

ISF Iceland greater silver smelt

Background information for MSC Risk Based Framework (RBF)

Why is RBF required?

Demersal beaked redfish (*Sebastes mentella*, ISL: Djúpkarfi) in Subarea 14 and Division 5.a, the Icelandic slope stock (East of Greenland, Iceland grounds), has been categorised as a main secondary species in UoA 1 (bottom trawl) of the ISF Iceland greater silver smelt fishery Announcement Comment Draft Report (ACDR). Since the stock has no biologically-based limits available, derived either from analytical stock assessment or using empirical approaches, the use of the RBF is triggered to score Performance Indicator (PI) 2.2.1 (Secondary Species Outcome) for this stock (MSC Fisheries Certification Process v2.2., §7.7.3 and Table 3).

Stakeholder consultation

A key purpose of the site visit is to collect information and speak to stakeholders with an interest in the fishery. For those parts of the assessment involving the MSC's Risk-Based Framework (RBF, see [msc.org](https://www.msc.org)), we will be using a stakeholder-driven, qualitative and semi-quantitative analysis during the site visit. To achieve a robust outcome from this consultative approach, we rely heavily on participation of a broad range of stakeholders with a balance of knowledge of the fishery. We encourage any stakeholders with experience or knowledge of the fishery to participate in these meetings.

The assessment team intend to undertake RBF discussions within each stakeholder meeting during the site visit. In accordance with the requirements of Annex PF2.3, the information gathered during the stakeholder consultation and site visit meetings shall be used to inform the scoring of the productivity-susceptibility analysis (PSA). In particular, to discuss and agree the evidence and scores in each productivity and susceptibility attribute (see next section). The assessment team is responsible for scoring the PI, so that where stakeholders do not reach consensus, the assessment team are required to award the more precautionary score.

If you have expertise on demersal beaked redfish, or the fishery under assessment and its interaction with this species we would like to talk with you during the site visit which is being undertaken between the 11th and 15th April 2022. If you cannot meet with the assessment team, we would welcome your written or oral input. Please contact the Lead Assessor, Conor Donnelly, at cdonnelly@nsf.org, if you would like to meet with the team or submit your input. Stakeholder input can be received until the last day of the site visit.

Please note that the consultation on the use of the RBF, this document and also the Fishery Announcement and ACDR can be found on the MSC webpage for this fishery:

- <https://fisheries.msc.org/en/fisheries/isf-iceland-greater-silver-smelt/@@assessments>

Productivity-susceptibility analysis

In accordance with Table PF1 of the MSC FCP v2.2, where the secondary species outcome is being scored using the RBF, PSA alone shall be undertaken. A draft PSA has been undertaken by the assessment team to inform the RBF discussions during the site visit and is detailed further in the steps below:

PSA Step 1: Score the productivity attributes

Draft scoring of the productivity attributes has been undertaken by the assessment team and presented in Table 1 below. For ease of reference, the MSC PSA productivity attributes and scores table (MSC FCP v.2.2, Table PF4) is included as Table 3 in Annex 1.

To meet the requirements of GPF4.3.1, the team has used information from Fishbase which is a database comprising multiple sources of information on the species and also the ICES Stock Annex and the latest MFRI Assessment Report to derive productivity information for demersal beaked redfish.

As demersal beaked redfish is not an invertebrate, the density-dependent attribute has not been scored.

PSA Step 2: Score the susceptibility attributes

Draft scoring of susceptibility attributes has been undertaken by the assessment team and presented in Table 1 below. For ease of reference, the MSC PSA susceptibility attributes and scores table (MSC FCP v.2.2, Table PF5) is included as Table 4 in Annex 1.

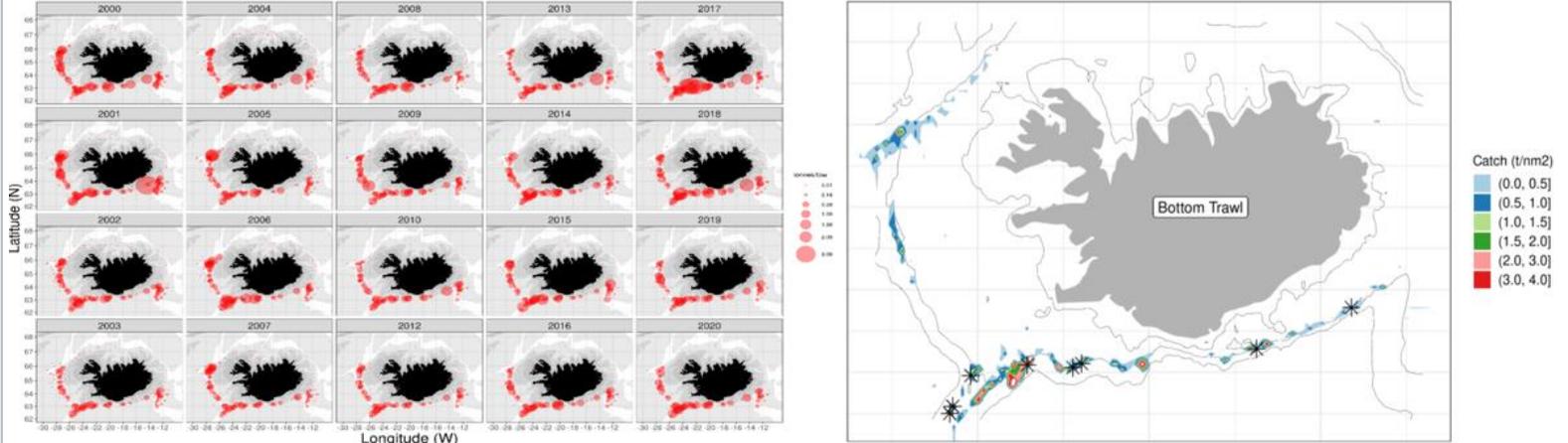
Please note that PF4.4.3 c) requires that, when scoring PI 2.2.1, if the UoA has main species with catches at 10% or more of the total catch by weight of the UoA, all MSC UoAs having a catch of the same species that is 10% or more of the total catch of the UoAs shall be identified and listed separately. Since demersal beaked redfish comprises 10% of the catch of UoA 1 (bottom trawl), the catches of all MSC UoAs catching the same species needed to be considered further in this assessment.

Table 1. PSA productivity attributes and scores.

Performance Indicator	2.2.1	
Productivity		
Scoring element (species)	Demersal beaked redfish (<i>Sebastes mentella</i> , ISL: Djúpkarfi) (Subarea 14 and Division 5.a, Icelandic slope stock (East of Greenland, Iceland grounds))	
Attribute	Rationale	Score ¹
Average age at maturity	11.5 years (https://fishbase.se/Reproduction/MaturityList.php?ID=505&GenusName=Sebastes&SpeciesName=mentella&fc=573)	2
Average maximum age	50 years (MFRI, 2021a), 65 years (https://fishbase.se/summary/Sebastes-mentella.html)	3
Fecundity	40 – 400 thousand larvae (Jónsson and Pálsson 2006 cited in ICES, 2012); (47,700 – 90,200 (https://fishbase.se/Reproduction/FecundityList.php?ID=505&GenusName=Sebastes&SpeciesName=mentella&fc=573&StockCode=521))	1
Average maximum size	40cm (ICES, 2018), 49.75cm (https://fishbase.se/popdyn/PopCharList.php?ID=505&GenusName=Sebastes&SpeciesName=mentella&fc=573)	1
Not scored for invertebrates		
Average size at maturity	39.6cm. On a precautionary basis, as the threshold for scoring this attribute between 1 and 2 is 40cm, this has been scored at 2. (https://fishbase.se/Reproduction/MaturityList.php?ID=505&GenusName=Sebastes&SpeciesName=mentella&fc=573)	2
Not scored for invertebrates		
Reproductive strategy	Ovoviviparous. Bear live young (https://fishbase.se/summary/Sebastes-mentella.html); produce many, small larvae (40-400 thousand larvae) that are extruded soon after they hatch from eggs and disperse widely as zooplankton (Jónsson and Pálsson 2006 cited in ICES, 2012).	3
Trophic level	4.2 ±0.61 se (https://fishbase.se/summary/Sebastes-mentella.html)	3
Susceptibility		
Fishery	As demersal beaked redfish comprises 10% of the total catch by weight of the UoA, section PF4.4.3 c) applies and all MSC UoAs having a catch of the same species that is 10% or more of the total catch of the UoAs must be identified and listed separately.	
Only where the scoring element is scored cumulatively	A thorough review was undertaken of all ISF certified fisheries and other fisheries that may catch the stock (Subarea 14 and Division 5.a, Icelandic slope stock (East of Greenland, Iceland grounds)) including Greenland cod, haddock and saithe trawl and Faroe Island fisheries such as Faroe Islands silver smelt. In none of these fisheries was there any UoA that catches demersal beaked redfish in volumes approaching 10% of the total catch. As such there is no need to identify and list these fisheries separately in order to take into account the impact of these fisheries on the demersal beaked redfish stock.	

¹ See Table 3, in Annex 1

Table 1. PSA productivity attributes and scores.

Attribute	Rationale	Score ²
Areal Overlap	<p>The areal overlap is the sum of the total percentage overlap of all fishery activity with the areal concentration of a stock. Estimation of overlap should take any uneven distribution or concentration of the stock into account, including consideration of core and marginal ranges (GPF4.4.6).</p> <p>As previously noted, as no other MSC UoAs catch 10% or more of the demersal beaked redfish stock the only fishery to consider here is the UoA under assessment. Good maps of the distribution of the stock and of fishing activity are available - including concentrations of the stock and of fishing effort within this range, see figure below.</p> <p>Icelandic slope beaked redfish from the Icelandic autumn survey is caught along the south-east to the west slope of the Icelandic continental shelf at depths between 400-800 m but is most abundant south-west along the Reykjanes ridge and west of Iceland (MFRI, 2021a). Fishing effort for greater silver smelt is also concentrated in these areas in particular the Reykjanes Ridge. On this basis, it is clear that there is high areal overlap of the stock and fishing effort (i.e. >30%) as such a score of 3 is awarded (for thresholds for scoring see Table 4 below).</p>  <p>Figure 1. Left: Spatial distribution of demersal beaked redfish in Icelandic autumn survey in 2000-2020. The survey was not conducted in 2011 (source: MFRI 2021a). Right: Fishing grounds for greater silver smelt using bottom trawl in 2020 as reported in logbooks and positions of samples taken from landings (asterisks) (source: MFRI 2021b).</p>	3

² See Table 4 in Annex 1.

Table 1. PSA productivity attributes and scores.

<p>Encounterability</p>	<p>Under this attribute, the team generates a score after consideration of the likelihood that the species will encounter fishing gear that is deployed within the geographic range of that species.</p> <p>As previously noted, as no other MSC UoAs catch 10% or more of the demersal beaked redfish stock the only fishery to consider here is the UoA under assessment. One gear is deployed in this UoA, the bottom trawl.</p> <p>Greater silver smelt is mostly fished along the south and southwest coast of Iceland, at depths between 500 and 800 m, as targeted fishing is only allowed at depths greater than 400 m (MFRI, 2021b). As noted in the previous attribute, in the autumn survey demersal beaked redfish is caught at depths of 400-800m. Both species have similar habitat preferences, i.e. both are bathypelagic. Given the high degree of overlap between the stock and the fishery for this attribute, encounterability is scored as high risk. For thresholds for scoring see Table 4 below.</p>	<p>3</p>
<p>Selectivity of gear type</p>	<p>Under this attribute, the team generates a score for each gear type within the UoA after consideration of the potential of the gear to capture or retain the species that encounters the fishing gear.</p> <p>As previously noted, as no other MSC UoAs catch 10% or more of the demersal beaked redfish stock the only fishery to consider here is the UoA under assessment. Also, only one gear is deployed in this UoA, the bottom trawl.</p> <p>The team scores the selectivity of the gear type considering its potential to retain immature fish. 2 elements are defined in order to adequately assess the selectivity attribute (see Table 4 below). Scoring element (a) considers the frequency of deployments in which immature fish are caught. Scoring element (b) considered the potential of the gear/fishing method to retain juveniles or, in other words the ability of the juveniles to escape or avoid that particular gear.</p> <p>Mainly redfish larger than 30 cm are found in Icelandic waters. The East Greenland shelf is most likely the main nursery area for the Icelandic slope stock. The abundance index of fish 30 cm and smaller (recruits) has been at very low level since 2007 (MFRI, 2021a).</p> <p>Given the very low abundance of juvenile fish in the areas where the fishery occurs, the team consider that individuals less than the size at maturity are rarely caught (i.e. < 5% of gear deployments). Consequently, scoring element (a) is scored at low risk. The assessment team did not find information on the ability of immature redfish to escape or avoid capture in the bottom trawls used in the greater silver smelt fishery. However, despite the high degree of overlap between the redfish habitat and fishery, there is a very low abundance of juvenile redfish in the areas where the fishery occurs and since the mature size of the target species, greater silver smelt (>35cm, MFRI 2021b), is similar to demersal beaked redfish, it would seem appropriate to determine a medium risk level for scoring element (b) based on the susceptibility information set out in table PF5 (copied as table 4 in Annex 1), i.e. <i>“individuals < half the size at maturity can escape or avoid gear”</i>.</p>	<p>2</p>

Table 1. PSA productivity attributes and scores.

	As the scoring elements (a) and (b) achieve different scores, in accordance with PF4.4.8 c) i) of the MSC FCP v2.2, the score is assigned as the average of the 2 categories, rounded up to the nearest whole number on the 1:3 scale.	
Post capture mortality	This attribute assesses the likelihood that, if captured, a species would be released and that it would be in a condition to permit subsequent survival. As demersal beaked redfish is part of the Icelandic quota system, if caught it must be retained and landed and therefore this attribute is scored as high risk.	3
Catch (weight) Only where the scoring element is scored cumulatively	Not applicable. As previously noted, as no other MSC UoAs catch 10% or more of the demersal beaked redfish stock the only fishery to consider here is the UoA under assessment.	NA

Draft PSA score

The draft PSA score for demersal beaked redfish is set out in the table below. It achieves an MSC PSA-derived score of 69, representing ‘medium’ risk equivalent to an MSC scoring guidepost of 60-79.

In accordance with §7.7.3.6 of the MSC Fisheries Certification Process (FCP) v2.2³, we note that the PI contains scoring elements that are data-deficient (including demersal beaked redfish) but also non-data-deficient (harbour seal and grey seal), so the CAB will use the RBF (Annex PF) to assess the data-deficient scoring elements and score non-data-deficient scoring elements using the default tree.

³ MSC Fisheries Certification Process v2.2. https://www.msc.org/docs/default-source/default-document-library/for-business/program-documents/fisheries-program-documents/msc-fisheries-certification-process-v2-2.pdf?sfvrsn=9294350_9

Table 2. Draft PSA score for demersal beaked redfish (*Sebastes mentella*, ISL: Djúpkarfi) in Subarea 14 and Division 5.a, the Icelandic slope stock (East of Greenland, Iceland grounds)

Productivity Scores [1-3]								Susceptibility Scores [1-3]				Cumulative only									
Average age at maturity	Average max age	Fecundity	Average max size	Average size at Maturity	Reproductive strategy	Trophic level	Density Dependence	Total Productivity (average)	Availability	Encounterability	Selectivity	Post-capture mortality	Total (multiplicative)	PSA Score	Catch (tons)	Weighting	Weighted Total	Weighted PSA Score	MSC PSA-derived score	Risk Category Name	MSC scoring guidepost
2	3	1	1	2	3	3		2.14	3	3	2	3	2.33	3.16					69	Med	60-79

References

ICES, 2018. NWWG Report 2018. 20 Icelandic slope *Sebastes mentella* in 5.a and 14.

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/22%20NWWG%20Report%202018_Sec%2020_Icelandic%20slope%20Sebastes%20mentella%20in%205.a%20and%2014.pdf?msclid=927060beaf9011eca5999b94c26fdc0b

ICES, 2012. Stock Annex: Beaked redfish (*Sebastes mentella*) in Divisions Va and XIVb. May 2012.

https://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2015/smn-con_SA.pdf?msclid=de0c1bccaf9111eca562d65c0442c65c

MFRI 2021a. MFRI Assessment Reports 2021. Icelandic slope beaked redfish *Sebastes mentella*. Marine and Freshwater Research Institute, 15 June 2021.

https://www.hafogvatn.is/static/extras/images/05-demersalsmentella_tr1259394.pdf

MFRI 2021b. MFRI Assessment Reports 2021. Greater silver smelt *Argentina silus*. Marine and Freshwater Research Institute, 15 June 2021.

https://www.hafogvatn.is/static/extras/images/23-greatersilversmelt_tr1259463.pdf

Annex 1

Table 3. PSA productivity attributes and scores (MSC FCP v.2.2, Table PF4).

Productivity attribute	High productivity (Low risk, score = 1)	Medium productivity (medium risk, score = 2)	Low productivity (high risk, score = 3)
Average age at maturity	<5 years	5-15 years	>15 years
Average maximum age	<10 years	10-25 years	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year
Average maximum size (not to be used when scoring invertebrate species)	<100 cm	100-300 cm	>300 cm
Average size at maturity (not to be used when scoring invertebrate species)	<40 cm	40-200 cm	>200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Trophic Level	<2.75	2.75-3.25	>3.25

Table 4. PSA susceptibility attributes and scores (MSC FCP v.2.2, Table PF5).

Susceptibility attribute	Low susceptibility (Low risk, score = 1)	Medium susceptibility (medium risk, score = 2)	High susceptibility (high risk, score = 3)
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	<10% overlap	10-30% overlap	>30% overlap
Encounterability: The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species (Principle 1).
Selectivity of gear type: Potential of the gear to retain species	a Individuals < size at maturity are rarely caught.	a Individuals < size at maturity are regularly caught.	a Individuals < size at maturity are frequently caught.
	b Individuals < size at maturity can escape or avoid gear.	b Individuals < half the size at maturity can escape or avoid gear.	b Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM): The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released. Default score for retained species (Principle 1 or Principle 2).