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# Social and Economic Impact Assessments for Fisheries Management Decisions – Annex A: Review of Example SEIAs

(MMO1384)



...ambitious for our seas and coasts



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**Report prepared for:**  
Marine Management Organisation

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## A Review of Example SEIAs

This annex sets out the detailed review of the example social and economic impact assessments (SEIAs). The six example assessments reviewed were:

1. MMO impact assessment for fisheries management measures in marine protected areas (MPAs) (Section A.1)
2. Defra De Minimis Assessment (DMA) for highly protected marine areas (HPMAs) designation and management (Section A.2)
3. Devon & Severn IFCA byelaw impact assessment (Section A.3)
4. Welsh Government Integrated Impact Assessment (Section A.4)
5. Scottish Government SEIA for MPA designation (Section A.5)
6. USA Environmental Impact Statement including Social Impact Assessment for halibut management proposal (Section A.6).

A summary of each example is provided in Table A1.

**Table A1: Summary of example SEIAs.**

Example	General approach	Economic aspects monetised	Economic aspects not quantified	Social aspects assessed	Environmental aspects	Level of analysis (local, regional, national)	Approach to displacement	Data requirements
MMO DMA assessment of MPA byelaw	Assessment of costs to fisheries over 10 years, using 4-year average.	Fisheries landings affected.	Indirect costs to the fishing industry associated with displacement. Number of non-UK vessels affected.	Not assessed. Some related aspects are described briefly in the justification.	Impact of displaced activity on habitats outside the management area (not quantified).	Local – Site-based, not linked to land-based impacts. Local/expert knowledge used to contextualise some of the data.	Recognises potential for displacement to mitigate some impacts on fisheries but does not assess or quantify.	Moderate.
Defra DMA of HPMAs	Assessment of costs to fisheries and benefits to ES over 30 years	Fisheries profit foregone (incorporating displacement).	Not stated – focus is on the quantified impacts.	Social vulnerability metrics were included in site selection process. Brief mention of social impacts related to 'loss of jobs and mental health impacts'.	Ecosystem services assessment undertaken, although this appears to value total benefits, rather than marginal benefits from protection.	Local – Site-based, and consideration of local/ regional aspects through MSOAs.	Displacement was assessed using specialist models and incorporated into profit foregone calculations. Details of models and assumptions not provided.	Moderate/ Extensive.
Devon & Severn IFCA impact assessment for fishing permit byelaw	Assessment of costs to fisheries over 10 years.	Cost to fisheries of the increase in permit price.	Brief mention of catch reporting requirements. Benefits described of complying with national legislation, and	Not specifically addressed, but identifies the types of groups that would be subject to permit conditions.	Brief qualitative consideration of benefits of protection for habitats, and reduced CO <sub>2</sub> emissions.	Local, incorporating local knowledge on individual vessels affected.	Not assessed (not relevant).	Low.

Example	General approach	Economic aspects monetised	Economic aspects not quantified	Social aspects assessed	Environmental aspects	Level of analysis (local, regional, national)	Approach to displacement	Data requirements
			reduced steaming times for vessels to undertake maintenance.					
Welsh Government IIA to reduce water pollution	Mostly qualitative and descriptive impact assessment, covering broad range of topics. 'Central scenario' over 20 years presented.	Costs to businesses of complying with the proposal.	Not clear what aspects are included in the monetisation and what aspects are not monetised.	Social impacts described qualitatively and at high level. Relates to public health, tenant farmers, children's rights, mental wellbeing and community cohesion.	Brief description of the potential to contribute to an improved environment and reduced emissions. Environmental benefits are monetised, but details not provided.	High-level, national.	Not relevant.	Moderate.
Scottish Government SEIA for 4 MPAs	Assessment of costs to fisheries and other sectors over 20 years.	Impact on fisheries landings value, GVA and employment (direct, indirect, induced). Public sector costs.	Displacement impacts	Distribution of impacts by location, fishing group, age, income, social groups and gender. Considered qualitatively. More recent SEIAs for offshore wind development have	Ecosystem service costs and benefits considered qualitatively (marginal changes).	Local – Site-based, and land-based impacts linked to home port and port of landing.	Not specifically assessed, but described qualitatively. Later SEIAs have quantified the potential significance of displacement.	Moderate.

Example	General approach	Economic aspects monetised	Economic aspects not quantified	Social aspects assessed	Environmental aspects	Level of analysis (local, regional, national)	Approach to displacement	Data requirements
				considered impacts on social clusters.				
USA Environmental Impact Statement and Social Impact Assessment	Impact assessment considering impacts on stocks, fisheries, and environmental components. Includes specific social impact assessment. Future impacts over a set time period were not assessed.	Fisheries revenue (gross first wholesale value, or ex-vessel value).	Fish processing, support services to the harvesting and processing sectors, consumers of fish and fishery products, and non-consumption of the resource. Management and enforcement considerations	Detailed social impact assessment, for communities identified as engaged in and dependent on the fisheries. Vulnerability of communities considered. Wider social and cultural importance of the fishery highlighted.	Impacts on the fish stock, and on other environmental components (mammals, birds, habitats, ecosystem).	Local (communities) and fleet-level.	Not specifically assessed. Highlighted that revenue estimates do not incorporate potential behavioural adaptations.	Extensive.



## A.1 MMO impact assessment for fisheries management measures in marine protected areas

MMO carried out a **DMA** for the **Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023** (MMO, 2023a). This intends to ensure conservation objectives of the sites are furthered, conserving marine fauna and habitats by prohibiting bottom towed fishing activities within specified areas. The assessment incorporated information from a previous Call for Evidence. The consultation documentation includes mapping, byelaw details and assessment of fisheries impacts.

### A.1.1 Impact assessment requirement

Legislation with net costs to businesses over £5 million requires a regulatory impact assessment. Below this, DMAs are produced. Analysis is in line with HM Treasury Green Book methodology, and includes consideration of the impact on small and micro businesses.

### A.1.2 Approach

The following options were considered, with option 2 being the preferred option:

- Option 0: Do nothing.
- Option 1: No statutory restrictions; introduce a voluntary agreement.
- Option 2: Removal of pressures from specified areas of designated feature via prohibition of bottom towed fishing. This may include a whole site prohibition where sensitive designated features are distributed throughout the whole site.
- Option 3: Removal of pressures via a whole site prohibition across all sites. The use of bottom towed gear will be prohibited throughout the MMO section of all sites considered in this assessment.

A ten-year timescale is considered for the impacts to businesses. Costs and benefits are presented for the preferred option only.

Links are made to relevant marine plan policies in the area of each site, and to the UK Marine Strategy.

### A.1.3 Economic impacts

Economic impacts are assessed over a ten year period, using a discount rate of 3.5%<sup>1</sup>. The fishing analysis used annual average data from a four-year period (2016-2019). 2020 was also presented but was not included in the analysis due to the effects of Covid-19 on normal fishing patterns.

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<sup>1</sup> The discount rate reflects the concept of time preference – that generally people prefer to receive goods and services now rather than later (HM Treasury, 2022).

For fishing, the analysis covers the following:

- the gear types used in the sites, and the proportion that is UK and non-UK activity (it is not clear how gear type has been assigned to non-UK vessels, this may have been linked from the Community Fleet Register)
- estimated number of UK vessels using bottom-towed gears in the proposed management areas (split by over-12m and under-12m vessels)
- direct costs to the fishing industry from reduced access to fishing grounds, assessed as loss of profits (monetised)
- potential impact of displaced fishing activity on habitats/areas outside of the management areas (non-monetised)
- 'indirect costs to the fishing industry associated with displacement to other fishing grounds' (non-monetised, as it was considered 'not possible to accurately predict the location (and thus the associated costs) of displaced fishing activity')
- familiarisation costs for reading the new byelaw information
- monitoring and compliance costs for public bodies, which were considered to be absorbed by existing compliance systems and therefore not represent an additional cost.

The DMA states that economic impacts on non-UK fishing vessels is not within the scope for the headline cost figures, but evidence is included for context. For non-UK vessels, the following information is provided:

- the number of over-12m non-UK vessels using bottom-contacting gears in the proposed management areas (from VMS records)
- effort by non-UK vessels (VMS records)
- best-case and worst-case landings value by EU member state (based on value of landings from the relevant ICES rectangles)
- estimated landings value for EU member states per management area per nation (derived by proportioning the landings from the ICES rectangle to the management area; for under-12m vessel this used the proportional area technique; for over-12m vessels this was based on the VMS activity within the management areas versus the ICES rectangles)
- familiarisation costs for non-UK vessels.

Expert knowledge is used to interpret some patterns in the data. For example, apparent fishing VMS pings in one site, were thought to be vessels travelling at slower speeds (and therefore falsely considered to be fishing) due to travelling against strong tidal movements, and/or to time their arrival into local ports with sufficient tide or to meet allotted times provided by harbour masters.

#### **A.1.4 Displacement of fishing activity**

Concerns about displacement were raised in the Call for Evidence that preceded the consultation (MMO, 2023b). This included the cumulative effect of spatial restrictions from shipping lanes, anchorage areas, dredge spoil areas, aggregate extraction areas, other fisheries management measures and offshore wind farm and their associated cables. This was highlighted as resulting in increased pressure on nearby grounds, creating potential gear conflict between sectors, and increasing pressure

on fisheries. It would also result in increased fuel costs and safety concerns for vessels.

The assessment recognises that the impacts on fisheries may be mitigated by the use of other available fishing grounds by the vessels affected (displacement), but this is not quantified or monetised.

The DMA recognises that displacement is difficult to quantify, and it is impossible to predict exactly where activities may be displaced to. It mentions generically that the closure of fishing grounds can 'lead to significant displacement of fishing effort which can result in a range of costs'. It also mentions that displacement of the fishing fleet to other fishing grounds may result in competition with an existing fishing fleet there. No quantification or assessment of the potential significance of displacement is undertaken.

#### **A.1.5 Distributional impacts**

Distributional impacts are not specifically considered, however the number of UK vessels affected is presented according to under-12m and over-12m vessel lengths, and the cost impact on EU vessels does consider the distribution of costs to different EU member states and to under-12m and over-12m vessels.

#### **A.1.6 Social impacts**

Social considerations are not specifically addressed in the assessment. However, in the rationale for the intervention, a number of aspects connected with social impacts are described briefly. The marine environment provides public goods and services, which individuals do not have an incentive to protect, leading to under-protection and potential damage to fishing grounds. Similarly, negative externalities occur when the cost of damage is not fully borne by the users. In the case of habitat damage this may result in reduction of catches and potential increase in fuel costs involved in moving to new fishing grounds. Market prices often do not reflect the full economic cost of exploitation or of damage caused to the marine environment by that exploitation.

#### **A.1.7 Environmental aspects or natural capital/ecosystem services**

Environmental costs and benefits are considered briefly and qualitatively.

Costs are recognised in relation to the potential increase in pressure on fauna and habitats in areas where fishing is displaced to (although not quantified or monetised).

Non monetised benefits recognised relate to the MMO fulfilling its duties under legislation (Marine and Coastal Access Act 2009, The Conservation of Habitats and Species Regulations 2017, and The Conservation of Offshore Marine Habitats and Species Regulations 2017). The UK Marine Strategy and international obligations under UNCLOS, OSPAR North-East Atlantic Environment Strategy, the CBD and UN SDG 14 are also mentioned.

The assessment recognises natural capital as a way of understanding the diverse functions and values a habitat or species provides, to better secure and understand

the associated indirect benefits that management may provide. Two habitat types (moderate and high energy circalittoral rock, and rocky reef; and biogenic reef) are specifically included, and the ecosystem services that these habitats may provide are listed (e.g. species diversification, primary biomass production, secondary biomass production, tourism/recreation, formation of a physical barrier, climate regulation). Ecosystem service benefits are not quantified or monetised, and the potential marginal gains from protection are not explored.

### **A.1.8 Cumulative impacts**

Cumulative impacts were not considered. However, it is recognised that a contentious aspect of the proposal is that it includes management restrictions relating to multiple MPA sites. The decision document (MMO, 2023b) states that the MMO considers other activities and fisheries that may have a cumulative impact on the management of the site, however no mention is made of cumulative impacts on fisheries or fishers from MPA management measures and other regulations or activities in the marine environment. In-combination environmental impacts are considered within an associated document on Fisheries Assessments.

### **A.1.9 Data requirements**

Data requirements are moderate, involving analysis of UK and non-UK VMS and ICES rectangle data for fisheries. These data sources are available and require specific analysis in relation to the sites under consideration. Natural capital is considered in relation to the ecosystem services that might be provided generically by habitat types found in the sites.

### **A.1.10 Key points**

Key points from this case study are:

- The focus is on the costs and benefits of the policy on habitats, and on fisheries profits.
- It does not incorporate knock-on impacts on supply chains or communities, or social impacts resulting from the measures.
- As the DMA is part of a consultation, stakeholders have the opportunity to respond to the content and are specifically asked if they have more information on fishing activity in MPAs and how the suggested policy might impact them.

## A.2 Defra DMA for highly protected marine area designation and management

A **pre-consultation impact assessment** and **post-consultation DMA** were produced for the **designation and management of Highly Protected Marine Areas** (HPMAs) in English waters (Defra, 2022; 2023). Following the independent Benyon review, the Government committed to designate a number of pilot HPMAs in English waters using powers under the Marine and Coastal Access Act (2009). Pilot HPMAs will provide high levels of protection, prohibiting extractive, depositional and destructive activities.

### A.2.1 Impact assessment requirement

In England, the Better Regulation Framework guidance and principles of robust evidence, transparency and proportionality are taken into consideration in determining the need for an impact assessment. Legislation with net costs to business over £5 million requires a regulatory impact assessment. Analysis is in line with HM Green Book methodology, and includes consideration of the impact on small and micro businesses. A DMA is required for a low cost or deregulatory measure, or for validating the cost to business where costs to business is below the £5 million annual cost to business threshold. The HPMA policy's direct cost to business was assessed as being sufficiently below the threshold and therefore Defra completed a DMA, instead of a full Impact Assessment (IA).

### A.2.2 Approach

A pre-consultation IA was undertaken (Defra, 2022), and a DMA was subsequently produced, incorporating information from the consultation (Defra, 2023).

An initial appraisal of candidate sites was undertaken in the pre-consultation IA. This considered six options for the selection of pilot HPMA sites, using different weightings of ecological, social and economic criteria:

1. prioritisation of ecological criteria with no use of the exclusion filter
2. prioritisation of ecological criteria with use of the exclusion filter
3. prioritisation of ecological criteria with use of the exclusion filter and minimisation of economic costs
4. prioritisation of ecological criteria with use of the exclusion filter and balancing of economic costs with ecological and economic benefits (the preferred option)
5. prioritising minimising economic costs with use of the exclusion filter and then selecting sites which score highly based on the ecological criteria
6. sites with no or extremely low activity with use of the exclusion filter

Three options were considered in the DMA, focussing on the five candidate sites selected from the initial screening:

- do-nothing
- non-regulatory option (not preferred and not taken through to the shortlist)

- regulatory option with formal designation of at least one pilot site, and with five candidate sites proposed (including different boundary options for the individual sites).

Evidence gaps meant it was not possible to conduct a full appraisal of the sites in the pre-consultation IA. The post-consultation DMA in 2023, updated the analysis and incorporated additional evidence from the consultation and from engagement work. A qualitative approach was used for selection of candidate sites, which considered ecological criteria, balanced with economic risk. The latter included consideration of criteria related to levels of recreational angling, recreational anchoring, UK commercial fishing and non-UK commercial fishing as well as wider (non-fisheries) related economic activity.

The pre-consultation IA used a 10-year assessment period; the DMA extended this to 30 years. Discounting was carried out in line with Green Book guidance.

### A.2.3 Economic impacts

Analysis of economic impacts was undertaken for both the pre-consultation IA and the DMA. The DMA built on the IA, extending the analysis for some aspects, and removing other aspects in response to feedback from the consultation.

The level of UK commercial fishing operations was assessed for the pre-consultation IA using the following metrics:

- coverage of the candidate site by fishing activity hotspot (areas where there is intense fishing activity compared to the rest of the marine plan area)
- number of VMS pings (over-12m vessels)
- number of unique vessels (over-12m vessels)
- estimated number of vessels under 10m.

Additional metrics were used to understand the dependency of the UK fleet:

- average revenue dependency for UK vessels
- percentage of UK vessels generating over 50% of the revenue
- average effort dependency.

Qualitative information from local IFCAs was also considered in relation to potential displacement and the potential for interaction of displacement from multiple sites.

MMO were commissioned to assess impacts on non-UK vessels for the 5 shortlisted sites (detail of methods not available). The DMA identified nine non-UK countries that may be affected.

For the pre-consultation IA, the assessment of costs to business were focussed on fisheries, and were estimated as:

- Aggregated average annual fishing revenue was assessed by site, using VMS and logbook data for over-12m vessels and sightings and landings data for under-12m vessels (using a 3-year annual average from 2017-2019).

- Familiarisation costs, for both reading material related to the sites, and researching alternative fishing locations. This used information on ship captains' salaries, average reading speed for technical and non-technical documents, and anticipated length of regulations and communications, as well as estimated time to steam to alternative fishing grounds, and number of vessels affected. However, the consultation indicated that these familiarisation costs will not occur so this was not monetised in the DMA.

It is recognised that these estimates did not account for:

- the costs of doing business (fuel, labour)
- the potential to recoup revenues from fishing elsewhere
- land-based multiplier effects and supply chain impacts (the aim to include these in the post-consultation DMA was indicated, but it appears this was not undertaken)
- enforcement costs (to be included in post-consultation DMA)
- inspection costs, as these are borne by the public sector and anticipated to involve compliance monitoring through existing routes (IFCAs and MMO)
- non-financial costs, including social costs (with the aim to include these in the post-consultation DMA).

In the pre-consultation IA, angling was assessed using habitat mapping to estimate the potential for angling activity, and it was reported that Cefas were commissioned to provide an assessment of the potential for local displacement of recreational anglers. Licensed anchorages and mooring locations, and information from RYA on informal and irregular mooring were incorporated.

The DMA used a 30-year appraisal period (rather than a typical 10 years). This is because HPMA implementation requires a large and concentrated upfront economic cost to a small number of businesses, whereas the benefits will be diffused over a much wider population, and some benefits related to habitat recovery will not be realised until 25 or more years from site designation. This assumption is in line with HM Treasury Green Book guidance.

The following costs were assessed in the DMA:

- ongoing profit foregone, incorporating estimate of displacement (monetised)
- one-off gear costs for fishers to switch gears in order to fish elsewhere (monetised). However, the consultation responses indicated that modification of fishing gear would be unlikely where fishers are displaced onto others' established fishing grounds, and so costs relating to this were set to zero
- enforcement costs were considered in relation to the public sector costs of monitoring and enforcement.

Analysis of displacement (see below) was incorporated into the profit foregone data. Net present value to businesses is presented as 'low' and 'high' but no details are provided on the assumptions to the 'low' and 'high' options/scenarios.

The consultation also sought views on impact on trade. The DMA recognised that local processing firms may be affected as they are involved in the exporting of fish caught in England, but the effect on overall trade was expected to be negligible.

#### **A.2.4 Displacement of fishing activity**

During the pre-consultation phase, Defra undertook a qualitative assessment of displacement based on an assessment of the local area impacts (qualitative information provided by local IFCAs). Other evidence sources were also used as supplementary evidence in the decision-making process (for example, MMO landings, and consultation evidence).

For the post-consultation DMA, the fisheries assessment used evidence from Cefas which included displacement analysis. This aimed to go beyond the impact on revenues of UK fishers in a site to assess the impacts once a fisher is displaced from the area. The DMA does not provide details of the analysis undertaken, but the pre-consultation IA indicated that existing displacement models, e.g., the Fishing Impacts Decision Guidance Information Tool (FIDGIT) or based on location choice models would be updated with the most recent available data on fishing activity and fishing regulations that may restrict spatial effort reallocation.

Secondary displacement, where those in the area to which activity is displaced to are then displaced due to increased activity displaced from the original site, was indicated would also be assessed once this work is complete. The DMA recognises that displacement of fishing to alternative areas may result in increased competition and overcrowding. However, it considers this to be a short-term impact that would be ameliorated through increased fish populations from HPMA's spilling into surrounding areas in the long-term.

#### **A.2.5 Distributional impacts**

The DMA undertook an assessment of distributional impacts. This considered the communities living in areas where impacts from designation were most likely, including those residing in Middle Level Super Output Areas (MSOAs) directly attached to the HPMA and directly attached to the ports where catch from the candidate HPMA is landed.

#### **A.2.6 Social impacts**

The pre-consultation IA identified the main affected groups ('those who use the pilot HPMA for leisure and for employment, for example fishers, the local community, and tourists'). The post-consultation DMA identified social costs from HPMA's as 'loss of jobs and mental health impacts'. These were not monetised.

Indices of Multiple Deprivation (IMD), published by DLUHC, were used to assess the deprivation levels for those local to the site and use the site for either commercial or recreational uses.

Social vulnerability was assessed for the coastal communities around candidate HPMA's. This considered:

- levels of deprivation in relation to income and employment
- housing affordability
- social dependency



- employment opportunities.

The only monetised social benefit was ecosystem services (see below).

### **A.2.7 Environmental aspects or natural capital/ecosystem services**

The pre-consultation IA recognised the potential ecological benefits of HPMA, as well as identifying potential carbon storage and sequestration, future benefits for fisheries, and benefits for tourism.

The baseline assumption used was that ecosystems and biodiversity that are deteriorating continue to deteriorate at the same rate and those which are stable will continue to be so. The pre-consultation IA also recognised that the exact links between biodiversity and ecosystem services are not well understood, but that it is generally agreed that biodiversity contributes to the generation of ecosystem services.

The DMA presented estimated benefits present value for each site. Examples of ecosystem services given in the text are that 'some HPMA sites contain 'blue carbon' habitats which capture and store carbon, so provide carbon benefits, and honeycomb reefs and blue mussel beds provide water purification and coastal erosion protection'.

Details of the ecosystem services (ES) assessment are not provided, however, the pre-consultation IA referenced the Ecosystem Services Valuation Database (ESVD) which provides specific values, converted on a consistent basis, and referenced in the literature, that relate to a range of ecosystem services provided by each marine habitat type.

It is not clear whether the ES assessment considered the marginal benefits from an increased level of protection to habitats and species in the HPMA sites, or the total value of benefits deriving from the habitats and species present in those sites. This is an important distinction to make. The impact assessment should consider what *additional* ES benefits there will be as a result of protection (i.e. the *marginal* benefits resulting from protection). It should not consider the *total* value of ES benefits from the site, as these benefits are being delivered from the environment in its current state without the need for any additional protection.

### **A.2.8 Cumulative impacts**

Cumulative impacts were not considered.

### **A.2.9 Data requirements**

Data requirements for the fisheries analysis and displacement analysis are quite intensive and used specialist models. There are also data limitations for fisheries, particularly for under-12m vessels, with a lack of spatially explicit catch information to assess small spatial areas. An initial assessment of activities, costs and benefits was undertaken.

Evidence gaps were identified and work to fill them included site-specific engagement with local stakeholders to collect further evidence on the social and economic criteria.

The valuation of ecosystem services is technical and time-consuming to ensure the right values are applied and the ecological impacts at site level are appropriately considered. Data on ecosystem services and their valuation is limited, particularly in relation to marginal improvements in ES delivery connected with improvements in condition of biodiversity elements.

### **A.2.10 Key points**

Key points from this case study are:

- Economic impacts on the catching sector are assessed, but impacts on associated businesses were not.
- Impacts were assessed in relation to operating profit foregone, rather than on gross value added (GVA) which provides a broader reflection of the impact on society.
- The DMA provides a fairly advanced analysis of displacement, which is incorporated into the assessment of impacts on profits, however details of the models and assumptions were not included.
- Social impacts were considered in the shortlisting of sites, in relation to social vulnerability of coastal communities, and social impacts in relation to loss of jobs and mental health were touched on briefly.
- Ecosystem services were assessed and valued, but this appeared to relate to the total value of ES from a site, rather than the marginal benefit from increased protection. Assumptions and value transfer from other studies may not be appropriate for UK habitats.

## A.3 Devon & Severn IFCA byelaw impact assessment

An **Impact Assessment** (IA) was produced for the introduction of the **Mobile Fishing Permit Byelaw** (2022) (D&SIFCA, 2022), which is an amendment of a previous 2014 version. This permit-based model enables the issuing of two categories of permit (at sea or estuaries). This is to spatially manage the mobile fishing fleet and prevent unauthorised fishing activity within MPAs. Amended permit conditions are included in the revised byelaw to manage fishing activity in areas of sensitive designated features.

### A.3.1 Impact assessment requirement

Inshore Fisheries and Conservation Authorities (IFCAs) develop byelaws for the management of fishing activity and for conservation purposes within their district (out to 6 nautical miles (NM)). For byelaws, an Impact Assessment is developed that presents the socio-economic impact on businesses to support decision making by the Authority. Formal consultation is undertaken and a formal public debate takes place at an IFCA meeting.

### A.3.2 Approach

Four policy options were considered, as well as a 'do-nothing' option:

- do nothing (retain the Mobile Fishing Permit Byelaw – introduced in 2014)
- revoke the Mobile Fishing Permit Byelaw (2014) and replace it with voluntary measures
- create a new Mobile Fishing Permit Byelaw 2022 and retain existing management measures (within the Permit Conditions)
- create a new Mobile Fishing Permit Byelaw 2022 and make changes to the Permit Conditions (from a structure only perspective)
- create a new Mobile Fishing Permit Byelaw 2022 and make changes to the structure and the management measures within the associated Permit Conditions (preferred option).

The IA outlines how the proposed 2022 permit will differ from the 2014 version, and gives the rationale behind the decision.

Much of the analysis is descriptive or qualitative rather than monetised or quantitative. Links are made to the South and South West Marine Plans.

### A.3.3 Economic impacts

Costs and benefits are outlined with a cost assessment over a 10 year time period and using a 3.5% discount rate. Both monetised and non-monetised costs and benefits are considered in relation to “main affected groups” from a change in permitting. Only new monetised costs are included as the IA builds on the 2014 byelaw.

The only cost to business that is monetised is the increase in the price of a permit from £20 to £40. Some additional impacts on fishers are noted, such as the

'requirement to submit catch information relating to mussel taken in a calendar year and notification to the Authority relating to the start of fishing in a calendar year', but without further exploration of this impact.

Benefits are described but not monetised. This principally relates to the ability of the Authority to adapt Permit Conditions to reflect changes to national legislation. It also describes the benefit of allowing exemptions for fishers to undertake maintenance activities at sea within the District (e.g. deploying trawls or dredges to test hydraulics, winches etc.). This avoids them having to steam to areas outside the District to undertake such activities, thus saving time and fuel costs, and reducing their carbon footprint. It also considers the potential benefit to fishers if a new fishery emerges, through the ability to adapt permit conditions to allow for different gear types to be used.

The cost burden to the Authority associated with consultation and advertising of the revised byelaw, or the management, research, monitoring and enforcement of the byelaw, is not included.

#### **A.3.4 Displacement of fishing activity**

Displacement is not assessed as it was not relevant to the proposal. It was considered that demersal mobile fishing did not take place in the areas where additional spatial restrictions were proposed to protect sensitive designated features of MPAs.

#### **A.3.5 Distributional impacts**

Distribution of impacts is not explicitly reported, however the IA does identify the types of groups that would be subject to the permit conditions and on whom the impacts might fall.

#### **A.3.6 Social impacts**

Social impacts are not specifically addressed. There is a brief consideration of public goods and services, negative externalities, and common goods and services. This is used as part of the justification for the proposal. Natural capital and biological diversity are considered public goods which individuals may not have an incentive to voluntarily ensure their continued existence, resulting in under-protection. Negative externalities occur when the cost of damage is not fully borne by the users causing the damage, meaning the Authority has to balance the social and economic benefits of exploitation of fisheries resources with the need to protect the marine environment. Common goods may lead to over-exploitation and inefficient allocation of resources, meaning the Authority must balance the needs of different people that use the sea fisheries resources in the district.

#### **A.3.7 Environmental aspects or natural capital/ecosystem services**

Environmental impacts are considered briefly and qualitatively. The proposed byelaw includes new spatial restrictions to protect MPAs further. This 'lessens environmental impact' and areas of sea grass are specifically mentioned as benefiting from protection.

The proposal includes an exemption clause for maintenance activities, and this is briefly mentioned as potentially helping reduce CO<sub>2</sub> emissions and reduce carbon footprints of fishing vessels needing to test their equipment at sea.

### **A.3.8 Cumulative impacts**

Cumulative impacts are not included.

### **A.3.9 Data requirements**

Data requirements are not intensive. However, there is detailed information regarding the local situation of fisheries, based on the local knowledge of the Authority. This allows them to identify individual vessels that might be affected, and to have a high level of certainty if there is fishing activity going on in specific areas that might be affected by the proposed byelaw.

### **A.3.10 Key points**

Key points from this case study are:

- The IA presents a predominantly qualitative cost benefit analysis with reference to the relevant legislation.
- It provides the thought process behind the creation of the legislation and IA, for example it gives the other policy options that have been considered which is backed up in the evidence base.

## A.4 Welsh Government Integrated Impact Assessment

An **Integrated Impact Assessment** of measures to **reduce water pollution from agriculture** was carried out (Welsh Government, 2021). The measures are not clearly described in the document but aim to minimise losses of nutrients to the environment, integrating good practice within the regulatory framework.

### A.4.1 Impact assessment requirement

The Well-being of Future Generations (Wales) Act 2015 (WFGA 2015) provides the framework for the Integrated Impact Assessment (IIA), which assesses the social, cultural, economic and environmental impacts (both positive and negative) of policy proposals.

It aims to provide ‘a comprehensive assessment of the impact of a proposed action, with a view to maximising economic, social, cultural and environmental well-being both now and in the long term’, in line with requirements of the Well-Being of Future Generations (Wales) Act 2015.

An IIA is generally undertaken in parallel to any Regulatory Impact Assessment that may be required<sup>2</sup>. The IIA draws together information from a range of different impact assessments and provides a type of screening to identify which other impact assessments are required. Some aspects of the IIA may be required by statute (e.g. equality impact assessment; official languages impact assessment), whereas other aspects may not be required but are prepared as part of good practice (e.g. children’s rights impact assessment; health impact assessment; sustainable development; privacy impact assessment; rural proofing impact assessment).

### A.4.2 Approach

The IIA is a fairly high-level and descriptive impact assessment that brings together information from across a range of other specific assessments. As such, it is supported by a series of appendices that provide further detail of specific assessments:

- Children’s Rights IA
- Equality IA
- Rural Proofing IA
- Welsh Language IA
- Biodiversity IA.

Specific scenarios or policy options are not set out. Instead, the IIA provides an introduction section on ‘what action is the Welsh Government considering and why?’ This provides a description of the context and need for the measures, how the measures are anticipated to address the problem, the primary intention of the proposal, considerations and linkages with other policies, and further work that will be undertaken with stakeholders.

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<sup>2</sup> <https://www.gov.wales/welsh-ministers-regulatory-impact-assessment-code-for-subordinate-legislation-2021-html>

Benefits and costs are considered over a 20-year period, and the net present value for a 'central estimate' is provided. However, details of the discount rate, and what estimates were considered, are not provided in the document. Further details may be included in the associated Regulatory Impact Assessment, but this was not available.

The structure of the IIA puts greater emphasis on social and cultural aspects than economic ones. The order and layout of a document has an influence on the perceived importance of its contents. The IIA first considers social well-being, then cultural well-being. Economic well-being comes after these two, and is followed by environmental well-being. The text is descriptive, and quantified cost and benefit values in the economic well-being sections are incorporated within the text rather than in stand-alone boxes.

#### **A.4.3 Economic impacts**

Economic impacts are described in terms of both costs and benefits. It recognises costs and benefits to the agriculture sector, and that other business sectors reliant on clean water and a healthy environment are likely to benefit. Short terms costs are recognised as being determined by the level of investment required to achieve compliance and will vary for individual businesses.

Cost and benefits figures are presented for a 'central scenario' over 20 years, but details of scenarios, discount rates etc are not set out in the document. It may be that further details are contained in a Regulatory Impact Assessment, but the associated document was not available for review.

#### **A.4.4 Displacement of fishing activity**

Displacement was not relevant to the IA, as it did not assess fisheries.

#### **A.4.5 Distributional impacts**

Distributional impacts are considered qualitatively in relation to different sectors and groups that might be affected by the proposals.

#### **A.4.6 Social impacts**

Social impacts are described qualitatively through the sections on social well-being and cultural well-being, as well as included in aspects related to environmental well-being.

These aspects are all treated at a very high level, without underlying analysis of referencing of linkages between proposed measures and anticipated impacts. There is some repetition of information between the social and economic sections, with the same issues being raised in both (e.g. businesses storing slurry will face the most significant costs).

Social and cultural aspects mentioned include:

- improved public health due to reduced pollution
- specific issues related to tenant farmers and challenges with clauses in their tenancy agreements
- children's rights, in relation to the effect of elevated levels of nitrate in drinking water on the health and development of children particularly bottle-fed infants
- recognition of the potential impact of detrimental economic conditions on the health of individuals, and the negative impact of additional regulatory requirements on mental well-being
- access to clean water and a safe and healthy environment for physical activity and mental health benefits
- community cohesion through improved employment opportunities in rural areas.

The Equality Impact Assessment provides further consideration of the impact in relation to protected characteristics. This considers whether there might be positive or negative impacts, reasons for the judgement, and how impacts will be mitigated, in relation to the following:

- age
- disability
- gender reassignment
- marriage and civil partnership
- pregnancy and maternity
- race
- religion, belief and non-belief
- sex and sexual orientation
- children and young people
- low-income households
- human rights.

#### **A.4.7 Environmental aspects or natural capital/ecosystem services**

Consideration of environmental well-being includes a short description of the potential for measures to contribute to improvements in biodiversity and a healthy environment. Climate change is considered in relation to decarbonisation (reduction in greenhouse gas emissions) and adaptation (reduced agricultural pollution contributing to ecosystem resilience). The full Biodiversity Impact Assessment is very brief, mentioning specifically birds and species with aquatic life stages as particularly benefiting.

#### **A.4.8 Cumulative impacts**

No assessment of cumulative or in-combination impacts is presented.



#### **A.4.9 Data requirements**

This is a very high-level and descriptive assessment which does not have significant data requirements. It is not clear what data and information feed in to the economic assessment.

#### **A.4.10 Key points**

Key points from this case study are:

- No examples of IIA relevant to marine and fisheries proposals (consultations) were identified in the literature search, therefore it was not possible to review an example specific to fisheries for examples of the types of analysis undertaken.
- The structure of the IIA (order of sections, use of narrative text) puts the emphasis on social and cultural aspects rather than economic numbers.

## A.5 Scottish Government SEIA for MPA designation

A **Socio-Economic Impact Assessment** was produced for the proposed **designation and management of four inshore MPAs** (Scottish Government, 2019a). This considered the potential impacts on fisheries, and other marine-based industry sectors, as well as the potential environmental benefits from ecosystem services. Subsequent SEIAs have built on this assessment, including for the designation of a deep-sea marine reserve (Scottish Government, 2019b), and forthcoming assessments on proposed sectoral marine plans for offshore wind (not yet published), offshore and inshore MPA fisheries management measures (not yet published).

### A.5.1 Impact assessment requirement

The Scottish Government undertakes a socio-economic impact assessment for proposed plans and regulations. This is used to inform a Business and Regulatory Impact Assessment (BRIA), as well as an Equalities Impact Assessment and an Islands Assessment. Completion of a BRIA is considered best practice, although the content of a BRIA should be proportionate to the problem involved and the size of the proposal (Scottish Government, 2022).

### A.5.2 Approach

The BRIAs<sup>3</sup> (one prepared for each site) considered two options:

- do nothing
- designate site as a Marine Protected Area.

Within the underlying SEIA, three estimates (lower, intermediate, upper) were assessed, together with a 'do nothing' option, to assess the potential range of impacts associated with the proposal, reflecting a range of possible management options that may be applied. Assumptions for the estimates were developed for each sector assessed. For commercial fisheries they were broadly based around the following:

- do nothing
- lower: voluntary measures / follow best practice guidance
- intermediate: proposed management measures by gear type and feature
- upper: proposed management measures by gear type and feature, covering a larger proportion of the feature, or across the whole site.

Other Scottish Government MPA SEIAs have incorporated displacement assumptions into the lower estimate (i.e. that compensatory landings would be taken from alternative fishing grounds if the value of landings affected was below a specific threshold), and assumed that under the upper estimate all affected landings from any managed gear types across the whole site would be lost.

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<sup>3</sup> Available at <https://consult.gov.scot/marine-scotland/four-new-marine-protected-areas/>. Accessed 28 November 20223.

Costs were assessed over a 20-year timeframe, with a discount rate of 3.5%.

The SEIA for the sectoral marine plan for offshore wind used a 40-year timeframe (Scottish Government, 2019c). A reduced discount rate of 3.0% was used for years 31 onwards in line with HM Green Book guidance.

### A.5.3 Economic impacts

For most sectors, economic impacts are considered in relation to additional costs to business, for example due to additional assessment costs for licence applications, which would reduce operating revenue. Potential delays in consenting and impacts on investor confidence were also considered but not quantified.

The fishing analysis used annual average data from the most recent five-year period available (2013–2017). Impacts on fisheries were assessed as follows:

- Loss of value of landings:
  - For over-12m vessels, VMS data linked to logbook data is used in spatial analysis, to assess the potential loss in value of landings from the areas proposed for management measures.
  - For under-12m vessels, ICES rectangle data were used, combined with estimates of the distribution of effort within each ICES rectangle, to determine the proportion of effort from within the proposed management areas<sup>4</sup>.
- Impact on direct GVA was assessed, because the loss of landings has the potential to change the level of output of the sector. Direct GVA was calculated as a proportion of the value of landings affected, using Seafish economic data for relevant fleet segments.
- Impact on indirect and induced GVA was assessed, to reflect the knock-on impacts on the supply chain and wider economy, using multipliers from input-output tables, for the 'fishing' sector in Scotland.
- Impact on employment was assessed, for direct, indirect and induced impacts, through the use of employment effect multipliers applied to the change in turnover data.

The use of multipliers extends the assessment beyond the catching sector, to consider also potential knock-on impacts on the upstream supply chain (e.g. boat maintenance, gear suppliers, transport, financial services etc).

The assessment of impacts varies by type:

- Some impacts are considered quantitatively, e.g. the value of landings affected in absolute terms, as well as relatively in relation to the total value of landings to the port (or, in the case of home ports, the total value of landings by vessels registered to that home port).
- Social impacts are considered qualitatively (see 'social impacts' below).

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<sup>4</sup> More recent assessments have used data that provide greater spatial resolution of under-12m effort based on landings and logbook reports which include latitude and longitude information on fishing location for each day.

- Non-quantified impacts include displacement impacts (on vessel costs/revenues, impacts to habitats, gear conflict).

Impacts to the public sector are included in relation to potential future monitoring costs, preparation of marine management schemes for the MPAs, statutory instruments, voluntary measures and provision of regulatory and advisory costs associated with licensing decisions (for marine sectors other than fisheries).

#### **A.5.4 Displacement of fishing activity**

Displacement of fishing activity was not specifically assessed. Economic impacts assessed assume a worst-case scenario that all affected fishing effort and associated landings are lost, rather than being displaced. It is recognised, however, that some displacement is likely.

Scottish Government developed a displacement test to look at the potential for displaced effort to be absorbed within surrounding fishing grounds (Scottish Government, 2014). More recent draft SEIAs (in prep.) have applied this test to assess the potential for displaced effort to be absorbed within surrounding, existing fishing grounds without significant additional environmental impact. This compares, for each fleet segment (vessel length and gear type), the value of landings affected with the value of landings in the surrounding area. This is done progressively, first looking at any remaining open areas within the MPA, then in the ICES rectangles that the MPA sits within, and then in the wider region. Thresholds of 10% (MPA), 10% (ICES rectangles) and 1% (region) are set. If the value of landings affected is less than the threshold, it is considered that affected effort can be displaced to remaining fishing grounds for that fleet segment in the surrounding area, without significant negative impacts. If the thresholds are exceeded, displacement of effort will be more difficult, with a higher likelihood of negative impacts on fishing fleets (higher costs and lower catches, potential for gear conflict, additional quota costs), negative environmental impacts (from exploring new fishing grounds).

#### **A.5.5 Distribution of impacts**

The distributional analysis considers:

- location (region, home port, landing port, whether rural/urban/mainland or island)
- fishing group (vessel size, gear type)
- age (children, working age, pensionable age)
- income (10% most deprived, 10% most affluent, remaining 80%)
- social groups (crofters, ethnic minorities, with disability or long-term sick)
- gender (male, female).

The distribution of impacts on employment in the fishing sector is considered in relation to the registered Home Ports of the vessels affected. The impact of the reduction of fish landings on the processing industry is also considered. The distribution of this impact is assessed in relation to the ports of landing of the affected vessels' catches.

### A.5.6 Social impacts

The SEIA considers social impacts to be closely linked to economic impacts, connected to their nature, scale and distribution of impacts on income and employment.

The distribution of employment impacts was considered based on vessels' home ports; and the distribution of impacts on the fish processing sector was linked to landing ports. The distributional analysis also considered location (ports), fleet segment, age, gender, income and social groups (crofters, ethnic minorities).

Social impacts are considered qualitatively in relation to whether the proposal is likely to impact on the different groups, and the potential significance of the impact using a positive/negative rating scale (minimal, possible, or significant).

Consequential impacts (on culture, heritage, crime, health, education, access to services) were considered unlikely. The potential impact on cultural ecosystem services including recreation and social welfare impacts were considered through the ES assessment (qualitatively).

In the SEIA for the sectoral marine plan for offshore wind energy (Scottish Government, 2019c), social impacts were assessed using 'social clusters', which are groupings of impacts intended to capture those effects that have been identified as being most significant to individuals and communities. These clusters were developed through a specific participatory research project to identify the potential social impact of offshore renewables (Scottish Government, 2016). The potential impacts from development of the offshore wind supply chain, and potential impacts on other sectors, were considered in relation to their linkages with each social cluster.

The social clusters were:

- individual
  - family, family life, inter-generation issues
  - jobs, career, employment
  - money, cost of living
- community
  - local jobs, local industry, community sustainability
  - transport connections, technology connections
  - education
  - shops, housing
  - socialising, recreation, parks, leisure
  - friends, being involved, supporting others
  - local identity, cultural heritage, Gaelic
- wider political and environmental context
  - landscape, seascape, wildlife, environmental change
  - national and EU level political and decision-making systems.

### **A.5.7 Environmental aspects or natural capital/ecosystem services**

The SEIA considers the potential impact on ecosystem services through a qualitative description of potential changes in ES provision, recognising that there is high uncertainty associated with this. The assessment recognises the data limitations for quantification and valuation of ES provision and change due to management measures.

The ES assessment considers the expected changes in ES as a result of implementing the management measures, i.e. the marginal change, and not the total ES arising from the sites. Both potential costs and benefits to ES, on-site (within the MPA) and off-site (beyond the MPA, e.g. due to spillover, or impacts of displaced fishing effort) are considered.

The following ES are included:

- fish and shellfish for human consumption
- fish and shellfish for non-human consumption
- climate regulation
- waste breakdown/detoxification
- non-use value of natural environment
- recreation
- research and education.

### **A.5.8 Cumulative impacts**

The impact of the sites is assessed individually, and summed across the four sites cumulatively.

In addition, an assessment of in-combination impacts has been undertaken and considers how the significance of the impacts might vary when taking account of the total impact as a result of all MPAs and current or planned renewable energy generation development to date. This included the potential for cumulative impacts on specific fisheries in particular locations where there were other existing or forthcoming spatial restrictions on activity.

### **A.5.9 Data requirements**

Data requirements are moderate. The analysis includes detailed assessment of the potential impact on fisheries, but this uses existing data and information that is available to the Scottish Government (e.g. VMS records linked to logbook returns, and statistics on total value of landings to ports).

### **A.5.10 Key points**

Key points from this case study are:

- The requirement for SEIAs and BRIAs to frame impacts in relation to significance at national level raises the concern from fisheries stakeholders that local and individual level impacts are not adequately reflected in the assessment.

- The SEIA includes assessment of both direct and wider economic impacts, and the distribution of economic impacts across different social groups.
- More recent assessments have applied a displacement test to assess the significance of potential displacement.
- Impacts on ecosystem services were assessed qualitatively in relation to the anticipated change in ES resulting from the management measures introduced.
- Post-implementation monitoring of inshore MPA management measures was undertaken (Scottish Government, 2020). This found impacts on overall landing volumes and values were not identifiable, but that there were some distributional impacts including both positive and negative impacts on coastal communities and industries. This included negative impacts on Nephrops trawlers and scallop dredgers (decreased landings and a decrease in employment), and positive impacts on Nephrops creelers (increased landings and a slight increase in employment). Static gear fishers felt more secure in their fishing, whereas mobile gear fishers reported losing access to sheltered, winter fishing grounds, having to steam further and in some cases stay out on the boat for a few days at a time, and the potential impacts of this on family life.
- GVA and employment multipliers exist for the fishing sector in Scotland at a national level. However, specific regional multipliers are not available.

## A.6 USA Environmental Impact Statement including Social Impact Assessment for halibut management proposal

An **Environmental Impact Statement** was produced for the **Bering Sea and Aleutian Islands (BSAI) Halibut Abundance-Based management proposal** (NOAA, 2022). This aimed to link halibut prohibited species catch (PSC) limits for the groundfish trawl fleet to halibut abundance. This aims to minimise halibut mortality whilst achieving optimal yield in the groundfish fisheries. The Environmental Impact Statement also includes a **Social Impact Assessment**.

### A.6.1 Impact assessment requirement

In the United States of America (USA), the Magnuson-Stevens Fishery Conservation and Management Act states that ‘any fishery management plan ... shall ... include a fishery impact statement ... which shall assess, specify, and analyse the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures’. In addition, the National Environmental Policy Act (NEPA) requires an Environmental Impact Statement (EIS) for every major federal action ‘significantly’ affecting the quality of the human environment.

### A.6.2 Approach

Several alternatives and options are included in the EIS (NOAA, 2022):

- no action
- set PSC limit based on abundance of BSAI halibut according to the 3-year rolling average of survey index values
- set PSC limit based on abundance of BSAI halibut with a constraint on PSC variability
- set PSC limit based on abundance of BSAI halibut according to an annual limit
- set PSC limit based on abundance of BSAI halibut according to the most recent setline survey and the shelf trawl survey, with constraints.

The EIS contains detailed background on the fishery, stock status, fleet composition and management measures. Additional background information is contained in other reports and incorporated by reference. In-depth analysis is presented of the potential environmental effects of the proposal, through simulation modelling of the fishery, including: impacts on the halibut stock; impacts on the fishery and directed halibut fisheries; and impacts on BSAI halibut commercial catch.

The economic and social assessment does not specify a timescale over which impacts are assessed, and discount rates are not applied.

A separate Social Impact Assessment is included as an Appendix to the EIS. The National Marine Fisheries Service (NMFS) has been developing social impact assessment for fisheries over a number of decades. Guidelines for assessment of



the social impact of fishery management issues were first issued in 1991, and the latest guidance is from 2007 (NMFS, 2007).

### A.6.3 Economic impacts

Economic impacts considered include:

- revenue (gross first wholesale value, or ex-vessel value depending on the fleet segment)
- groundfish catch.

Most economic analysis is provided at the aggregated sector level, due to confidentiality restrictions on releasing data unless it is aggregated over a minimum of three firms. Impact at the level of individual firms is presented in relation to their usage or potential exceedance of the PSC limits.

The assessment of economic impacts focuses only on revenue. It does not incorporate wider economic assessments of output, income, employment or other economic measures. Indirect or induced impacts are explicitly not included due to 'poorly quantified economic multipliers'. However, it goes on to say that models are being developed to estimate economic multipliers that are specific to Alaska fisheries, and will more accurately represent impacts on smaller, fishing-dependent areas.

Different sampling methods and datasets are used to estimate impacts on revenue, providing a range and upper and lower bounds of potential impacts.

Average estimated revenues for the status quo and for each alternative (in percentage difference from status quo terms) are calculated. This focuses on retrospective analysis of what revenues would have been, had different PSC limits been imposed, rather than looking forward to what revenues might be as a result of the management measures, due to the uncertainties in forecasting future conditions.

There is also a discussion of the practicality of bycatch avoidance and further bycatch reduction, and current bycatch avoidance and mitigation measures used by the fleet. It recognises that as bycatch limits become more constraining there is greater potential for increased consolidation of the sector and that some firms/vessels may exit the fishery.

Net economic benefits are assessed by summing all producer and consumer surplus that occurs in the US economy. This includes direct and indirect participants in the fishery as well as other members of society. Groups considered include persons who harvest or process fish affected by the action, those who provide support services to the harvesting and processing sectors of the fishing industry affected by the action, consumers of the fish and fishery products, and members of society that are non-consumptive users that value the resource. However, this results in a broad consideration of costs and benefits, and as a result they are assessed qualitatively as the magnitude of effects cannot be quantified. It is highlighted that the social, cultural and environmental impacts and benefits, that are not considered in the net economic benefits, should not be excluded when considering overall costs and benefits.

Management and enforcement considerations are discussed, including the potential for cost recovery, vessel safety, potential for attempts to bias observer samples and incidents of harassment and intimidation for observers, and implications for management processes and regulations.

#### **A.6.4 Displacement of fishing activity**

Displacement of fishing effort is not specifically assessed; the proposed measure is not a spatial measure. The analysis highlights that the impacts assessed (revenue estimates) do not capture potential behavioural adjustments such as changes in targeting, fishing location, or other halibut avoidance strategies.

#### **A.6.5 Distribution of impacts**

Impacts are considered in relation to different fleet segments and fisheries. Further distribution of impacts is considered in the social impacts assessment (see below).

#### **A.6.6 Social impacts**

‘Social and environmental justice’ is considered, drawing on information from the Social Impact Assessment. This explores community and regional participation patterns in the fishery, and potential community-level impacts.

Existing quantitative fishery information was used to identify patterns of participation in the relevant sectors of the fisheries. A subset of communities was then selected for more detailed characterisation of the community context of the relevant fisheries to describe the range, direction, and order of magnitude of social- and community-level engagement and dependency on those fisheries. A subset was used due to time and resource constraints, and fieldwork was undertaken in conjunction with the routine updates of the baseline fishing community profiles of the communities selected.

Communities were identified for inclusion in the social impact assessment based on whether they had at least a minimal, ongoing level of engagement in the relevant fisheries (based on vessel/processors with a local ownership address) or were the location of processing (catcher/processor product transfers).

Vulnerability of communities was considered to be a function of dependence of the community on the potentially affected fisheries, and the economic resiliency and diversity of the community. These were considered as follows:

- relative importance of the fishery to vessels participating in it, in comparison to all area, species, and gear fisheries in which those same vessels participate (community vessel diversity)
- relative importance of the fishery to all local ownership address vessels participating in all area, species, and gear fisheries combined (community fleet diversity)
- relative importance of the overall community fishery sector within the larger community economic base in terms of private sector business activity and public revenues (community economic diversity).

The socio-economic structure of the communities was considered together with the relative diversity of their respective local economies. Each community is described, including its involvement in the fishery and processing, potential for direct and indirect impacts from changes in economic activity from the proposals, support service suppliers, demographics of owners, crew and processing employees including minorities, low-income populations and Native tribes. Low-income populations are assessed in relation to the percentage of residents living below the poverty threshold.

It also recognises there is no straightforward way to quantitatively estimate the impacts, whilst recognising that they could be locally important. It also mentions/considers the potential for cumulative social impacts, for example, related to losing working age residents (as the local halibut fishery represented one of the few private sector income and employment opportunities in the community) and vulnerability of school funding due to low enrolment levels.

In relation to environmental justice concerns, the report highlights the potential for disproportionate impacts on minority groups due to their representation in the labour force (catching and processing), as well as loss of income opportunities for crew (due to increased expenses relating to halibut avoidance measures resulting in reduced crew compensation) and potentially more time away from home with time-consuming and/or labour-intensive measures.

The wider social and cultural importance of the fishery, and of halibut fishing specifically, is highlighted. It is recognised that fishing regulatory actions can result in a wide range of socio-cultural impacts in rural fishing communities. The following points are made:

- For many residents of the communities, commercial fishing is not a stand-alone socio-economic activity, but an integral part of self-identity.
- This is compounded for those from families with multi-generational experience in commercial and/or subsistence fishing.
- The cultural importance of halibut fishing is documented in anthropological literature and halibut feature in legends and parables.
- The cultural significance of halibut for fishermen and their associated communities includes but exceeds the economic value of the fishery.
- The importance of flexibility to target a range of fisheries to be able to adjust to short- and long-term fluctuations in resource availability, and to changing markets for seafood products, as part of an overall adaptive strategy in subsistence and economic contexts in the region.

As part of the cultural significance of the fishery, it is recognised that the fishery provides a local source of employment in a day fishery that allows individuals to remain in their community, spend time with their family and build social networks, and engage in broader, culturally meaningful practices like subsistence.

The social impact assessment is supported by a framework that has been created by NMFS of quantitative indices to help understand community well-being and participation in marine fisheries. This includes the development of social indicators of fishing community vulnerability and resilience (Jepson & Colburn, 2013), and an

interactive map showing the most recent social indicators for coastal communities in the USA<sup>5</sup>.

### **A.6.7 Environmental aspects or natural capital/ecosystem services**

As the assessment forms part of an environmental impact statement, there is extensive consideration of the impacts on the fish stock. Consideration of 'other resource categories' (marine mammals, seabirds, habitat, ecosystem) is also included in detail, including status, effects of incidental take on their populations (entanglement in gear and ship strikes), prey availability effects, and disturbance effects.

### **A.6.8 Cumulative impacts**

Cumulative effects are considered in relation to the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. Analysis focusses only on those effects that are truly meaningful and on human actions rather than natural events. The focus is on the potential cumulative impacts on the Pacific halibut stock, rather than cumulative impacts on the fishermen or communities.

### **A.6.9 Data requirements**

Data requirements are extensive, as well as analytical and technical expertise to carry out the required analyses. Impacts on fish stocks are extensively assessed. Economic impacts are focussed on revenue only, using sampling of historical data. Social impacts are assessed in detail, requiring significant baseline data and engagement with communities.

### **A.6.10 Key points**

Key points from this case study are:

- EISs can be substantial (in excess of 1,000 pages), providing a comprehensive environmental and stock analysis, however this may not be feasible for all management proposals and requires extensive resource (including stakeholder time for input and review).
- There is a well-developed social impact assessment approach and guidance, with extensive baseline data on community engagement in fisheries, which supports the assessment of social impacts.
- Despite this, a review of SIAs found that analysis of economic and social variables varies, and that there tends to be a substantially greater focus on economic variables (Mengerink *et al.*, 2014).

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<sup>5</sup> <https://www.st.nmfs.noaa.gov/data-and-tools/social-indicators/>. Accessed 28 November 2023.

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