Annex H3 Methods for assessing impacts on aquaculture

Contents

H3.1 This section outlines the method taken to assess the impacts of recommended Marine Conservation Zones (rMCZs) on the UK aquaculture sector. For the purposes of this Impact Assessment (IA), aquaculture is defined as the process of farming and does not include the collection of wild organisms (for use in farming operations).[1] The method is presented under the following sections: (1) baseline description; (2) management scenarios; (3) assessment of the economic impact of Marine Conservation Zones (MCZs) and (4) limitations.

1 Baseline description

H3.2 The baseline description outlines the aquaculture operations that will be affected in each rMCZ, including the species grown and the scale of cultivation. The location of operations was identified using data layers provided in Lee, Stelzenmüller and Rogers (2010) as well as information gathered informally during MCZ planning meetings and consultation with Inshore Fisheries and Conservation Authorities (IFCAs).

H3.3 Because of the small number of aquaculture businesses that operate in each rMCZ, commercially sensitive information on the value of production is not provided at the level of individual rMCZs, and the importance of different species to businesses is expressed only as a percentage of total output and turnover. Where identified via consultation with stakeholders, expected significant changes to aquaculture operations in the baseline situation are described.

H3.4 In the Finding Sanctuary MCZ Project Area (south-west), all commercial aquaculture businesses that could be impacted on by MCZs were contacted and where possible information on their operations in rMCZs has been sourced from them directly. Where the relevant information could not be gathered directly from operators, it has been sourced from the relevant regulating body.

2 Management scenarios

H3.5 Management scenarios have been identified for each rMCZ that make assumptions about the management of aquaculture that may be needed in order to achieve the conservation objectives of features protected. These scenarios have been used, for the purposes of the IA, to estimate the potential economic impacts of the effects of MCZs on the sector.

H3.6 The scenarios are for illustrative purposes only and do not constitute recommendations. Following the designation of MCZs, the management of aquaculture will be decided on a case-by-case and site-by-site basis and may differ from the management scenarios used in this IA. It will be informed by additional evidence on the location, sensitivity and existing condition of features protected by the suite of MCZs, as well as the current level and risk of impact (if any).

H3.7 The scenarios have been established by the regional projects, drawing on information and advice provided via MCZ regional project vulnerability assessments, Joint Nature Conservation Committee (JNCC) and Natural England fisheries management advice and guidance (JNCC and Natural England, 2010; JNCC and Natural England, 2011a; JNCC and Natural England, 2011b) as well as other formal and informal meetings and conversations with JNCC, Natural England and

[1] These activities are considered under the 'commercial fishing' sector assessments.

relevant public authorities. The management scenarios used in this IA are set out below and are discussed separately for rMCZs that are and are not rMCZ Reference Areas.

2.1 Management of aquaculture in rMCZs that are not rMCZ Reference Areas

Pacific oyster cultivation in the south-west

H3.8 Pacific oyster *Crassostrea gigus* cultivation was the only element of the aquaculture sector identified as potentially requiring management to mitigate impacts on features protected by the suite of MCZs. Management may be required to mitigate the risks of wild settlements of Pacific oysters prohibiting the achievement of the conservation objective of MCZ features. Pacific oysters are considered by the UK government to be invasive non-native species, and the condition of a number of habitats and species recommended for protection by MCZs is sensitive to the introduction and spread of non-native species (ABP Marine Environmental Research, 2010). However, the oyster cultivation industry does not view Pacific oysters as invasive species and, in its view, management of Pacific oysters is not required (Shellfish Association of Great Britain, pers. comm., 2011; Devon and Severn Inshore Fisheries and Conservation Authority (IFCA), pers. comm., 2011). The classification of Pacific oysters, the risks arising from Pacific oyster settlement and the most appropriate way of managing these risks are therefore currently subject to debate. The risks and associated management have been considered in recent work published by Seafish (Syvret and Fitzgerald, 2008) and further work is currently being undertaken by Bournemouth University. Discussions with stakeholder representatives, including Natural England, the Shellfish Association of Great Britain, and the Devon and Severn IFCA, indicate that there is not yet any conclusion to this issue.

H3.9 The IA does not provide a management recommendation. Two management scenarios, which result from the current debate described above, are adopted as illustrative approaches for mitigating impact. For the purposes of the IA, it is assumed that the management will be applied to all Pacific oyster cultivation operations within, or within close proximity of, an rMCZ. The scenarios are:

- Management Scenario 1: no (additional) management;
- Management Scenario 2: compulsory use of triploid stock for Pacific oyster cultivation.

Pacific oyster cultivation in other project areas

H3.10 The Pacific oyster was introduced to the Balanced Seas Project Area through aquaculture and now occurs in many locations as stand-alone, wild, viable populations (Balanced Seas vulnerability assessment, 2011). The widespread distribution of the Pacific oyster, and the fact that it is now prolific and well established, means methods other than the compulsory use of triploid stock have been more appropriate in this region, and it has not, therefore, been considered as a potential mitigation measure (Balanced Seas vulnerability assessment, 2011). As such, no management scenarios have been adopted for Pacific oyster cultivators in the south-east.

H3.11 In the other regional project areas – Irish Sea Conservation Zone and Net Gain – Pacific oyster cultivation does not take place in the vicinity of rMCZs.

2.2 Management of aquaculture in rMCZ Reference Areas

H3.12 The rMCZ Reference Area guidance (JNCC and Natural England, 2010) states that aquaculture is classified as an activity that is both depositional and extractive and will, therefore, not be permitted in rMCZ Reference Areas. Consequently, only one management scenario is used in this IA:

- Management Scenario: closure of the site to aquaculture operations.

H3.13 However, no known aquaculture operations are present within or in close proximity to any of the rMCZ Reference Areas. As such, no impacts to the aquaculture sector are anticipated as a result of rMCZ Reference Areas.

3 Assessment of the economic impact of MCZs

3.1 Data collection

H3.14 Quantitative information on the shellfish production of affected businesses was obtained from a number of sources, including:

- Audited data collated by regulators. This included the Devon and Severn IFCA.
- Unaudited data provided directly by affected businesses.

H3.15 Quantitative and qualitative information on the impacts of the MCZ management scenarios was collected via a series of one-to-one meetings with affected businesses and representatives and regulators of the sector. It should be noted that information collected through formal and informal discussions with organisations during the development of the management scenarios has also been employed in the IA.

Meetings with affected businesses, sector representatives and regulators

H3.16 Semi-structured interviews were undertaken in person, by telephone and/or by email during July, August and September 2011. This technique was chosen because it allowed the interviewer the flexibility to pursue certain questions in greater depth, depending on the knowledge of the interviewee and the scale of the impacts. Information from the interviews was recorded as meeting notes.

H3.17 Prior to the meeting, each interviewee was provided with maps of the MCZs and an explanation of the IA management scenarios. Background to the MCZ project was provided where necessary at the beginning of each interview. This included an overview of the management scenarios being considered in the IA, and the basis for and status of the scenarios. The purpose of the interview was explained, and the interviewee was asked to assume that the management scenarios would be enforceable and effective when providing information on impacts. Depending on the status of the interviewee, they were asked to provide information on their own business activities, or on the activities of businesses that they represent or regulate.

H3.18 The key aspects covered in each interview regarding management of Pacific oyster cultivation were:

- output and turnover of the business and amount attributable to the cultivation of Pacific oysters;
- type of Pacific oyster seed used;
- previous experience of triploid seed stock;
- sources and available supply of triploid seed stock;
- if it was required, the anticipated effect of compulsory use of triploid stock on species cultivated by operators and their business's ongoing viability.

3.2 Analysing the impacts

H3.19 The data collected were used to provide a qualitative description of the likely impacts of MCZ management and to provide underlying data on which to base calculations of the economic impact. Data collected on volume and value of output were used to estimate the potential impacts on business revenues. Where value data were not provided by an individual operator, estimates were made by applying average price per tonne values to that operator's volume data. Price per kg ranged from £3.50 to £4.30.

H3.20 A 'best estimate' of the revenue affected is presented in the IA Evidence Base and Summary and Annex O. Best estimates of the cost have been calculated based on the relative probabilities of the management scenarios occurring. In the absence of better information, it is assumed that each of the two scenarios has an equal probability of occurring, and the best estimate is therefore taken to be the mid-point of the two. These figures are not provided at site level.

Estimating the economic impact

H3.21 The economic impact of the effect of MCZs on aquaculture is estimated for the IA in terms of the impact on gross value added (GVA). Sufficient data with which to calculate impacts via changes to consumer and producer surplus (the measures used in conventional economic cost-benefit analysis) were not available and GVA was used as an appropriate alternative. GVA measures the contribution to the economy of each individual producer, industry or sector and is used across government to measure national, regional and sub-regional economic performance (Wainman, Gouldson and Szary, 2010).

H3.22 Insufficient data are available on which to calculate the impact on GVA directly. Consequently, the impact on GVA has been calculated based on an estimate of GVA as a percentage of the sector's total revenue. *Charting Progress 2* identifies that 55% of total revenue for the UK shellfish and finfish marine aquaculture sector is captured as GVA (Defra, 2010). This figure has been used in this IA to estimate the impact on GVA from the impact of MCZs on the revenue of affected operators.

H3.23 A 'best estimate' of the effect of MCZs on GVA is calculated as described in paragraph H3.20.

4 Limitations

H3.24 There are a number of limitations associated with this approach that derive from the assumptions made. These include:

- The considerable uncertainty over the likely management (reflected by the two management scenarios) results in significantly different magnitudes of impacts. It is unknown which of the two scenarios is most likely to occur. The 'best estimtae' may under or overstate the true impact.
- The conversion of affected revenue to GVA based on information for the whole UK shellfish and finfish marine aquaculture sector is crude and does not take into account regional variation, or differing relative economic contribution of cultivators of different species and business sizes. As such, the estimates of impact on GVA may underestimate or overestimate the true value.
- Insufficient information was obtained to be able to assess any potential reduction in the impacts that may result from operators switching to other species in response to the impacts of MCZs. As such, the costs calculated are likely to be overestimated.

5 References

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