Supplementary Advice on Conservation Objectives for Geikie Slide and Hebridean Slope Nature Conservation MPA

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The information provided in this document sets out JNCC's supplementary advice on the conservation objectives set for Geikie Slide and Hebridean Slope Nature Conservation MPA (NCMPA), hereafter referred to as 'the site'. This document forms part of JNCC's formal conservation advice package for the site and must be read in conjunction with all parts of the package as listed below:

- **Background Document** explaining where to find the advice package, JNCC's role in the provision of conservation advice, how the advice has been prepared, when to refer to it and how it can be applied;
- **Conservation Objectives and Management Advice** document setting out the broad ecological aims (conservation objectives) for the site and JNCC's advice on;
    - protected feature condition;
    - conservation benefits that the site can provide if managed effectively; and
    - conservation measures that JNCC consider are required to support achievement of the conservation objectives stated for the site.
- **Advice on Operations** providing information on those human activities that, if taking place within or near the site, can impact it and hinder the achievement of the conservation objectives stated for the site.

The most up-to-date conservation advice package for the site can be downloaded from the conservation advice section of the Site Information Centre (SIC) on JNCC's website.

The advice presented here describes the ecological characteristics or 'attributes' of the site's protected features as specified in the site's conservation objectives listed in the 2014 Designation Order:

- burrowed mud (seapen and burrowing megafauna communities),
- offshore subtidal sands and gravels,
- offshore deep-sea muds.

Figure 1 below illustrates the concept of how a protected feature's attributes are interlinked: with impacts on one potentially having knock-on effects on another e.g. the impairment of any of the supporting processes on which a feature relies can result in changes to its extent and distribution and structure and function.

Collectively, the attributes set out in Table 1 & Table 2 below, along with the objectives set for each of them, describe the desired ecological condition (favourable) for the site's

protected features. All attributes listed in Table 1 & Table 2 must be to consideration when assessing impacts from an activity.

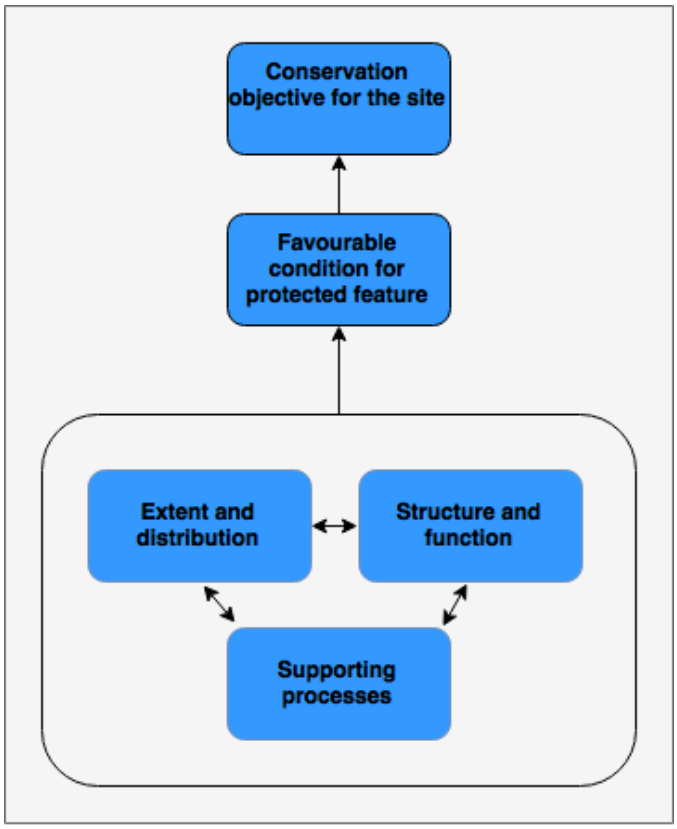

Figure 1. Conceptual diagram showing how feature attributes are interlinked and collectively describe favourable condition and contribute to the conservation objectives stated for the site.

In Table 1 & 2 below, the attributes for the burrowed mud & offshore deep-sea muds, and offshore subtidal sands and gravels protected features are listed respectively. An objective of recover or conserve is set for each protected feature attribute, reflecting our current understanding of available evidence e.g. whether it indicates some of a protected feature's extent is lost and needs to be recovered or that extent is not lost and needs to be conserved to ensure the protected feature is in overall favourable condition. Where a recover objective is advised and there is considerable uncertainty as to whether recovery is possible, this will be noted alongside the objective.

The rationale for setting an objective is provided in the summary of evidence column and supporting references listed in the reference section at the end of this document.

Note: when a conserve objective is set, this does not preclude the need for management, now or in the future to ensure a protected feature remains in favourable condition.

The advice presented here does not cover the site's geological or large-scale protected features as specified in the site's conservation objectives listed in the 2014 Designation Order:

- continental slope, and;
- slide deposits and slide scars representative of the Geike slide key geodiversity area.

Based on the best available evidence, JNCC do not consider that the activities taking place, or that could conceivably take place, are capable of affecting the continental slope large-scale feature . Moreover, achievement of the conservation objectives for the subtidal sedimentary habitats protected within the site is expected to preserve the slide deposit and slide scar features representative of the Geikie slide key geodiversity area (Brooks, 2013).. Therefore, large-scale features and geological features are not considered further within the scope of this advice.

Table 1: Supplementary Advice on Conservation Objectives for offshore deep-sea muds and burrowed mud protected feature of the site

In summary, the offshore deep-sea muds and burrowed mud protected features are considered to be in unfavourable condition and need to be recovered. This conclusion is driven by evidence that suggests mobile bottom-contacting fishing practices taking place may be impacting upon the structure and function of offshore deep-sea mud and burrowed mud. Whilst a fishing regulation ((EU) 2016/2336) came into force in 2016 that prohibits all bottom-contact fishing gear below 800 m, relatively moderate to low levels of demersal trawling still occur in the site and may have impacted upon the structure and function of offshore deep-sea muds and burrowed mud. Please see the Conservation Objectives and Management Advice document available in the conservation advice section of the SIC for JNCC's advice on the management of activities which JNCC consider is needed to recover to favourable condition the offshore deep-sea muds and burrowed mud protected features of the site.
Further information on activities capable of affecting the protected features of the site can be found in the Advice on Operations workbook available also in the conservation advice section of the SIC.

Attribute	Summary of evidence	View of attribute condition & objective	Confidence in attribute condition
Extent and distribution	The extent and distribution of offshore deep-sea muds and burrowed mud is defined by the sediment composition and biological assemblages. Any changes to sediment composition and biological assemblages brought about by human activities may impact the conservation status of the feature. The biological structure of offshore deep-sea muds in this site is closely linked to the burrowed mud feature, which represents the characteristic biological communities of this habitat. As such, these two features have been assessed together. Whilst the full extent of these features are not fully understood within the site, the most recent evidence presents a potentially larger extent of this feature than previously recorded at the point of designation (Ferguson *et al.*, 2022). The demersal fishing regulation that came into force in 2016 removes key fishing pressures of concern (abrasion, penetration and removal of non-target species) across offshore deep-sea muds and burrowed mud below 800m in the site (Regulation (EU) 2016/2336). However, according to Vessel Monitoring System (VMS) data mobile bottom-contacting fishing, specifically	Favourable - needs to be conserved	Low - JNCC has a baseline understanding of the extent and distribution of offshore deep-sea muds and burrowed mud, which is derived from point records taken from video and still transects recorded as part of the 2016 monitoring survey of the site (Fergusson *et al.*, 2022). This is supported by Marine Scotland Science (MSS) video data collected between 2000 and 2009. Further evidence is required to accurately delineate the extent of the features within the site. Evidence for impact is mainly indirect, based on our understanding of the sensitivity of burrowed mud and offshore deep-sea muds and its associated biological communities to pressures associated with human activities known to be taking place in the site; in this case bottom-contacting fishing gear, and is

	demersal trawling, has been occurring at low to moderate levels across the extent of offshore deep-sea muds and burrowed mud occurring above 800 m within the site. Supporting the VMS data is direct evidence of historical trawl marks across the features within the site (Ferguson *et al*., 2022). Whilst there is evidence from VMS data of demersal trawling occurring, albeit at relatively low levels of effort, pressures associated with this activity type are not considered capable of impacting the extent and distribution of these sedimentary protected features. On this basis, JNCC therefore advises a conserve objective.		supported by direct historical evidence of trawl marks found during the most recent monitoring survey of the site which coincides with these features (Fergusson *et al*., 2022, Tyler-Walters *et al*., 2023, FeAST, 2023 and JNCC, 2018). Our information about activities taking place within the site is incomplete e.g. our best available evidence for fishing activities only goes up to 2020. The assessment is also limited by the lack of information about Ministry of Defence activities that could be occurring within the site, as a Military Practice Area overlaps with the extent of the site.
Structure and function	The structure of offshore deep-sea muds and burrowed mud refers to the physical structure of the feature itself (finer scale topography, sediment composition) and its biological structure (the presence of key and influential species and characteristic communities). Recent survey data shows a disparity between the biological structure of the burrowed mud habitat in this site and the characteristic fauna associated with the feature, suggesting that further research on biological communities of burrowed mud at this site would be beneficial (Ferguson *et al*., 2022). The demersal fishing regulation that came into force in 2016, does remove key fishing pressures of concern (abrasion, penetration and removal of non-target species) across offshore deep-sea muds below 800 m in the site (Regulation (EU) 2016/2336). However, VMS data show mobile bottom-contacting fishing, specifically demersal trawling, occurring at relatively low to moderate levels across the offshore deep-sea muds and burrowed mud features which occur above 800 m. Supporting	Unfavourable - needs to be recovered	Same as for extent and distribution above.

	the VMS data is direct evidence of historic trawl marks across the feature (Ferguson *et al*., 2022). Expert opinion has determined that the activities, specifically demersal trawling, occurring are not significant enough to impact the physical structure of the offshore deep-sea muds and burrowed mud features, but the impact on the biological communities through abrasion and removal of non-target species will impact the function of the features. JNCC therefore advises a recover objective on this basis.		
Supporting processes	Supporting processes with respect to offshore deep-sea muds and burrowed mud include hydrodynamic regime, water and sediment quality. There is no evidence to suggest that human activities are having an adverse impact on the typical hydrodynamic regime to which the site is exposed. Whilst it is noted that the Irish and Scottish west coast sub-region of the Celtic Seas OSPAR region within which the site is located has been assessed to have a good contaminant status, (Larson et al., 2022), there is insufficient evidence to assess water or sediment quality in the site. Overall, there is no evidence to suggest that supporting processes that operate at this site are being impeded with respect to supporting the conservation status of burrowed mud and offshore deep-sea muds. JNCC advises conserve objective on this basis.	Favourable – needs to be conserved	Low - The evidence-base supporting JNCC's assessment against this attribute draws upon data from the Irish and Scottish west coast region and the wider Atlantic region (Larson et al., 2022), rather than any evidence available from within, or in close proximity to, the site itself. This lack of data pertaining to water and sediment quality within the site limits our assessment. Moreover, there is a lack of time series data concerning water quality and on how human activities may have impacted this.

Table 2: Supplementary Advice on Conservation Objectives for the offshore subtidal sands and gravels protected feature of the site

In summary, the offshore subtidal sands and gravels protected feature of the site is considered to be in unfavourable condition and needs to be recovered. This conclusion is driven by evidence that suggests mobile bottom-contacting fishing practices taking place may be impacting upon the extent and distribution, and structure and function, of offshore subtidal sands and gravels. Whilst a fishing regulation ((EU) 2016/2336) came into force in 2016 that prohibits all bottom-contact fishing gear below 800 m, moderate to low levels of demersal trawling still occur in the site and may have impacted upon the extent and distribution and structure and function, of offshore subtidal sands and gravels. Please see the Conservation Objectives and Management Advice document available in the conservation advice section of the SIC for JNCC's advice on the management of activities which JNCC consider is needed to recover to favourable condition the offshore subtidal sands and gravels protected feature of the site.
Further information on activities capable of affecting the protected features of the site can be found in the Advice on Operations workbook available also in the conservation advice section of the SIC.

Attribute	Summary of evidence	View of attribute condition & objective	Confidence in attribute condition
Extent and distribution	The extent and distribution of offshore subtidal sands and gravels are defined by their sediment composition and biological assemblages. While the full extent of the offshore subtidal sands and gravels feature is not fully understood, the most recent evidence for this site, collected in 2016, presents a potentially smaller extent of this feature than previously recorded (Ferguson *et al*., 2022). The demersal fishing regulation that came into force in 2016 does remove key fishing pressures of concern (abrasion, penetration and removal of non-target species) across offshore subtidal sands and gravels below 800 m in the site (Regulation (EU) 2016/2336).However, VMS data shows mobile bottom-contacting fishing, specifically demersal trawling, has been occurring at relatively low to moderate levels across the central extent of offshore subtidal sands and gravels, which are present above 800 m. Recent survey data found direct evidence of historical trawl scars in the area coinciding with the offshore subtidal sands and gravels feature (Ferguson *et al*., 2022).	Unfavourable - needs to be recovered	Low- JNCC has a baseline understanding of the extent and distribution of offshore subtidal sands and gravels, which is derived from point records taken from video and still transects from video and still transects recorded as part of the 2016 monitoring survey of the site (Fergusson *et al*., 2022). This is supported by MSS video data collected between 2000 and 2009. Further evidence is required to accurately delineate the extent of offshore subtidal sands and gravels within the site. Evidence for impact is mainly indirect, based on our understanding of the sensitivity of offshore subtidal sands and gravels and their associated biological communities to pressures associated with human activities known to be taking place in the site; in this case bottom-contacting fishing gear. There is also direct evidence of historical trawl marks found during the most recent monitoring survey of the site which coincides with this

	On this basis, JNCC therefore advises a recover objective.		feature (Fergusson *et al*., 2022, Tyler-Walters *et al*., 2023, FeAST, 2023, and JNCC, 2018). Our information about activities within the site is incomplete e.g. our best available evidence for fishing activities only goes up to 2020. The assessment is also limited by the lack of information about Ministry of Defence activities that could be occurring within the site, as a Military Practice Area overlaps with the extent of the site.
Structure and function	The structure of offshore subtidal sands and gravels refers to the physical structure of the feature itself (finer scale topography, sediment composition) and its biological structure (the presence of key and influential species and characteristic communities). The demersal fishing regulation that came into force in 2016 does remove key fishing pressures of concern (abrasion, penetration and removal of non-target species) across offshore subtidal sands and gravels below 800 m in the site (Regulation (EU) 2016/2336).However, VMS data shows mobile bottom-contacting fishing, specifically demersal trawling, occurring at relatively low to moderate levels across the central extent of offshore subtidal sands and gravels which are occurring above 800 m. Recent survey data found direct evidence of historical trawl scars in the area coinciding with the offshore subtidal sands and gravels feature (Ferguson *et al*., 2022). JNCC therefore advises a recover objective on this basis.	Unfavourable - needs to be recovered	Same as for extent and distribution above.
Supporting processes	Supporting processes with respect to offshore subtidal sands and gravels include hydrodynamic regime, water and sediment quality. There is no evidence to suggest that human activities are having an adverse impact on the typical hydrodynamic regime to which the site is exposed. Whilst it is noted that the Irish and Scottish west coast sub-region of the Celtic	Favourable – needs to be conserved	Low- The evidence-base supporting JNCC's assessment against this attribute draws upon data from the Irish and Scottish west coast region and the Wider Atlantic region (Larson et al., 2022), rather than any evidence available from within, or in close proximity to, the site itself. This lack of data pertaining to water and

	Seas OSPAR region within which the site is located has been assessed to have a good contaminant status (Larson et al., 2022), there is insufficient evidence to assess water or sediment quality in the site. Overall, there is no evidence to suggest that supporting processes that operate at this site are being impeded with respect to supporting the conservation status of offshore subtidal sands and gravels. Therefore, JNCC advises a conserve objective on this basis.		sediment quality within the site limits our assessment. Moreover, there is a lack of time series data about water quality and on how human activities may have impacted this.

References

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