Scottish MPA Project
Fisheries Management Guidance

FLAME SHELL BEDS

JULY 2013[1]

The fisheries management guidance has been produced to provide advice on the impact various fishing activities may have on MPA search features in Scotland's seas. The advice is organised by features and gear types. Fishing gears are grouped to combine those with broadly similar impacts, but where there is likely to be variation within a group of features (e.g. for high and low energy sand habitats), this has been taken into account. Where possible the guidance has been based on evidence from peer-reviewed scientific journals.

The advice on fisheries management falls into three broad categories:

- Gear/feature combinations that are unlikely to cause unacceptable impacts (except possibly at very high levels of effort) and so no additional management is likely to be required;
- Gear/feature combinations that are likely to cause unacceptable impacts and for which no possible mitigation measures could be identified at this stage other than closure to that gear;
- Gear/feature combinations that are likely to cause some degree of impacts but for which management may be possible to mitigate the effects (e.g. modification or restriction of certain gears, partial or temporary area closures, effort limitation).

In the last type of cases in particular, further site-specific evidence gathering and discussion with stakeholders will be required to determine the appropriate management measures.

The fisheries management guidance has been used, along with the FEatures Activities Sensitivities Tool (FEAST), to inform the development of management options papers for each possible MPA.

[1] Based on Version 1.1 of the fisheries management guidance

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The flame or gaping file shell *Limaria hians* creates nests by weaving together tough threads (byssus) with surrounding material such as seaweed, maerl and shells. Adjoining nests coalesce to form larger structures with multiple flame shells which, in some locations where conditions allow, carpet the bed for several hectares. The carpets create a unique habitat that stabilises the sediment and provides an attachment surface for many organisms including hydroids, bryozoans, ascidians and seaweeds. These organisms in turn add to the habitat complexity and provide shelter for other species such as cod and saithe. A rich diversity of fauna is also found within and below the flame shell bed.

Impacts

Demersal towed gear (including scallop dredges, otter trawl and beam trawls)

The mechanical impacts from demersal towed gear can affect flame shell beds in two main ways. Firstly, direct mortality from damage to the shells and secondly, breaking up the carpet of byssus threads where it occurs[1,2,3]. Mobile gear (predominantly dredging) is considered to be the likely cause of the decline in extent of former beds in the Clyde[3]. Full recovery is not certain[1] There are no studies directly addressing the effects of other towed gears on this habitat, however it is assessed as highly sensitive to the type of pressure caused by trawling (shallow abrasion)[4].

Demersal static gears (including pots, traps, lines and nets)

No direct evidence of the effects of static gears on flame shell beds was found; however given the delicate nature of their shells[1] and the nests, unregulated fishing with heavier static gear (pots) could have damaging effects. Further research will be required to determine the level of fishing that would produce an unacceptable impact.

JNCC/SNH Advice

Demersal towed gear - Given the characteristics of flame shell beds and the potential for impact even from low levels of activity, SNH and JNCC advise that use of demersal bottom contacting gears should be avoided on this feature.

Demersal static gear – The potential for adverse impact from static gear is likely to be directly related to fishing intensity. Fishing activity at low levels is not expected to adversely impact the feature, however further research will be required to determine the level of fishing that would be compatible with the feature.

Confidence in advice

Demersal towed gears - High certainty. The conclusions relating to dredging are supported by good quality, directly relevant scientific information. However, conclusions regarding trawling are based on sensitivity analysis and can be considered low certainty.

Demersal static gears - Moderate certainty. There is no direct published evidence specifically for static gear impacts on this feature, analogy with other habitats for which evidence does exist has been used to determine advice. Evidence to support this assumption is limited.

Evidence

[1]Trigg *et al.,* 2009; [2]Hall-Spencer *et al.,* 2003; [3]Hall-Spencer and Moore, 2000; [4]Tillin *et al.,* 2010.							
There is both experimental and observed evidence for the impacts of dredging on flame shell beds derived from the west coast of Scotland which is directly applicable to the type of beds likely to be designated as Nature Conservation MPAs. There is no direct evidence for the effects of static gears. Conclusions were based upon analogies with other habitats. Evidence supporting this assumption is limited.							
Directly relevant peer reviewed literature	✔	Directly relevant grey literature	✔	Inference from studies on comparable habitats, gears or geographical areas.	✔	Expert judgement or anecdotal evidence	✔