Biogenic habitats

Scottish Government
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Key message

The 'no loss' target in the extent of subtidal biogenic habitats (habitats formed by key animal or algal species) has not been achieved in the Moray Firth, West Highlands, Outer Hebrides, Argyll and Clyde Scottish Marine Regions (SMRs). There is low confidence in the assessment and insufficient data to assess the other SMRs.

Mixed horse mussels and flame shell, Loch Creran.

Background

This indicator is used to assess the status of six types of subtidal biogenic habitats (i.e. habitats formed by key animal or algal species): blue mussel, horse mussel, flame shell, maerl and seagrass beds, as well as serpulid aggregations (Figure 1), in relation to the target set by the UK Marine Strategy Part 1 (UK Government, 2012; 2019). These habitats are encompassed by the intertidal and continental shelf reporting category.

The indicator estimates losses in the coverage of these six habitats within each Scottish Marine Region (SMR) derived from surveys between 2011 and 2018. Losses could arise from physical disturbance, for example the use of demersal and static fishing gear, or anchoring, as well as a range of other factors such as overfishing, changes in the flow characteristics of the water resulting from engineering works, and potentially from climate change, ocean acidification and pollutants (including from fish farming). Furthermore, natural drivers of change; disease, storm action and fluctuations in recruitment of the habitat-forming species, are also possible factors.

The habitats are all Priority Marine Features and are habitats for which monitoring information is required to fulfil UK legislative requirements (Robson, 2014). All biogenic habitats are known to respond to anthropogenic disturbance which in turn affects coverage, with reductions being indicative of probable impacts to the wider marine environment.

The data underpinning the assessment are largely derived from surveys undertaken as part of marine protected area development and monitoring programmes run by NatureScot and Marine Scotland, together with historical baseline data drawn from the SNH GeMS database of Priority Marine Features.

For further information on this topic go to: https://marine.gov.scot/sma/assessment/biogenic-habitats

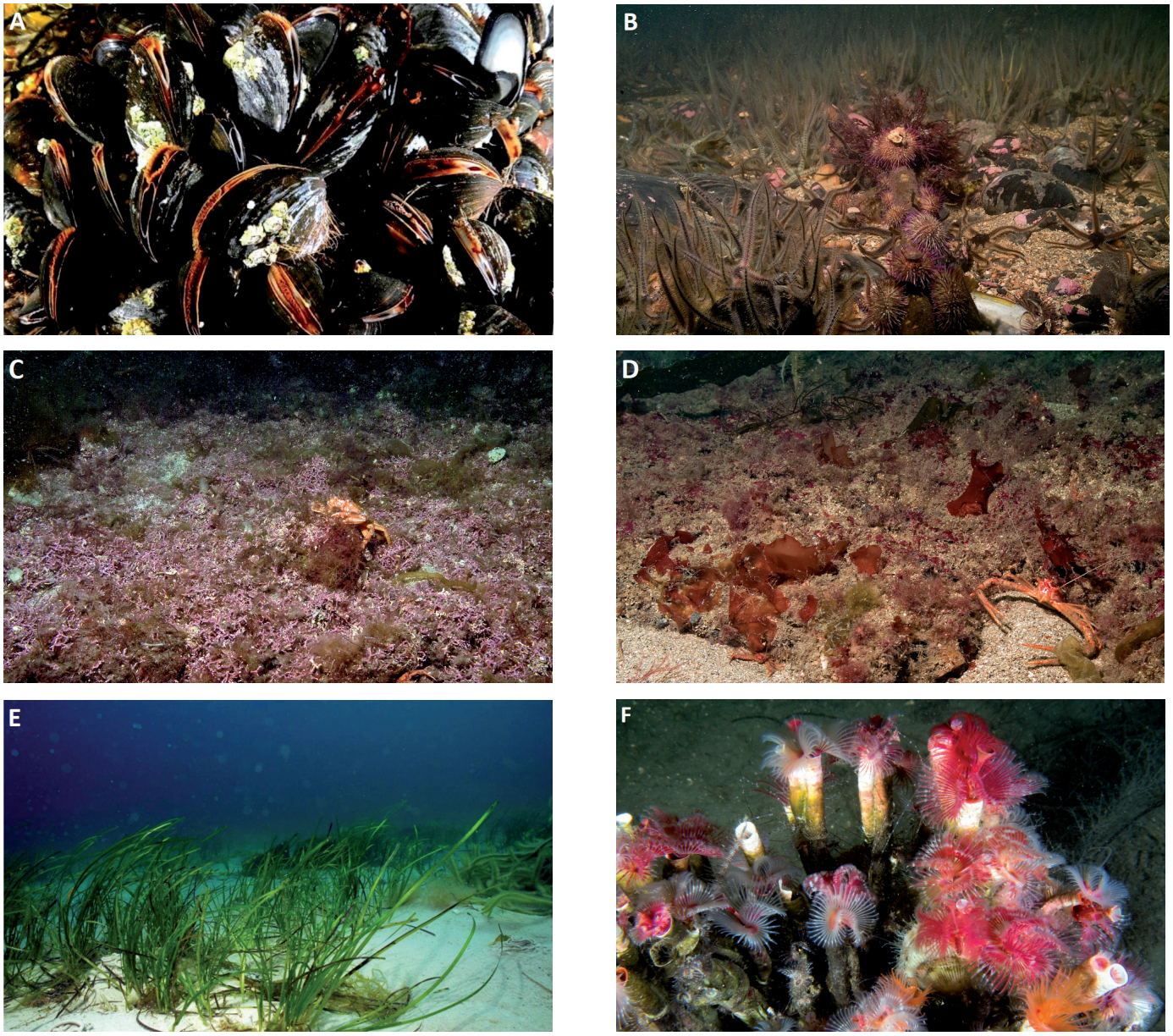

Figure 1:
Illustrations of the six biogenic habitats considered by the biogenic habitat loss indicator. A, blue mussel bed; B, horse mussel bed; C, maerl bed; D, flame shell bed; E, seagrass bed; F, serpulid aggregation. © NatureScot.

Results

The percentage loss in extent recorded during the assessment period 2011 to 2018 for each of the biogenic habitats for each region is shown in Table 1, as well as the aggregated total loss in hectares for each region. The target quality threshold of zero loss was not met in five of the regions: Moray Firth, West Highlands, Outer Hebrides, Argyll and Clyde.

There were insufficient data to provide assessments for the remaining six regions and the table reflects a paucity of data on biogenic habitat extent for Scottish Marine Regions in general. Recorded losses in the Clyde relate to flame shell and maerl beds at just one location (Loch Fyne). Marked losses in flame shell and serpulid aggregation habitats were principally responsible for the target not being met for Argyll, whereas seagrass and serpulid habitats were the significant contributors to loss in the Outer Hebrides and West Highlands respectively. Pronounced reduction of blue mussel beds in the Dornoch Firth were solely responsible for the recorded habitat loss in the Moray Firth.

Confidence in assessments

Confidence for all assessments is low. The role played by anthropogenic factors in driving change in habitat extent at the surveyed locations is generally not understood. There is no firm evidence for a linkage except for

Table 1: Percentage and total loss of biogenic habitat extent within Scottish Marine Regions based on comparison of 2011 - 2018 extent estimates with baseline values. Also shown is the indicator quality assessment in terms of meeting the target (0% loss of any habitat). '-' indicates feature unrecorded. '?' indicates feature present but insufficient data available to determine changes in extent. 'LOSS' indicates a clear reduction in extent on the basis of repeat observations but where details about either the original total extent and/or scale of loss are lacking. 'STABLE' indicates minimal change in known extent between survey events. See Tables a & b in Results (extended) for baseline extent of habitats and estimates of loss.

Scottish Marine Region	Habitat (% loss)						Total loss (ha)	Target met
	Blue mussel	Flame shell	Horse mussel	Maerl	Seagrass	Serpulid aggs		
Forth and Tay	?	-	?	-	?	-	?	?
North East	-	-	-	-	-	-	?	?
Moray Firth	99.5	-	Stable	-	?	-	217	No
Orkney Islands	-	?	?	?	?	-	?	?
Shetland Isles	?	-	?	?	?	-	?	?
North Coast	-	-	-	?	-	-	?	?
West Highlands	?	<1	?	?	?	>90	20	No
Outer Hebrides	?	-	?	?	27.1	-	180	No
Argyll	?	53.3	Loss	?	Loss	35.0	>78	No
Clyde	?	9.1	?	9.9	?	-	23	No
Solway	?	-	-	?	?	-	?	?

loss of flame shell habitat in West Highlands. For most of the habitats the level of confidence in baseline and current habitat extent data is low and so recorded reductions in extent of specific beds does not necessarily imply a global reduction within a region.

The level of accuracy of quantitative habitat loss assessments for particular beds is likely to be highly variable, although high confidence can generally be placed on the qualitative identification of loss. Apart from flame shell beds and serpulid aggregations, assessments are mostly based on temporal trend data derived from only a small proportion of the likely total extent of the feature within a region. The indicator includes losses recorded since 2011 but the precise timing of losses is generally unknown. Thus, in some cases loss may have predated 2011 with the post 2011 trend following a different projection.

Conclusion

Examples of habitat loss were recorded during the period 2011 to 2018 in five SMRs: Moray Firth, West Highlands, Outer Hebrides, Argyll and Clyde. There were insufficient data available to provide assessments for the remaining six regions or for all six biogenic habitats in any single region, with all six habitats currently only known to occur in West Highland and Argyll regions.

Recorded losses in the Clyde relate to flame shell and maerl beds at just one location (Loch Fyne). Marked losses in flame shell and serpulid aggregation habitats were principally responsible for the target not being met for Argyll, whereas seagrass and serpulid habitats were the significant contributors to loss in the Outer Hebrides and West Highlands respectively. Pronounced reduction of blue mussel beds in the Dornoch Firth were solely responsible for the recorded habitat loss in the Moray Firth.

Confidence in the assessment is low as a result of the small proportion of biogenic habitat for which records exist and the uncertainty regarding the extent to which habitat loss reflects anthropogenic drivers. The losses reported may be caused by a range of pressures including those associated with human activities or natural drivers of change including storm action and fluctuations in recruitment of the habitat-forming species.

Knowledge gaps

Whilst our knowledge-base has improved considerably over the last 10 years, a more detailed understanding of the distribution and extent of biogenic habitats within each of the Scottish Marine Regions is still required. Such data are needed to underpin any future application of a biogenic habitat extent indicator in Scottish waters (whether in the current combined format or perhaps a modified approach using habitat-specific assessments) and the continued use of the stringent UK 'no loss' target. Studies are also needed to determine the scale; nature and cause of natural temporal fluctuations in habitat extent and condition (compared with anthropogenic factors).

Status and trend assessment

Region assessed	Status with confidence	Trend with confidence
Argyll		
Clyde		
Moray Firth		
Outer Hebrides		
West Highlands		

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Scotland's Nature Agency
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JNCC
Joint Nature Conservation Committee

SEPA
Scottish Environment Protection Agency

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