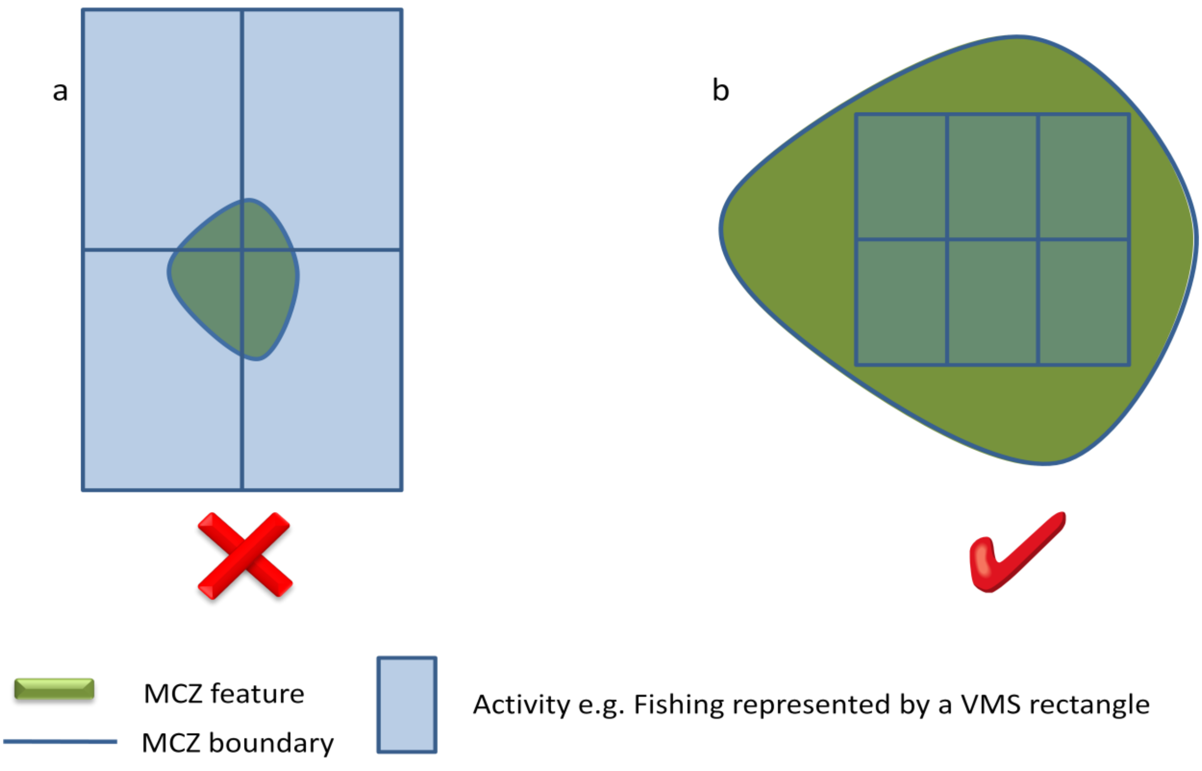

Figure 3: Compatibility of scale; confirming overlap between features and activities. **a**, the spatial scale of the feature is too small compared to the spatial resolution of the activity and you cannot confirm if the activity is occurring on the feature. NB. This may not be the case if you know that the activity is evenly distributed over the area. **b**, the spatial scale of the feature is smaller than the resolution at which the activity information is provided; you can confirm the activity is occurring on the feature.

Obviously, this excludes instances where we know the activity does not overlap with the feature but may still expose it to pressures, e.g. plumes from aggregate extraction occurring nearby. See table provided in Annex 2 for further explanation.

A feature can also be assessed as currently not vulnerable to any pressures; this would indicate that it may be in favourable condition. But, as discussed earlier, a VA precludes historical damage and so any feature which has been assessed through a VA as likely to be in favourable condition will necessarily have low confidence associated with it, even when you have moderate or high confidence in feature extent.

In summary, to raise confidence in feature condition when derived from a VA to moderate, you need the following to be true:

- *Feature is highly sensitive (with moderate or high confidence) to the pressure to which it has been assessed as moderately or highly vulnerable; &*
- *The activity that contributes to the feature's moderate or high vulnerability is known to overlap the feature.*

C. Feature condition determined using a combination of direct evidence and a VA

To assess scientific confidence of feature condition which has been assessed by using a combination of direct evidence (one or more data sources) and a VA, the key aspect to consider is whether they agree or disagree in their assessment of feature condition (favourable versus unfavourable).

- **Outcomes disagree**
  Where the outcomes of a direct evidence assessment and a VA disagree with respect to feature condition, a precautionary approach should be adopted and a 'recover' CO is assigned, please see COG for further explanation.

  If the direct evidence (and not the VA) indicates the feature was in unfavourable condition then you need to assess the confidence in feature condition by using the approach described in section 3A and assign this to the feature condition. If, however, the VA (and not the direct evidence) indicated the feature was in unfavourable condition then you need to assess the confidence in feature condition using the approach outlined in section 3B and assign this to the feature condition.

- **Outcomes agree**
  Where both direct evidence and a VA have been used to assess feature condition then assess the confidence associated with both methods. The confidence in feature condition derived using direct evidence should be assessed using the approach outlined in section 3A, taking account of confidence in feature extent as well as the four criteria; severity and scale of damage and data QA and age. The confidence in feature condition derived using a VA should be assessed using the approach outlined in section 3B, taking account of confidence in feature extent as well as criteria i and ii.

  For overall confidence in feature condition, where both methods result in the same assessment of feature condition you would choose the higher of the two confidences i.e. where the confidence associated with the direct evidence is moderate and that associated with the VA is low, then the final confidence in feature condition would be moderate.

See figure 4 below for a summary key to the assessment of confidence in feature condition.

Question 1. Is the confidence in feature extent low? (Refer to output of protocol E)

Yes – confidence in feature condition is **low** regardless of how feature condition was assessed
No – go to **Qu. 2**

Question 2. Has feature condition been assessed using a Vulnerability Assessment?

Yes – got to **Qu.3**
No – go to **Qu.6**

Question 3. Has feature condition been assessed as likely to be in favourable condition?

Yes – confidence in feature condition is **low**
No – go to **Qu.4**

Question 4. Is the feature highly sensitive with (moderate or high confidence) to any of those pressures to which it is moderately or highly vulnerable?

Yes – go to **Qu.5**
No – confidence in feature condition is **low**

Question 5. Are any of the activities which contributed to moderate or high vulnerability, provided in a resolution compatible in scale to the feature? See figure 1, can you confirm overlap of activity with the feature?

Yes – confidence in feature condition is **moderate**
No – confidence in feature condition is **low**

Question 6. The feature has been assessed using direct evidence. Follow the method outlined in section 3A of the protocol. What is the combined score for the 4 criteria listed in table 1; severity & scale of damage and data age & QA?

10-12 - confidence in feature condition is **high** – **unless confidence in feature extent is moderate, where confidence in feature condition is then moderate**.
7-9 – confidence in feature condition is **moderate**
4-6 – confidence in feature condition is **low**

Question 7. If the feature condition has been assessed using both a VA and direct evidence, do they agree?

Yes – go to **Qu. 1** and follow key for direct evidence and VA
No – go to **Qu.8**

Question 8. Did direct evidence indicate the feature was likely to be in unfavourable condition?

Yes – go to **Qu.1** and follow key for direct evidence
No – go to **Qu.1** and follow key for VA.

Final confidence in feature condition will be the higher of the two

Figure 4: Summary key to the assessment of confidence in feature condition.

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Annex 1: Condition scale for the Marine Protected Area (MPA) network

	Condition scale for features within the MPA network low – high, adapted from Natural England and JNCC 2010				
European marine sites (SACs[8] & SPAs[9])	Destroyed / Partially Destroyed	Unfavourable declining	Unfavourable maintained	Unfavourable recovering	Favourable maintained
Sites of Special Scientific Interest (SSSI)	Destroyed / Partially Destroyed	Unfavourable declining	Unfavourable maintained	Unfavourable recovering	Favourable maintained
MCZ	Destroyed / Partially Destroyed	Unfavourable declining	Unfavourable maintained	Unfavourable recovering	Favourable Reference conditions

Threshold for reaching MCZ conservation objectives

[8] SACs – Special Areas of Conservation.
[9] SPAs – Special Protection Areas.

Annex 2: Table of summary of uncertainties associated with the types of information used and how it is used and interpreted in the VA process (note the list provided is not exhaustive and not in any order of significance).

		Uncertainties
Information	**Sensitivity scores**	• A feature's sensitivity is not known for all pressures. Where a feature's sensitivity to a pressure is unknown, the vulnerability to that pressure cannot be quantified and remains unknown, even when the feature is exposed to the pressure. A VA is therefore only as complete as our knowledge of the sensitivities to pressures will allow. • Due to time and resource constraints in the undertaking of all the VAs, guidance in the COG stated that effort was to be concentrated on assessing the vulnerabilities to pressures to which features were moderately or highly sensitive. Therefore, in some instances, pressures to which a feature has low sensitivity were not taken into account in the VA. A feature can, theoretically, be exposed to a level of pressure high enough to result in a moderate vulnerability even if it is only sensitive at a low level. • Low confidence sensitivity scores. The MB0102 (ABPMer, 2010) sensitivity matrix provides confidence scores associated with each feature's sensitivity to each pressure, where it is known. Where confidence is scored as low, a feature's response to a pressure is not proven or is not very well understood. Where there is low confidence, it carries through to the vulnerability score and the assessment of feature condition, contributing to the overall uncertainty. • For some features, particularly broad-scale habitats, sensitivity in the MB0102 matrix to a pressure is given by a range to represent variability within the feature. When assessing the condition of such features, the highest sensitivity of the range was adopted as that of the entire feature (please see COG for fuller explanation) and used in the calculation of vulnerability to pressures. For example, for feature X, the MB0102 matrix provides the following sensitivity range (as opposed to a single score) to pressure A of not sensitive to moderately sensitive, with an associated confidence of high. For the purposes of the VA, moderate sensitivity to pressure A was used to assess vulnerability. This is precautionary and aligns with the approach undertaken for European Marine Sites. In these instances, it is no longer appropriate to use the moderate confidence score provided in the MB0102 matrix and the confidence may be unknown. In these instances, this makes it more difficult to assess a feature's vulnerability and condition with any degree of confidence. • Pressure benchmarks (against which a feature's sensitivity is assessed) frequently do not reflect how pressures are exerted at a site level and are therefore sometimes not very helpful when assessing a feature's

		exposure to pressures. Often pressure benchmarks are provided for one-off events for example or do not provide temporal or spatial parameters which makes it difficult to assess exposure to pressures associated with activities which vary temporally and spatially.
	Human activities data	• Low spatial resolution and/or accuracy of the information available, particularly for fisheries and recreational activities. Licensed activities, on the other hand can have a relatively high spatial resolution and/or accuracy. Sometimes where the spatial resolution of an activity is too coarse you cannot be sure where exactly an activity is occurring. You know it is happening within an area but you cannot narrow it down to a specific location which would allow you to determine whether or not it is occurring over a feature. The precautionary approach was adopted during the VA; it was assumed that the activity, and associated pressure, was occurring on the feature (unless additional information is provided to confirm otherwise). Note this is precautionary and is therefore associated with necessarily lower confidence.
	Ecological data	Variable spatial resolution of habitat maps and accuracy of location of point data for species or habitats. There is uncertainty in the exact location and extent of habitats and species due to limitations of available data. For habitats, level of confidence on the presence is being dealt with in protocol E, the output of which is incorporated as the 1st step to this protocol.
Process		The ***VA process*** relies heavily on expert judgment and assumptions, particularly: o For example an activity, which occurs in a particular way at a particular level, is exerting a pressure and therefore an impact/damage to the feature. This is an assumption that is necessary for the purposes of a VA when in fact the impact and damage is not proven. This is why the condition derived using a VA is described as 'likely'; we do not claim to provide a categorical determination of feature condition when assessed using a VA. This contributes significantly to the overall uncertainty in feature condition; o The VA only takes into account current known activities for which we have information available and does not account for activities that may have caused damage to the feature in the past but have since ceased or indeed activities currently occurring, for which we do not have information For example, an area of cold water *Lophelia pertusa* reef may have been trawled over in the past and (unknown to us because it hasn't been directly surveyed) it has been severely damaged. According to the currently available fishing activity data, the area is not subject to demersal trawling now. Therefore a VA may indicate the feature is not currently vulnerable to any pressures and is likely to be in

	favourable condition which, in reality, it is not because it has been severely damaged in the past. Not taking account of all historical activity contributes significantly to overall uncertainty in feature condition; o When assessing far-field effects. Some activities when occurring away from but close enough to a feature can exert pressures on a feature e.g. aggregate dredging can expose a nearby feature to smothering from suspended sediments. Assessing exposure in such instances requires expert judgment which takes account of several factors; current direction and strength, distance from feature and sediment type. This is reliant on expert judgment, which while a valid approach, does depend on application of knowledge and expertise and therefore involves a degree of uncertainty; o Where assessing the cumulative pressure caused by two or more activities, which individually do not expose the feature to the pressure above the benchmark. Again this is reliant on expert judgment and a degree of uncertainty.

Annex 2: Useful definitions[10]

Activity – Human social or economic actions or endeavours that may have an effect on the marine environment e.g. fishing, energy production.

Attribute – A selected characteristic of a feature which is used to provide an indication of the condition of the feature to which it applies, for example, extent, diversity, typical species, species composition, range and distribution of characteristic communities, topography and sediment character.

Exposure – The relative exposure of the interest features or the habitats that support them to the possible/likely effects of operations, resulting from human activities currently occurring on the site. The assessment of exposure can include the spatial extent, frequency, duration and intensity of the pressure(s) associated with the activities where this information is available.

Extent – The area covered by a habitat or community.

Favourable condition – Is the state of MCZ features (habitats, species, geological and geomorphological) within a site when all requirements to meet site specific conservation objectives have been achieved.

For MCZ habitat FOCI[11] and Broad Scale Habitats favourable condition occurs when**, within the site:**

i. Its extent/area is stable or increasing; and
ii. The specific structure and functions, such as ecological and physico-chemical structure and functions, which are necessary for its long-term maintenance exist; and
iii. Biological diversity of its characteristic communities is maintained such that the quality and occurrence of habitats and the composition and abundance of species are in line with prevailing physiographic, geographic and climatic conditions[12].

For MCZ species features favourable condition occurs when, **within the site**:

i. population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its habitat; and
ii. there is sufficient habitat to maintain its population on a long-term basis.

For geological and geomorphological features favourable condition occurs when **within the site**:

i. the extent, component elements and integrity of geological and geomorphological features are maintained or able to evolve within the parameters of natural change; and
ii. the structure, integrity and/or inherent functioning of these features are unimpaired and remain unobscured other than through natural processes[13].

In applying the term favourable condition to MCZ features, Natural England and JNCC are developing draft attributes specific to MCZ features which represent the generic elements above. It is Natural England and JNCC’s goal to eventually develop targets for each feature’s attributes, against which favourable condition will be assessed. These targets will be closely linked to the targets for Good Environmental Status being developed for the Marine Strategy Framework Directive implementation.

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[10] Adapted from ABPmer (2010) and Natural England & JNCC (2011).
[11] FOCI - Feature of conservation importance.
[12] This definition is aligned with Marine Strategy Framework Directive’s biodiversity descriptor.
[13] In the marine environment, recovery generally refers to natural recovery through the removal of unsustainable physical, chemical and biological pressures, rather than direct intervention (as is possible with terrestrial features).

The adoption of the term favourable condition, which is being used for other sites in the MPA network, will encourage consistency in the use of terminology for conservation objectives and facilitate the implementation of a common approach across the MPA network. Achieving and sustaining favourable condition of MPA features will ensure their appropriate contribution to the progress towards the achievement of Good Environmental Status by 2020 (under the EU Marine Strategy Framework Directive), and of Favourable Conservation Status[14] (under the EU Habitats Directive).

Impact – The effects (or consequences) of a pressure on a component where a change occurs that is different to that expected under natural conditions, e.g. benthic invertebrate mortality.

Intolerance – Susceptibility of a habitat, community or species to damage, or death, from an external factor.

Pressure – The mechanism (physical, chemical or biological) through which an activity has an effect on any part of the ecosystem, e.g. physical disturbance to the seabed. The nature of the pressure is determined by activity type, intensity and distribution.

Recoverability – Ability of a habitat, community or species to return to a state close to that which existed before the activity or event caused change.

Reference condition – the state where there are no, or only very minor, changes to the values of the hydromorphological, physico-chemical, and biological quality elements which would be found in the absence of anthropogenic disturbance.

Sensitivity – A measure of tolerance (or intolerance) of a species or habitat to damage from an external factor and the time taken for its subsequent recovery.

Sensitivity pressure benchmarks – A series of benchmark levels of intensity for each pressure, where intensity reflects the magnitude, extent and duration of each pressure were established by ABPmer and MarLIN under the MB102 sensitivity matrix contract. The benchmarks were designed to provide a ‘standard’ level of impact against which to assess resistance. Where practicable three benchmarks were developed for each pressure, where the benchmarks describe the breakpoints between high/medium and medium/low pressure level, and the mid-point between these two benchmarks (defined as medium pressure). This medium pressure was used for assessing the sensitivity score within the overall sensitivity matrix. The pressure benchmarks were further refined following review during two two-day workshops with research experts (workshop 1) and industry representatives (workshop 2).

Unfavourable condition – The state of the feature is currently unsatisfactory and management may be required to enable favourable condition to be achieved.

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[14] Favourable Conservation Status is defined in Article 1 of the Habitats Directive for habitats listed in Annex I and species listed in Annex II of the Directive as:

The conservation status of natural habitats will be taken as ‘favourable’ when:

i. *its natural range and areas it covers within that range are stable or increasing, and*
ii. *the species structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future, and*
iii. *the conservation status of its typical species is favourable as defined in Article 1(i).*

The conservation status of species will be taken as 'favourable' when:

i. *population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable*
ii. *component of its natural habitats, and*
iii. *the natural range of the species is neither being reduced for the foreseeable future, and*
iv. *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*

Vulnerability – Vulnerability is a measure of the degree of exposure of a receptor to a pressure to which it is sensitive.

Annex 4: Implementing and communicating the protocol

The lead author from JNCC and Natural England will be responsible for ensuring the protocol is implemented. They will ensure that all internal contributors to the MCZ advice will have a copy of the protocol and understand the requirements.

Defra's Marine Biodiversity team, Chief Scientific Advisor, Defra Arms Length Bodies, the Independent External Review Group, and wider stakeholders were invited to review the draft protocol and provide comments to Natural England and JNCC. Natural England and JNCC have considered all the comments received and updated the protocol accordingly. Comments received, and the draft and final protocols will be accessible on JNCC and Natural England's website.

Annex 5: Monitoring and review

Lead authors will monitor assessments and draft advice from section leads to ensure the protocol is followed. An independent expert review panel will assess whether the draft advice package is consistent with the protocol.

This protocol is currently time limited for the duration of the SNCBs' advice on MCZ recommendations. The MCZ Project Board may commission a review of the protocol in the light of any changes to timetables or policies.

Annex 6: Related documents

List of all of the MCZ advice protocols:

A. Strategic protocol – The Principles Underpinning Our Statutory Nature Conservation Body Advice On Marine Conservation Zone Designation;
B. Quality control, assurance and peer review;
C. Document style and language;
D. Audit trail – version control and record keeping;
E. Assessing the scientific confidence of the presence and extent of features in recommended Marine Conservation Zones;
F. Assessing the scientific confidence of feature condition;
G. Assessing Marine Conservation Zones most at risk;
H. Assessing the contribution of existing sites to the network.