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PUBLIC COMMENT DRAFT REPORT

Initial assessment of the ISF Iceland Northern shrimp fishery (inshore and offshore)

Icelandic Sustainable Fisheries

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Table of contents

ABBREVIATIONS & ACRONYMS 4

STOCK ASSESSMENT REFERENCE POINTS 5

MSC ABBREVIATIONS AND ACRONYMS 5

1 EXECUTIVE SUMMARY 6
1.1 Main strengths and weaknesses of the client's operation 6
1.2 Determination / draft determination 7

2 AUTHORSHIP AND PEER REVIEWERS 9
2.1 Assessment team 9
2.2 Peer reviewers 11

3 DESCRIPTION OF THE FISHERY 12
3.1 Unit(s) of Assessment (UoA) and scope of certification sought 12
3.2 Overview of the fishery 17
3.3 Principle One: Target Species Background 22
3.4 Principle Two: Ecosystem Background 50
3.5 Principle Three: Management System Background 76

4 EVALUATION PROCEDURE 80
4.1 Harmonised Fishery Assessment 80
4.2 Previous assessments 81
4.3 Assessment Methodologies 82
4.4 Evaluation Processes and Techniques 83

5 TRACEABILITY 89
5.1 Eligibility Date 89
5.2 Traceability within the Fishery 89
5.3 Eligibility to Enter Further Chains of Custody 92
5.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to Enter Further Chains of Custody 92

6 EVALUATION RESULTS 93
6.1 Principle Level Scores 93
6.2 Summary of PI Level Scores 93
6.3 Summary of Conditions 94
6.4 Recommendations 95
6.5 Determination, Formal Conclusion and Agreement 95
6.6 Changes in the fishery prior to and since Pre-Assessment 95

7 REFERENCES 96

APPENDIX 1 SCORING AND RATIONALES 102
Appendix 1.1 Performance Indicator Scores and Rationale 102
Principle 1 102
Principle 2 127
Principle 3: All UoAs. 181
Appendix 1.3 Conditions 199

APPENDIX 2 PEER REVIEW REPORTS 209

APPENDIX 3 STAKEHOLDER SUBMISSIONS 210

APPENDIX 4 SURVEILLANCE FREQUENCY 211

APPENDIX 5 OBJECTIONS PROCESS 212

APPENDIX 6 VESSEL LIST 213

APPENDIX 7 CLIENT ACCEPTANCE OF REPORT 214

ABBREVIATIONS & ACRONYMS

ACOM	Advisory Committee on fisheries Management (ICES)
CAB	Conformity Assessment Body
CFP	Common Fisheries Policy
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EC	European Commission
EEZ	Exclusive Economic Zone
EMODnet	European Marine Observation and Data Network
ERS	Electronic Recording and Reporting System
EU	European Union
FAO	Food and Agriculture Organization
GT	Gross Tonnage
HAFRO	Marine and Freshwater Research Institute (in Icelandic)
HCR	Harvest Control Rule
ICES	International Council for the Exploration of the Sea
ICJ	International Court of Justice
ISBF	Introduced Species Based Fisheries
ISF	Icelandic Sustainable Fisheries
ITQ	Individual Transferable Quota
ITLOS	International Tribunal for the Law of the Sea
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
LTMS	Long-Term Management Strategy
MCS	Monitoring, Control and Surveillance
MFRI	Marine and Freshwater Research Institute (of Iceland)
NAMMCO	North Atlantic Marine Mammal Commission
NEAFC	The North East Atlantic Fisheries Commission
NEA	North-East Atlantic
NE	North East
NGO	Non-Governmental Organisation
OSPAR	Oslo-Paris Convention (Convention for the Protection of the Marine Environment of the North-East Atlantic)
PCA	Permanent Court of Arbitration
RAC	Regional Advisory Council
RSW	Refrigerated SeaWater
SAM	State-Space Assessment Model
SIMWG	Stock Identification Methods Working Group (ICES)
TAC	Total Allowable Catch
TBC	To be confirmed
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	United Nations Fish Stocks Agreement
VMS	Vessel Monitoring System
VPA	Virtual Population Analysis
WWF	World Wildlife Fund

STOCK ASSESSMENT REFERENCE POINTS

Blim	Minimum biomass below which recruitment is expected to be impaired or the stock dynamics are unknown.
Bmsy	Biomass corresponding to the maximum sustainable yield (biological reference point); the peak value on a domed yield-per-recruit curve.
Bpa	Precautionary biomass below which SSB should not be allowed to fall to safeguard it against falling to Blim.
Btrigger	Value of spawning stock biomass (SSB) that triggers a specific management action.
CI	Confidence Interval
CPUE	Catch per unit effort: The quantity of fish caught (in number or in weight) with one standard unit of fishing effort; e.g weight of fish taken per hour of trawling. considered
F	Instantaneous rate of fishing mortality
Flim	Limit reference point for fishing mortality (mean over defined age range)
Fpa	Precautionary buffer to preclude true fishing mortality being at Flim when the perceived fishing mortality is at Fpa.
Fmax	F where total yield or yield per recruit is highest (biological reference point)
Fmsy	F giving maximum sustainable yield (biological reference point)
HCR	Harvest Control Rules
MSY	Maximum Sustainable Yield
MSY Btrigger	Precautionary biomass level at which the management plan initiates specific harvest control rules to minimise the risk of further decline in biomass and concomitant risk to recruitment.
SSB	Spawning Stock Biomass
TAC	Total Allowable Catch
yr	Year

MSC ABBREVIATIONS AND ACRONYMS

CAB	Conformity Assessment Body
CR	Certification Requirements
ETP	Endangered, Threatened and Protected species
FCR	Fisheries certification Requirements
LTL	Low Trophic Level (species)
MSC	Marine Stewardship Council
PI	Performance Indicator
P1	Principle 1
P2	Principle 2
P3	Principle 3
SG	Scoring Guidepost
SI	Scoring Issue
UoA	Unit of Assessment
UoC	Unit of Certification
VME	Vulnerable Marine Ecosystem

1 EXECUTIVE SUMMARY

This report provides information on the initial assessment of Iceland northern shrimp (inshore and offshore) fishery against Marine Stewardship Council (MSC) Fisheries Standard: Fisheries Certification Requirements v2.0. The report is prepared by DNV-GL for the Icelandic Sustainable Fisheries Organization.

The assessment was carried out using MSC Fisheries Certification Requirements and Guidance v2.0. For the assessment, the default assessment tree was used. The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any of the individual MSC Criteria for UoC 1, the offshore fishery and UoCs 2, 3, 4 & 5, the inshore fisheries in Eldey, Snæfellsnes, Arnarfjörður and Ísafjarðardjúp. UoCs 6 & 7, the inshore fisheries in Skjálfandi and Húnaflói, Öxarfjörður and Skagafjörður, scored less than 60 against one or more of the individual MSC Criteria under Principle 1. Scope of certification is up to the point of landing and chain of custody commences from point of sale.

The list of vessels covered by this assessment is shown in Appendix 6.

Tables 1 and 2 show assessment team members and assessment timeline.

Table 1 Assessment team

Role	Name
Team leader	Lucia Revenga
Principle 1 expert:	Julian Addison
Principle 2 expert:	Lucia Revenga
Principle 3 expert:	Geir Hønneland
DNV GL project manager and Chain of custody responsible:	Stefan Midteide

Table 2 Assessment timeline

Event	Date
Announcement of initial assessment:	2017-10-24
Site visit and stakeholder consultations:	2017-11-28 - 2017-11-30
Publication of Public Certification Report	<pending>
Eligibility date:	Expected 2018-05-16

1.1 Main strengths and weaknesses of the client's operation

1.1.1 Main strengths

Principle	Performance Indicator	Comment
Principle 1	PIs 1.2.1, 1.2.2 & 1.2.3	The fisheries have a well-defined harvest strategy and harvest control rules which set TACs based on estimates of stock biomass from annual stock surveys and precautionary exploitation rates.
Principle 2	Outcome PIs (PI 2.1.1, PI 2.2.1, PI 2.3.1)	The fishing strategy results in very clean catch composition, with very limited impacts on other fish species.
Principle 3	PI 3.2.3	Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with.

1.1.2 Main weaknesses

Principle	Performance Indicator	Comment
Principle 1	1.1.1 and 1.2.4	Stock status in relation to reference points is poor, except for UoC 3. There are no reference points clearly defined for UoC 7.
Principle 2	2.4.1 and 2.4.2	Some VME are not protected yet.
Principle 3	-	There isn't any main weakness to highlight.

1.2 Determination / draft determination

[PCDR: Draft determination with supporting rationale. FR: Final determination. PCR: formal statement from decision making entity]

The Iceland northern shrimp fishery in UoCs 1, 2, 3, 4 and 5 (the offshore fishery and the inshore fisheries in Eldey, Snæfellsnes, Arnarfjörður and Ísafjarðardjúp) achieved a score of 80 or more for each of the three MSC Principles and did not score under 60 for any of the set MSC criteria. UoCs 6 and 7 (the inshore fisheries in Skjálfandi and Húnaflói, Öxarfjörður and Skagafjörður) achieved a score of below 60 under PI 1.1.1 (UoCs 6 & 7) and PI 1.2.4 (UoC 7 only). Therefore UoC 6 and UoC 7 do not meet MSC certification requirements.

Based on the evaluation of the fishery presented in this report the assessment team recommends the certification of the Iceland northern shrimp fishery UoCs 1, 2, 3, 4 and 5 for the Icelandic Sustainable Fisheries client.

As the fishery achieved a score of below 80 against 4 scoring indicators, the assessment team has set 4 conditions (Table 3) for the continued certification that the client is required to address (however condition against PI 1.2.4 is non-binding as the relevant UoC, this is, UoC 7, fails to meet SG60). The conditions are applicable to improve performance to at least the 80 level within the period set by the assessment team.

The assessment team also makes five recommendations for the fishery (Table 4).

Table 3 Conditions for certification (full text in Appendix 1.3)

Condition number	PI	Condition	Time-scale for compliance
1	1.1.1	There must be evidence that the stock is at or fluctuating around a level consistent with MSY.	This condition should be closed by the 4th surveillance audit.
2	1.2.4	There is a requirement to develop appropriate reference points (applies for UoC 7 only).	Non-binding as UoC 7 fails to meet SG60.
3	2.4.1	The SG80 requirements for SIb (VME) must be met. There shall be evidence of conservation and management measures to protect VME such as sponge aggregations, and that UoC does not causes serious or irreversible harm to these habitats (applies to UoC 1 only).	This condition should be closed by the 4th surveillance audit.
4	2.4.2	The SG80 requirements for SIa must be met. There must be evidence of the implementation of a partial strategy designed to ensure the UoA does not pose a risk of serious or irreversible harm to the different types of encountered habitats, paying special attention to VME, so that the partial strategy is expected to achieve the Habitat Outcome 80 level of performance or above.	This condition should be closed by the 4th surveillance audit.

Table 4 Recommendations (full text in Appendix 1.3)

Recommendation number	PI	Recommendation
1	1.2.3	It is recommended that stock biomass estimates from the stock surveys are presented with confidence intervals around those estimates.
2	1.2.4	It is recommended that annual stock assessment reports should incorporate a temperature or ocean climate index.
3	1.2.4	It is recommended that regular external peer reviews of the stock assessments should be undertaken.
4	Principle 2 PI	Different Principle 2 PI (primary, secondary and ETP species) would benefit from UoA records of non-fatal interactions with halibuts, sharks, skates, rays and marine mammals sightings. Records on benthic species would benefit the score of bottom trawlers in PI related to habitats.
5	2.4.3	It is recommended that an estimation of the areal footprint of the fishery in relation to the fishing grounds is calculated, in order to facilitate the estimation of the habitat impact of the fishery.

2 AUTHORSHIP AND PEER REVIEWERS

2.1 Assessment team

Table 5 Assessment team

Role	Qualifications
Team leader: Lucia Revenga	See below
Principle 1 expert: Julian Addison	Julian holds a Ph.D. in population ecology and modelling from Imperial College of Science and Technology, University of London, and also a BSc in Zoology from Kings College, University of London. He has 30 years' experience of stock assessment and provision of management advice on shellfish fisheries and scientific research on crustacean biology and population dynamics and inshore fisheries. Until December 2010 when he left the organisation to become an independent consultant, he worked at the Centre for Environment, Fisheries and Aquaculture Science (Cefas) in Lowestoft, England where he was Senior Shellfish Advisor to Government policy makers, which involved working closely with marine managers, legislators and stakeholders, Government Statutory Nature Conservation Organisations and environmental NGOs. He has also worked as a visiting scientist at DFO in Halifax, Nova Scotia and at NMFS in Woods Hole, Massachusetts where he experienced shellfish management approaches in North America. For four years he was a member of the Scientific Committee and the UK delegation to the International Whaling Commission providing scientific advice to the UK Commissioner. He has worked extensively with ICES and most recently was Chair of the Working Group on the Biology and Life History of Crabs, a member of the Working Group on Crangon Fisheries and Life History and a member of the Steering Group on Ecosystems Function. He has extensive experience of the MSC certification process primarily as a P1 team member but also as a P2 team member and team leader undertaking MSC full assessments for the Ireland and Northern Ireland bottom grown mussel fisheries, the Newfoundland and Labrador snow crab fishery, Estonia and Faroe Islands North East Atlantic Cold Water prawn fisheries, Swedish Skagerrak and Norwegian Deep cold water prawn fishery, the Eastern Canada offshore lobster fishery and the Limfjord mussel and cockle fisheries. He has also undertaken MSC pre-assessments and numerous annual surveillance audits being responsible also for P3 issues and has carried out peer reviews of MSC assessments in both Europe and North America of lobster, cold water prawn, razorfish, cockle and scallop fisheries. Other recent work includes a review of the stock assessment model for blue crabs in Chesapeake Bay, USA, and an assessment of three Alaskan crab fisheries under the FAO-based Responsible Fisheries Management scheme. He meets the competence criteria in to MSC Certification requirements v. 2.0, annex PC, concerning substantial and appropriate skills related to Principle 1 and Principle 2 requirements. He is also skilled in fishery management issues having ten years' experience as the Senior Shellfish Advisor to Government policy makers and Ministers, which involved working closely with marine managers and legislators. He is trained as a team member and team leader according to v. 1.3 and team leader, according to v. 2.0. He has no conflict of interest in

	relation to the fishery under assessment.
Principle 2 expert: Lucia Revenga	Lucia Revenga is a marine scientist, specialized in Fisheries Biology who holds degrees in Marine Sciences and in Environmental Sciences. For 5 years she worked with TRAGSA for the Spanish General Marine Secretariat, conducting researches on the biology and stock status of different species, such as bluefin tunas, skipjack tunas, albacores, mackerels, sardines, eels, prawns, Norway lobsters, halibuts. She has also taken part in oceanographic surveys focused in the search of vulnerable marine ecosystems. From 2011 to 2015 she worked for IFAPA (Institute for Research and Training in Fisheries) as a Fisheries biology teacher for fishermen. She also conducts research in fishery local activities with the aim of increasing community awareness of the conservation of coastal ecosystems and encouraging sustainable fishing practices. Since then she works as an independent consultant. As a P2 expert she has been involved in the DS Nephrops assessment, the Olympic krill assessment, the AKER BioMarine Krill Fishery reassessment, and the Medfish project. She has been involved as a team leader in the IDW blueshell mussel reassessment. Lucia`s qualifications meet the competence criteria defined in the MSC Certification requirements v.2.0, annex PC, for the Team-leader. Lucia has no conflicts of interest in relation to the UoA under her responsibility.
Principle 3 expert: Geir Hønneland	Geir Hønneland is Research Director of the Fridtjof Nansen Institute in Oslo, Norway, and adjunct professor at the University of Tromsø, Norway. He holds a Ph.D in political science from the University of Oslo and has primarily studied international fisheries management (with a main emphasis on compliance issues), international environmental politics and international Arctic politics more widely. Among his recent books are Arctic Politics, the Law of the Sea and Russian Identity (Palgrave, 2014), Making Fishery Agreements Work (Edward Elgar, 2012), International Environmental Agreements (Routledge, 2011), Arctic Politics and International Cooperation (Routledge, 2007) and Law and Politics in Ocean Governance: The UN Fish Stocks Agreement and Regional Fisheries Management Regimes (Martinus Nijhoff, 2006). He worked in the Norwegian Coast Guard from 1988 to 1994, where he was certified as fisheries inspector. Geir also has a wide range of evaluation and consultancy experience, e.g. for the FAO and OECD, relating to responsible fisheries management. He has been involved in MSC assessments since 2009 (covering cod, haddock and herring fisheries in the Northeast Atlantic and krill in the Southern Ocean). He has also wide experience as peer reviewer, including for shrimp fisheries in the North-East Atlantic and for other Swedish fisheries. His qualifications meet the competence criteria defined in the MSC Certification requirements v.2.0, annex PC. Hønneland has no conflicts of interest in relation to the UoA under his responsibility
DNV GL project manager Stefan Midteide	Stefan Midteide is principle consultant and project manager within MSC Fishery at DNV GL. His core competencies are project management, sustainability assessments, risk assessment responsible supply chain management, responsible investment and implementation of sustainability policies. He has 9 years' experience

	as sustainability consultant and project manager. He has participated and managed project across a wide range and industries, seafoods and aquaculture, power, telecom, food retail, finance, technology, defense, pharmaceutical retail, public sector. Stefan holds degrees from the Nottingham University Business School (MBA), London School of Economics (M.Sc. Development Studies) and the University of Oslo (Cand Polit, Economic Geography). His qualifications meet the competence criteria defined in the MSC Certification requirements v.2.0, annex PC. Midteide has no conflicts of interest in relation to the UoA under his responsibility

2.2 Peer reviewers

Peer reviewers have been appointed by the MSC Peer Review College and are anonymous.

Table 6 Peer reviewers: Anonymous

3 DESCRIPTION OF THE FISHERY

3.1 Unit(s) of Assessment (UoA) and scope of certification sought

The fishery is, to the knowledge of the assessment team, within the scope of the MSC Fisheries standard according to the following determinations:

- The target species is within the scope of MSC certification
- The fishery does not use poisons or explosives.
- The fishery is not conducted under a controversial unilateral exemption to an international agreement.
- The client or client group does not include an entity that has been successfully prosecuted for a forced labour violation in the last 2 years.
- The fishery has mechanisms for resolving disputes and disputes do not overwhelm the fishery.

3.1.1 UoA and Proposed Unit of Certification (UoC)

(ALL REPORTS EXCEPT PCR)

MSC certification is specific to the fishery holding the certificate, the Unit of Certification. The assessment team may choose to assess a wider unit, the Unit of Assessment, to which the certificate may be extended under specific circumstances.

3.1.1.1 Unit of Assessment

The Unit of Assessment defines the full scope of what is being assessed and includes the Unit of Certification and any other eligible fishers.

The Unit of Assessment includes the target stock (s), the fishing method or gear type/s, vessel type/s and/or practices, and the fishing fleets or groups of vessels, or individual fishing operators pursuing that stock, including any other eligible fishers that are outside the Unit of Certification.

The rationale for the chosen Unit of Assessment is that it covers all relevant fishers, methods of capture and geographical areas relevant to the stocks targeted. The fishery activities and the stocks are clearly geographically defined.

The Units of Assessment for this fishery assessment are specified in Table 7. They were chosen as they cover all shrimp fishing activities in Iceland. The Units of Assessments are identical to Units of Certification. There are 7 Units of Assessments included as specified below.

Table 7 Unit of Assessment (UoA)

		#	Area description
Geographical areas	Offshore	UoA 1	Offshore, north of Iceland, within ICES area Va2
	Inshore	UoA 2	Eldey
		UoA 3	Snæfellsnes
		UoA 4	Arnarfjörður
		UoA 5	Ísafjarðardjúp
		UoA 6	Skjálfandi
		UoA 7	Húnaflói, Öxarfjörður and Skagafjörður
Method of capture:	Bottom trawl		
Species:	*Pandalus borealis*		

Target Stock name:	*Pandalus borealis* (inshore and offshore in geographical areas defined above).
Management	The fisheries are in Icelandic waters only and managed by Icelandic Ministry of Fisheries and Agriculture based on the Fisheries Management Act 1990, Icelandic Coast Guard and the Directorate of Fisheries.
Client group:	All member vessels of Iceland Sustainable Fisheries targeting northern shrimp, inshore and offshore in Icelandic waters.
Other eligible fishers:	None

3.1.1.2 Proposed Unit of Certification

The Unit of certification is the unit entitled to receive an MSC certificate.

The proposed Units of Certification include the target stock, the fishing method or gear type/s, vessel type/s and/or practices, the fishing fleets or groups of vessels or individual fishing operators pursuing that stock including those client group members initially intended to be covered by the certificate.

The MSC FCR v2.0 specifies that the Unit of Certification is defined as *"The target stock or stocks (= biologically distinct unit/s) combined with the fishing method/gear and practice (including vessel type/s) pursuing that stock and any fleets, groups of vessels, or individual vessels of other fishing operators."*

The proposed Units of Certification are provided in Table 8.

Table 8 Proposed Unit(s) of Certification at the start of the certificate (prior to any certificate sharing)

		#	Area description
Geographical areas	Offshore	UoC 1	Offshore, north of Iceland, within ICES area Va2
	Inshore	UoC 2	Eldey
		UoC 3	Snæfellsnes
		UoC 4	Arnarfjörður
		UoC 5	Ísafjarðardjúp
		UoC 6	Skjálfandi
		UoC 7	Húnaflói, Öxarfjörður and Skagafjörður
Method of capture:	Bottom trawl		
Species:	*Pandalus borealis*		
Target Stock name:	*Pandalus borealis* (inshore and offshore in geographical areas defined above).		
Management	The fisheries are in Icelandic waters only and managed by Icelandic Ministry of Fisheries and Agriculture based on the Fisheries Management Act 1990, Icelandic Coast Guard and the Directorate of Fisheries.		
Client group:	All member vessels of Iceland Sustainable Fisheries targeting northern shrimp, inshore and offshore in Icelandic waters.		
Other eligible fishers:	None		

Figure 1: Location of the fishing grounds for the offshore shrimp fishery (UoA 1) in 2016, as described in MFRI advice. Different colours represent the average catch in tonnes per square nautical mile (t/nm2). Source: MFRI 2016 advice for offshore shrimp.

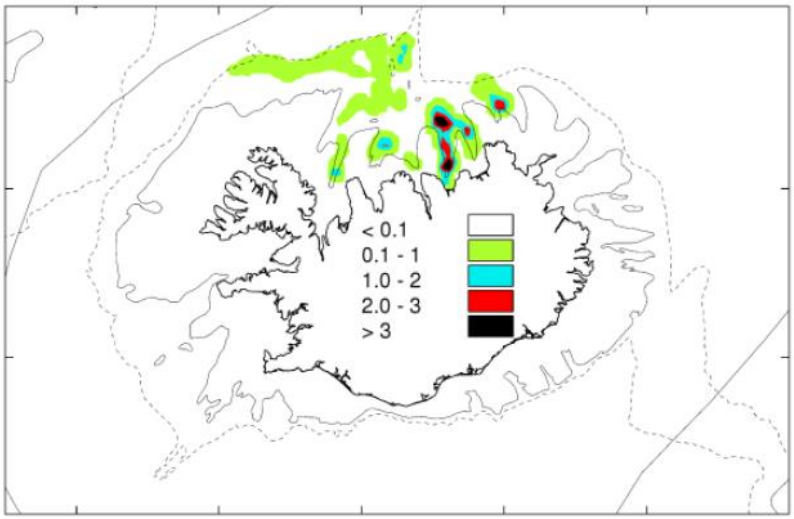
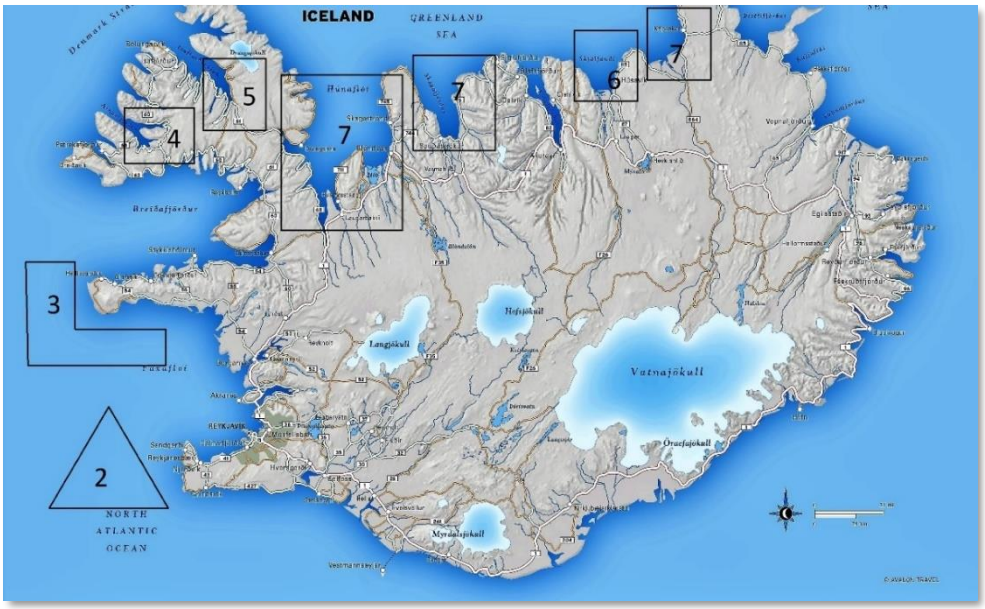


Figure 2: Location of the fishing grounds for the inshore UoAs (UoA 2 – UoA7), as described by the client. Numbers represent the different UoAs. (UoA 2: Eldey; UoA 3: Snæfellsnes; UoA 4: Arnarfjörður; UoA 5: Ísafjarðardjúp; UoA 6: Skjálfandi, and UoA 7: Húnaflói, Öxarfjörður and Skagafjörður). Source: DNV-GL. Original from Moon Iceland Travel Guide.



3.1.1.3 Other eligible fishers at the start of the certificate (prior to any certificate sharing)

Other eligible fishers mean operators that have been evaluated as part of the Unit of Assessment, but who are not eligible to use the MSC Fishery certificate without a certificate sharing agreement with the client group. There are no other eligible fishers for this fishery.

3.1.2 Final UoC(s)

(PCR ONLY)

The Unit of Certification covered by the MSC Fishery certificate at the time of certification is described in Table 9.

Table 9 Unit(s) of Certification at the time of certification

Target stock(s)
Fishing method or gear type(s), vessel type(s) and/or practices
The fishing fleets or groups of vessels or individual fishing operators pursuing that stock including those client group members initially intended to be covered by the certificate

Rationale for any changes to the proposed UoC(s).

3.1.2.1 Final other eligible fishers at the time of certification

There are no other eligible fishers for this fishery

3.1.3 Total Allowable Catch (TAC) and Catch Data

As the UoC and UoA cover the same fishing grounds and the same fishing vessels, data for each UoC and UoA are identical. Besides, as there isn't any non-Icelandic vessel targeting prawns, so the UoA/UoC share of the TAC is 100%. As the prawn is not processed on board, the green weight is equivalent to the catch. Fishing year for most UoCs runs from September 1st to August 31st.

Table 10 TAC and catch data (in kilos) for the different UoCs. Source: http://www.fiskistofa.is/veidar/aflastada/afli-i-raekju/aflastada_raekja.jsp

Fishing area	Area code	Fishing season	UoC	Catch by area 2015/ 2016	Catch by UoC 2015/ 2016	TAC 2015 /2016	Catch by area 2016 /2017	Catch by UoC 2016/2017	TAC 2016/2017	TAC 2017 /2018
Rækja (offshore)	41	01/09-31/08	UoC1	5.124.569	5.124.569	4.000.000	3.068.588	3.068.588	4.100.000	5.000.000
Eldeyjarrækja	4108	01/01-31/12	UoC2	146.229 (2016)	146.229 (2016)	171.000 (2016)	335 (2017)	335 (2017)	0 (2017)	0
Raekja Breiðafjörður,	4107	01/05-15/03	UoC 3	0	589.648	700.000	0	825.906	820.000	698.000
Rækja í Kolluál	4112	01/05-15/03		0			0			
Rækja Snæfellsnes	4113	01/05-15/03		589.648			825.906			
Arnarfjarðarrækja	4101	01/09-31/08	UoC4	257.546	257.546	250 .000	129.684	129.684	167.000	0
Isafjardardjup (Raekja I Djúpi)	4103	01/10-31/08	UoC5	747.983	747.983	700.000	502.934	502.934	484.000	0
Rækja í Skjálfanda	4106	01/01-31/12	UoC6	141.737 (2016)	141.737 (2016)	140.000 (2016)	0 (2017)	0 (2017)	0 (2017)	0
Húnaflóarækja	4102	01/09-31/08	UoC7	58	58	0	0	0	0	0
Öxarfjarðarrækja	4105	01/09-31/08		0			0			
Skagardfjordur	4104	01/09-31/08		0			0			

3.1.4 Scope of Assessment in Relation to Enhanced Fisheries

The MSC Certification Requirements and Guidance v2.0 defines enhanced fisheries as: "Any activity aimed at supplementing or sustaining the recruitment or improving the survival and growth of one or more aquatic organisms, or at raising the total production or the production of selected elements of the fishery beyond a level that is sustainable by natural processes. It may involve stocking, habitat modification, elimination of unwanted species, fertilisation or combinations of any of these practices".
The fishery in the UoA is a wild capture fishery and does not meet the definition above. It is therefore not considered to be enhanced.

3.1.5 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF)

The MSC Certification Requirements v2.0 defines ISBF fisheries as: Any fishery which prosecutes a target fin or shellfish species that was intentionally or accidentally transported and released by human activity into an aquatic environment beyond its natural distribution range. This does not include species that are "introduced" into a location due to an expansion in their natural geographic range. The fishery under assessment does not meet the definition above. Therefore, it is not considered as ISBF.

3.2 Overview of the fishery

3.2.1 Client name and contact information

Table 11 Client contact data

Client name:	Icelandic Sustainable Fisheries
Contact person:	Kristinn Hjálmarson (Project manager)
Address:	Grandagarði 16. Reykjavík 101
Telephone:	+354 840 6886
Email:	kristinn@isf.is

3.2.2 Client information

Icelandic Sustainable Fisheries (EHF/ISF) was founded in 2012 by companies in the fishing industry, producers and sales organisations. ISF is not a closed group. It is a cost sharing company open to other companies, which pay an initial amount and annual fees to join. There are at present 54 companies in ISF (see full list of members (as in January 2011) in **Table 12** below). Only members to ISF can utilize the MSC Fishery Certificates owned by ISF, and are the only ones allowed to export products which are to carry the MSC logo. The purpose of ISF is to obtain certifications of fishing gear and fish stocks exploited around Iceland.

The list of certificate sharers is published on the MSC and can also be found here:
http://www.icelandsustainable.is/isf-partners.html

Table 12: The Certificate Sharers of all ISF MSC per 14.05.2018. Source: ISF

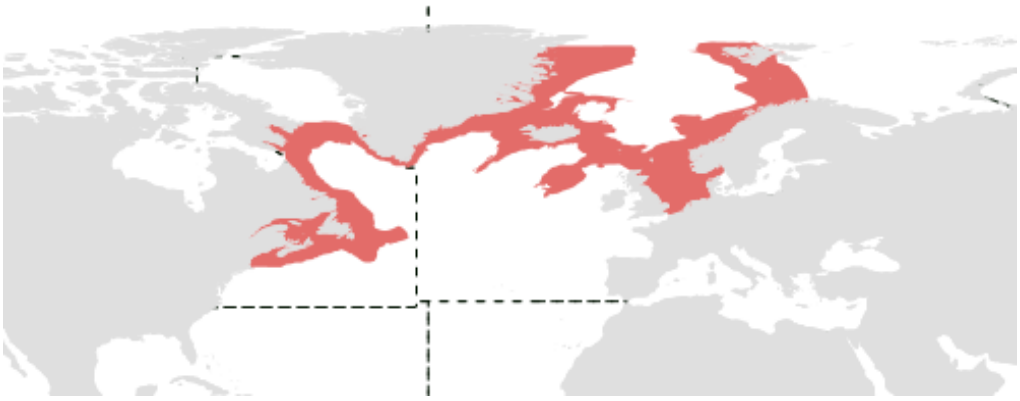
	Shareholder Name	Id number	Adress
1	AB Fish ehf	530213-0210	Hlíðarsmára 6, 201 Kópavogir
2	Akraborg ehf.	510789-3939	Kalmansvöllu 6, 300 Akranesi
3	Bacco Seaproducts ehf	650804-3920	Dalshrauni 1 220 Hafnarfirði
4	Bergur-Huginn ehf	560384-0179	Skildingarvegur 2, 900 Vestmannaeyjar

	Shareholder Name	Id number	Adress
5	Danica Seafood hf.	510193-2619	Suðurgötu 10, 101 Reykjavík
6	Erik the Red Seafood ehf	540313-1720	Lónsbraut 1, 220 Hafnarfirði
7	Eskja hf	700610-0980	Óseyrarbraut 17, 220 Hafnarfirði
8	Ferskfiskur ehf	440685-0729	Bæjarhrauni 8, 220 Hafnarfirði
9	Fisk- Seafood ehf	461289-1269	Háeyri 1, 550 Sauðárkróki
10	Fiskkaup hf	620983-0209	Fiskislóð 34, 101 reykjavik
11	Frostfiskur ehf.	680492-2479	Hafnarskeiði 6, 815 Þorlákshöfn
12	Háteigur ehf	621299-3369	Brekkubyggð 79, 210 Garðabær
13	HB Grandi hf	541185-0389	Norðurgarði 1 , 101 Reykjavik
14	Ice Fresh Seafood ehf	700707-1590	Glerárgötu 30, 600 Akureyri
15	Ice Frozen Seafood ehf	660310-0530	Norðurtún 2 Garðabæ
16	Ice-co foods ehf	451011-0140	Fornubúðum 5, Hafnarfirði
17	Iceland Pelagic ehf	420108-0600	Krossey 780 Höfn Hornafirði
18	Iceland Seafood ehf.	471197-2389	Köllunarklettsvegi 2, 104 RVK
19	Iceland Westfjord Seafood ehf	640614-0130	Hnífsdalsbryggja, 410 Hnífsdal
20	Icelandic Group hf.	461296-2119	Borgartún 27, 105 Reykjavik
21	Icelandic Nýfiskur ehf	560185-0229	Hafnargötu 1, 245 Sandgerði
22	Icemar ehf	650403-2740	Hafnargata 27, 230 reykjavik
23	Icemark ehf.	511099-2779	Barðarstöðum 11, 112 Reykjavík
24	Iraco ehf	630106-1840	Fornubúðum 5, 220 Hafnarfjörður
25	Leo Fresh fish ehf	420913-0280	Garðavegi 15, 900 Vestmannaeyjum
26	Marz Sjavarafurdir ehf.	640371-0219	Aðalgötu 5, 340 Stykkishólmi
27	Merlo Seafood ehf	430502-4840	Krókhálsi 4, 110 Reykjavík
28	Nastar ehf.	490999-2649	Skútuvogi 1b, 104 Reykjavík
29	Rammi hf	681271-1559	Hornbrekkuvegi 3, 625 Ólafsfirði
30	Royal Iceland	601299-3999	Hafnarbakka 11, 260 Reykjanesbær
31	Selhöfði ehf	520702-2530	Jónsvör 7 190 Vogar
32	Skinney-Þinganes hf	480169-2989	Krossey, 780 Höfn Hornafirði
33	Spes ehf	660203-2060	Bakkalág 15b, 240 Grindavík
34	Sverrir Björnsson ehf	040139-4279	Laugavegi 44 580 Fjallabyggð
35	Toppfiskur ehf.	491187-1749	Fiskislóð 65, 101 Reykjavík
36	Vignir G. Jónsson Hf	681293-3299	Smiðjuvöllum 4, 300 Akranesi
37	Vinnslustöðin hf	700269-3299	Hafnargötu 2, 900 Vestmannaeyjar
38	Vísir hf.	701181-0779	Hafnargötu 16, 240 Grindavík
39	Whitelink Seafood ehf	550414-1980	Strandgötu 16 245 Sandgerði

3.2.3 General overview of the fishery

A few species of invertebrates have been harvested in Icelandic waters albeit of considerably less importance than traditional fisheries. As for crustaceans, northern shrimp (*Pandalus borealis*) is the most important species, followed by Norway lobster (*Nephrops norvegicus*).
The northern shrimp (*Pandalus borealis*) is a sub-arctic species, widespread in the northern parts of the North Atlantic. The species is typically found at depths ranging from 10-500 m but is also found at deeper waters. In Iceland, the species is predominantly found off the north coast of Iceland at depth below 300 metres, although high concentrations have also been found in shallower inshore waters.
Temperature, together with depth, substratum and salinity, are all major physical determinants of the distribution of *P. borealis* (Bergström 2000). Shrimps are found at temperatures ranging from 0 – 14ºC, and temperature seems to be closely correlated with changes in abundance (Shumway et al. 1985).

Figure 3: Distribution of *Pandalus borealis in* Atlantic waters. Source: www.fao.org/fishery/species/3425/en



The shrimp has a remarkable life cycle. Usually schooling shrimp live on or near soft bottom with high organic content but do exhibit diurnal vertical migration (Shumway et al. 1985). A male once it reaches maturity, it subsequently changes gender. Females can reach lengths of over 18 cm (Bergström 1992). Offshore individuals are larger than those caught inshore.

The Icelandic shrimp fishery takes place both in offshore waters as well as in different inshore fishing grounds. The fishery has been going on for many decades now without any expansion to new grounds. There are approximately 30 vessels targeting shrimp in Iceland, although the number may vary through the years. There are no foreign vessels targeting shrimp in Icelandic EEZ. Discarding of shrimp is considered negligible in all fishing grounds. Minimum landing size is 13 mm of carapace length. If undersized shrimp comprises 30% or more of the catch, then short term closures (2 weeks) are enforced to prevent the catch of juvenile shrimps.

The MFRI conducts 3 shrimps surveys annually, which serve to give fishing advice for the different fishing grounds. The different TACs allocated by the Directorate of Fisheries in the different fishing grounds follows this advice. Each fishing area has its own fishing season.

Icelandic shrimp fishery, as other fisheries in Iceland, are subject to different regulations, such as Act no. 79/1997 (on fishing in Iceland's exclusive fishing zone), Act no. 116/2006 (on fisheries management), and Act no. 57/1996 (on marine resource management).

- The Offshore shrimp fishing started in Iceland in the mid '70s. At the peak in the mid '90s shrimp was annually caught in excess of 70,000 tonnes. A dramatic decline followed as certain fish stocks increasingly migrated to northern waters.

The offshore shrimp fishery takes place outside the coastal baseline. Fishing trips can ast up to 5 days. A sorting grid has been mandatory since 1996 and since 2005 fishermen can use a collection bag with greater mesh size to collect fish that would otherwise escape (this is only allowed for vessels with quota for the by catch species). Most common bycatch species are cod and Greenland halibut, which can comprise a 30% of the landings for those vessels using the collection sac.

Figure 4: Sorting grid for the offshore shrimp fishery. Source: https://isfell.is/vorulisti/#p=147

The sorting grid allows the escapement of bigger fish (through the top hole) and of smaller shrimp (through the second grid on the bottom). The grids are made of stainless steel or plastic, and distance between bars ranges from 19 to 22 mm. The gradient of the grid ranges from 48-50 degrees. As regards the voluntary collection sac, if used, it has to have a 135 mm mesh size.

- The inshore shrimp fishery is regulated by Regulation 258/2012. And the location of the different fishing areas (which takes place in localised areas inside the different fjords) is regulated by Regulation 396/2005.
  Shrimp vessels inside the fjords have to be less than 200 gross tonnage. Trips last some hours as fishing grounds are located close to the coast inside the different fjords. The use of sorting grids is not mandatory in the inshore shrimp fishery (although vessels can use it if they want to).

Figure 5: Fishing gear for the inshore shrimp fishery. Source: https://isfell.is/vorulisti/#p=147

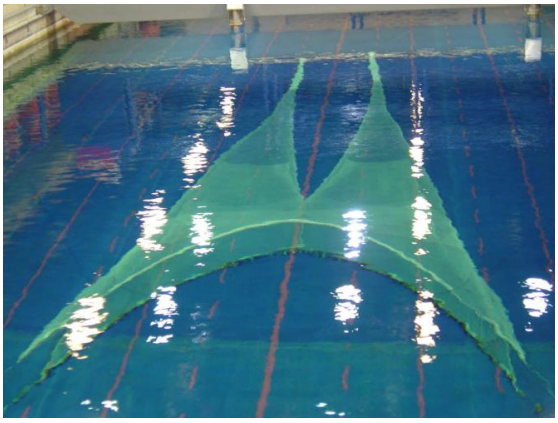
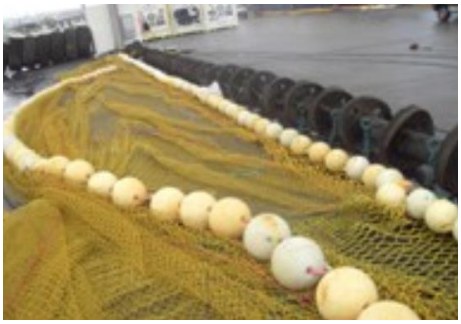


Figure 6: Footrope of the shrimp fishing gear. Source: https://isfell.is/vorulisti/#p=147



Worldwide, the *Pandalus borealis* fishery has been steadily increasing from a few thousand tonnes in the 1950's to over 350,000 tonnes in recent years, with Canada reporting the largest catches (FAO). In Iceland, the stocks declined in the 2000's with total catch in 2006 down to less than 1,000 tonnes. The stock has somewhat recovered and catches in 2013 were a total of 10,400 tonnes. The bulk of the catch is exported to the UK.

3.3 Principle One: Target Species Background

3.3.1 Fishery Resources

3.3.1.1 Taxonomy and geographic range

The cold water prawn *Pandalus borealis* (Krøyer, 1838), also known as the pink or northern shrimp, is a caridean shrimp of the family Pandalidae. It is distributed across the North Atlantic around the Barents Sea, Svalbard, Iceland and Greenland and south to the North Sea in the Northeast Atlantic and Massachusetts in the Northwest Atlantic, and across the North Pacific from the Bering Sea south to Japan and Oregon (Holthuis, 1980). In all these areas there are important commercial fisheries for *Pandalus borealis*.

3.3.1.2 Stock structure

Migration of egg-carrying females into shallower waters in connection with egg-hatching has been observed (Horsted, 1978) and juveniles may migrate from shallower to deeper water (Smidt, 1981). In adition the larvae of *P. borealis* may be transported as far as 300km during the pelagic phase as revealed by particle tracking models in the Barents Sea (Pedersen *et al*. 2003) suggesting some connectivity between populations within the main Icelandic fishing areas. Jónsdóttir *et al*. (1998) investigated the population genetics of *Pandalus borealis* in inshore and offshore areas of Icelandic waters and the Denmark Strait based on genetically determined and electrophoretically detectable protein variants. The study identified significant genetic differences between shrimps in the three areas, especially between shrimp in inshore Icelandic waters, and shrimp from Icelandic offshore waters and Denmark Strait, and concluded that for management purposes, *P. borealis* in the three areas should be treated as three separate biological units. A similar separation of stocks was postulated by Skúladóttir and Pétursson (1999) based on a statistical analysis of two morphological characters, L_{50}, the carapace length at which 50% of females are mature, and L_{max}, the maximum length of individuals within a sample.

Elsewhere in the Northeast Atlantic Martinez *et al.* (2006) investigated the genetic structure of *Pandalus borealis* analysing variation in the genomic DNA by random amplified polymorphic DNA (RAPD) markers and found no significant genetic variation among shrimp samples from the Barents Sea and Svalbard, although there was significant variation between the Barents Sea and two northern Norwegian fjords. To date there have been no studies of the genetic structure of *P. borealis* populations in Icelandic waters using the more powerful method of analysing DNA microsatellites that has been used to investigate genetic structure of populations of *P. borealis* in the Northwest Atlantic from Hudson Strait south to the Gulf of Maine and out to the Flemish Cap (Jorde *et al*., 2014), and by Knutsen *et al*. (2014) in the Skagerrak and North Sea. Interestingly Knutsen *et al*. found little genetic variation between oceanic samples from Skagerrak and the eastern North Sea but Skagerrak fjord samples generally displayed elevated levels of genetic differentiation.

On the basis of genetic evidence, it is appropriate to treat the inshore and offshore areas as two separate stocks, and although there are no known genetic differences between the inshore areas, studies in the Barents Sea and Skagerrak demonstrate genetic differences in shrimps between coastal fjords, and with stock surveys and management advice undertaken separately for each inshore area, it seems appropriate that each inshore area is treated as a separate UoC in this assessment. Stock surveys have shown that there have been very few shrimps for many years in three of the northern fjords, Húnaflói, Öxarfjörður and Skagafjörður, so the fishery has not been open since 2000, and these three fjords have been aggregated into a single UoC.

3.3.1.3 Biology and life history

The North East Arctic cold water prawn, *Pandalus borealis* is found primarily in areas with soft, muddy sediments on the continental shelves in the North Atlantic, usually at depths between 50 and 500 m (Shumway *et al*., 1985) but can also be found in depths over 800m in the Barents Sea. Temperature is a key determinant of the distribution of *P. borealis*, although depth, salinity and the nature of the seabed may also influence distribution (Bergstrøm, 2000). Results from the joint Norwegian-Russian ecosystem survey in the Barents Sea showed that the highest shrimp densities observed were at temperatures between 0 and 4 degrees C (Hvingel and Thangstad, 2016b). *Pandalus borealis* is a protandric hermaphrodite (Bergstrøm, 2000). Individuals start out as males, mature as males and mate for two years but in Icelandic waters they change sex after about 5 to 6 years and complete their lives as females (Skúladóttir, 1995). Shrimp spawn in autumn, and females carry their eggs until spring when the larvae hatch. In the offshore areas (UoC1), the fishery is all year round, but the best season is from May to September. For the inshore areas, in Eldey (UoC2) the main fishing season is summer and autumn, in Snæfellsnes (UoC3) the main fishery is in the summer and in Arnarfjörður (UoC4), Ísafjarðardjúp (UoC5), Skjálfandi (UoC6) and Húnaflói, Öxarfjörður and Skagafjörður (UoC7) the main fishing season is from early winter (following the annual Icelandic shrimp survey in September/October) until 30th April. Depending on the fishing area, the main fishery therefore overlaps the period when females are carrying eggs to varying degrees, with consequent varying impacts of exploitation on recruitment.

The species has five pelagic larval stages which drift with ocean currents and within a period of approximately 2 months, the shrimp larvae settle to the bottom (Aschan and Ingvalsen, 2009), although particle tracking models reveal that the larvae of *P. borealis* may be transported as far as 300km during the pelagic phase (Pedersen *et al*. 2003). Shrimp feed both on the ocean floor and in the water column. Their diet will therefore include both benthic and pelagic organisms. Recruitment of one year old shrimp appears to be dependent on spawning stock biomass, but it may also be affected by the timing and duration of the phytoplankton bloom (Aschan and Ingvalsen, 2009). Recruitment to the fishery when the shrimps are greater than the minimum landing size of 13 mm carapace length is influenced by temperature, competition with other species and predation. Numerous fish and marine mammal species are predators of *P. borealis* (Parsons, 2005) and predation mortality is thought to be an important factor in shrimp stock dynamics (Sten Munch-Petersen, DTU Aqua, pers. comm.). Cod in particular can consume large amounts of shrimp, and cod abundance in the autumn and spring groundfish surveys in the Icelandic offshore area was at the highest in the time series in 2015, suggesting that cod predation on shrimp has increased significantly in recent years. In the inshore areas, the same high density of predators has not been observed. Although cod can be a significant predator of shrimp, the exact quantitative relationship between the density of cod and the stock dynamics of *P. borealis* in Icelandic waters has not been determined and therefore cod abundance is not incorporated within the stock assessment for *P. borealis*. Temperature may also be an important driving factor in Pandalus stock dynamics, but currently a temperature index is not included in the stock assessment for *P. borealis* in Iceland.

Pandalus borealis is not a key trophic level species in the Icelandic ecosystem, as it does not meet all the criteria set out in paragraphs SA2.2.8-SA2.2.10 of the MSC Fisheries Certification Requirements v2.0 (MSC, 2014). *Pandalus borealis* are prey for cod, saithe and other predators. Although they are widely distributed within Icelandic waters and the North Atlantic, catches are low on an ecosystem scale and *Pandalus borealis* is unlikely to play an important role in energy transfer in the ecosystem as shrimp predators will consume other prey species.

3.3.2 Harvest Strategy

3.3.2.1 General harvest strategy

The fishery for *Pandalus borealis* in Iceland takes place within Icelandic waters and is managed by the Minister of Fisheries and Agriculture, which is part of the Ministry of Industries and Innovation. The overarching legislation is the Fisheries Management Act 1990 (revised in 2006) which states that the objective of fisheries management in Iceland is "to ensure conservation and efficient utilization of marine living resources in the Icelandic EEZ". Within the Ministry, the Directorate of Fisheries (Fiskistofa) is responsible for implementing fisheries management through, for example, the issuing of licences, and for monitoring control and surveillance in conjunction with the Icelandic Coast Guard.

In addition to the overarching Fisheries Management Act, there are specific regulations set out for the shrimp fishery. For example, the inshore shrimp fishery is regulated by Regulation 258/2012, and the location of fishing areas within the different fjords is regulated by Regulation 396/2005.

All regulations can be found at: https://www.reglugerd.is/

If Icelandic vessels fish outside Icelandic waters in Greenland waters, their fishing activity would be covered by NAFO measures, such as port state measures and Greenland fisheries management regulations. However, the UoA covers only vessels fishing in Icelandic waters and landing into Icelandic ports. Foreign vessels are not permitted to fish for shrimps within the Icelandic EEZ.

There is no specific Code of Conduct for shrimp vessels, but all Client (ISF) members are members of the Iceland Responsible Fisheries Management Certification Programme, which was developed to "to preserve the fisheries management principles adopted by the international community, to document well managed Icelandic fisheries to the highest level of assurance, to promote community consensus behind good discipline in fisheries management and to offer our customers choice in certification."

3.3.2.2 Elements of the harvest strategy

Management regulations

Fishing for shrimps in Icelandic waters requires a permit issued by the Ministry. Permits are issued for one fishing area only. There is a limit on the number of permits that are issued, but there are no restrictions on the number of days fished by licensed vessels.

The key element of the harvest strategy is the setting of an annual TAC for each of the UoCs based on estimates of stock biomass from annual stock surveys. The harvest year runs from 1 September to 31 August in the following year. In addition to an overall TAC, quotas are allocated to individual vessels. Quotas are allocated for one area only, but quotas can be bought or loaned, and for example, it is possible for an owner to aggregate three quotas on to one vessel, although there is an upper limit on the quota that single company can hold (approximately 12% of the total quota).

There is a minimum landing size (MLS) for *P. borealis* of 13mm carapace length (CL), but in practice there is negligible discarding of small shrimps as discarding is prohibited. There is a minimum mesh size for the cod end of the shrimp trawl of 36mm. The incorporation of sorting grids in the trawls, which permit the escape of fish bycatch, are mandatory in the offshore fishery (Figure 1) but are voluntary in the inshore fishery (Figure 2). The grids have a bar spacing of 19 to 22 mm and a gradient ranging from 48 to 50 degrees. If the offshore vessels have appropriate

fish quotas for e.g. cod and Greenland halibut, an additional net, known as a tunnel or sack, with a mesh size of 135mm may be attached to the trawl to collect the largest fish that have passed over the sorting grid.

Vessels licensed to fish the offshore areas are not permitted within the coastal baseline and vessels in the inshore fishery must be less than 200 tonnes gross tonnage. There are some closed areas which have been implemented to protect habitats.

Iceland is a Contracting Party to the North East Atlantic Fisheries Commission (NEAFC). In 2014 NEAFC adopted Recommendation 19 (amended in 2015) that requires vessels to move 2 nautical miles away from trawl tracks when encountering "the presence of more than 30 kg of live coral and/or 400 kg of live sponge of VME indicators". Icelandic vessels abide by commonly accepted move-on rules when encountering VMEs, however these remain informal and there are no UoA mandatory scientifically based move-on rules to protect vulnerable marine ecosystems (VMEs) as required to meet PI 2.4.2 SG80. Shrimp vessels avoid areas of coral as the trawl will snag on the coral, and shrimping does not occur in areas where sponges are found. There is a juvenile move-on rule if more than 30% of the catch is under the minimum landing size whereby the area is closed for a period of two weeks to prevent further capture of juvenile shrimps. The closed area may be a substantial area of the fishery. There are also closures of fishing areas if bycatches of small redfish, cod or halibut exceed thresholds. Areas identified for closure may be made by observers or land-based officers of the Directorate of Fisheries, following which the Directorate liaises with the Icelandic Marine and Freshwater Research Institute (MFRI), and the closures can be implemented by the Coast Guard via public radio within 3 hours and then posted on the Directorate's website. All permanently closed areas, fisheries that are closed due to biomass being below the limit reference point, and temporary closures due high levels of bycatch are published and immediately updated on the Directorate's website.

http://www.fiskistofa.is/media/aflatolur/regugerdir_fridanir_15022016.jpg

There is no formal closed season, except in Snæfellsnes where the fishery is closed between 16 March and 30 April. Offshore vessels will fish all year-round, but fishing in the inshore areas in the fjords occurs primarily in the summer months. There was previously a prohibition on night-time fishing in the fjords, and although this restriction is no longer in place, inshore vessels tend to fish daylight hours.

Monitoring

There is a detailed monitoring programme of the stocks, fishing activity and landings as follows:

- Stock surveys are carried out annually to provide estimates of stock biomass and other biological information for shrimps, and collect abundance and biological information on the shrimp's main predators, cod and haddock
- Mandatory completion of electronic log books, landings declarations and recording of weight of landings by designated officials, and completion of sales notes
- Vessel monitoring systems (VMS) are mandatory on all vessels licensed to fish for shrimps, and all shrimp vessels must 'hail out' on leaving port and 'hail in' prior to landing shrimps. All vessels also have an Automatic Identification System (AIS) on board, but this is primarily for safety reasons.
- Size distributions of the landings are monitored through a market sampling programme conducted by MFRI.

- There is no formal observer programme, but MFRI scientists may occasionally monitor catches on board vessels, and Directorate of Fisheries staff may occasionally accompany vessels for enforcement purposes or to look at specific scientific issues. However, the stock survey uses the same mesh size as the commercial vessels so representative shrimp size distribution data and bycatch information are collected through the survey at the start of the main season in each area.

Control and enforcement of regulations

Monitoring of fishing activity at sea and landings on the quayside is carried out by the Directorate of Fisheries in collaboration with the Icelandic Coast Guard. There is a robust mechanism in place for ensuring that quotas are not exceeded. Weighing of 100% of landings on land is undertaken by official weigh-masters under the direction of the Directorate of Fisheries, in collaboration with the Coast Guard. These records are therefore independent of skippers' recordings on log books and sales notes from buyers or sellers, permitting the cross-checking of log book records, landings declarations and sales notes completed by the buyers. There is 10% tolerance margin for skippers in their estimates of weight of landings recorded on their log books. The cross-checking of all three records ensures compliance of the quotas. The official weights landed are the value that is checked against the quota. Landings will also be monitored to check that there is compliance with the MLS, and the area from which landings are declared can be overlaid on VMS plots to identify if any closures are required due to high levels of small shrimps or bycatch species. Directorate of Fisheries state that compliance is very good within the shrimp fishery and note that there is also strong community pressure on compliance with all regulations, and the Client reported that fishermen are keen to have cameras installed on their vessels to provide evidence to support their assertion that the fishery is very "clean". If the VMS system is turned off, the Coast Guard will immediately board the vessel. The programme of enforcement activities follows a risk-based assessment and with very good compliance observed in the shrimp fisheries, enforcement activities are relatively low level.

Although discarding is prohibited, there is little evidence of significant landing of shrimp below the MLS. With individual vessel quotas, there could be an incentive for high-grading – the discarding of small low-value shrimps and replacement by larger higher-value shrimps to ensure that the quota is not filled with low value shrimps. However, the Directorate of Fisheries considers that capacity aligns with the quotas and therefore the quotas are not overly-restrictive. In adition quotas can be bought and rented, and even if an individual vessel lands over quota, then the owner still receives 20% of the value of the landings with the authorities receiving 80% of the value. The Directorate of Fisheries also noted that quotas are not generally exceeded, so there is little evidence of any high-grading occurring in this fishery.

An important element of the harvest strategy for the *Pandalus borealis* fishery is the assessment of stock status against pre-determined reference points and subsequent harvest control rules. A description of the reference points and their underlying rationale is given below in section 3.3.4.

3.3.2.3 Review of harvest strategy

There is regular formal and informal consultation with stakeholder groups by the Ministry on policies and regulatory issues and on the annual scientific recommendations by the Marine Research Institute and the setting of annual TACs, and there may be regular reviews of technical

conservation measures and other regulations, but there does not appear to be a regular review of all elements of the harvest strategy.

3.3.3 Data and information

Annual stock surveys are conducted in all areas of the fishery prior to the start of the main fishing season in order to provide an estimate of stock biomass upon which the TAC can be based. For the offshore fishery, the annual stock survey is undertaken in July so that the TAC advice can be produced for 1 September. The stock surveys use the same trawls as those used by commercial vessels, although in the offshore area, a sorting grid is not used in the annual surveys. The surveys provide information on the abundance, size distribution, sex and maturity stage of all shrimps caught. Detailed information on abundance, length-weight, condition and stomach contents of the main predators, cod and haddock, are also recorded during the surveys. Data on any benthos caught as bycatch in the surveys are not recorded. Full details of the stock surveys are described by Jónsdóttir *et al.* (2017).

The completion of catch and fishing effort data on electronic log books by all vessels is mandatory. The skipper must record the start and finish of each day and catch of shrimps must be recorded for each tow, along with weight of bycatch. Log book entries are automatically submitted electronically through the system.

All vessels have both VMS and AIS on board. By law, the VMS must send back a positional record (ping) every 10 minutes, but on most vessels there is a ping every 30 seconds, so there is a very detailed description of fishing activity recorded for all vessels.

Size compositions of the shrimp catch are measured through a market sampling programme undertaken on the quayside by MFRI. The Directorate of Fisheries may visit fishing areas regularly and go on board fishing vessels to check for compliance with minimum landing size, but they do not undertake regular monitoring of the size distribution of landings. There is no formal observer programme in the shrimp fishery, but the annual surveys use the same trawl as the commercial vessels and so size distribution and bycatch information on commercial vessels from the surveys will be similar to that recorded on the stock surveys.

Official weigh-masters under the direction of the Directorate of Fisheries, in collaboration with the Coast Guard, undertake weighing of 100% of landings, and sales notes are completed by the buyers.

3.3.4 Status of stocks

3.3.4.1 Stock assessment methods

At present there is no formal analytical assessment of the shrimp stocks. Assessment of stocks is based primarily on the results of annual stock surveys from which annual TACs are calculated. The surveys provide an estimate of stock biomass before the start of the main season permitting an evaluation of stock status against the limit reference point, Ilim, a proxy for Blim. The standard approach taken by NAFO for setting reference points for data-poor stocks is that the point at which a valid index of stock size has declined by 85% from the maximum observed index level provides a proxy for Blim (NAFO, 2004). If the highest index of stock size is equal to Bmsy, then it would be consistent for Blim to be 30% of that level. Blim is therefore set at 15% of the highest observed

biomass level for Pandalus in the NAFO Divisions covering the Flemish Cap, Grand Bank, Denmark Strait and East Greenland fisheries (ICES, 2017). In the Icelandic *Pandalus borealis* fisheries, a similar approach is used where Ilim is defined as 20% of the average of the three highest values of the biomass index (I) observed for the stock in UoCs 1, 3, 4 and 5, but in UoC 2 where the highest observed values of stock size were very much higher than the levels observed in any other years, Ilim was set at 12% of the average of the three highest observed values. A preliminary Ilim has been set for UoC6, but this is not directly calculated from previous high observations of stock biomass, and there is currently no defined value of Ilim for UoC7. At present there is no upper or target biomass reference point defined for the shrimp stocks. However, the temporal variation in predation levels observed in the fishery suggests that Bmsy may vary over time, and it is appropriate therefore that there is a target exploitation rate reference point (target Fproxy).

The advice for the shrimp fisheries is based upon the application of the ICES framework for category 3 stocks for which analytical assessment is not possible but trends in biomass indicators are assumed to reflect changes in stock dynamics (ICES, 2012). The advice is based upon multiplying the target Fproxy by the most recent biomass index value under the assumption that discarding is negligible. The target Fproxy (catch/survey biomass) is defined for each fishing area and is generally based upon the mean catch/survey biomass for a reference period. Fproxy values are considered to be precautionary because they are based on historical time series of catch/biomass ratios when stock levels were high and will therefore differ between UoCs. The Fproxy is set at a lower level than that observed when the stock biomass was high, i.e when the exploitation rate was demonstrated to be sustainable.

The harvest control rule states that if the estimated biomass is below the proxy for Blim, then the fishery will be closed ensuring there will be sufficient spawning stock biomass to provide recruitment in the following years. If the estimated biomass is above Blim, then the annual TAC will be fixed using the Fproxy. As there is no biomass target reference point, the TAC is calculated as a simple proportion of the total biomass based upon the agreed Fproxy, whatever the estimate of biomass (i.e. there is a linear relationship between TAC and stock biomass index) unless that estimate is below Blim. The escapement biomass is therefore increased in proportion to stock size which should ensure a high probability of achieving the minimum amount of biomass left to spawn, which is a key element of sustainable harvest strategies for shrimp fisheries. However as noted above, whilst the TAC is reduced as the stock declines towards Blim, the exploitation rate remains the same, and a more precautionary approach might be to reduce the exploitation rate at stock biomass levels above but close to Blim.

There is ongoing research within MFRI to develop an analytical stock assessment model to assess whether the values of Fproxy used in each fishery are appropriate and to develop an additional upper or target reference point, which can be considered to be consistent with Bmsy, such as MSYBtrigger (as used by ICES in the MSY framework) or Bpa or MSYBescapement. At present only the estimate of stock biomass is used in the assessment of stock status in relation to reference points, and the calculation of the TAC. Detailed size distribution and other biological information, for example on maturity-at-size, are available from the stock surveys but these data are not used currently in the assessment of stock status in relation to reference points.

The annual stock assessments of all fishing areas are published by MFRI. The assessments are peer-reviewed internally within MFRI, although MFRI is a small institute with a limited number of scientists available to review the assessments. To date, there has been no external peer review of the shrimp stock assessments, but there is scope within the system evidenced by the formal external peer review of MFRI cod stock assessments in 2000 carried out by both European and North American scientists. The assessments of the Icelandic shrimp fisheries within Icelandic

waters are not considered by the NAFO/ICES Pandalus Assessment Group (NIPAG) which meets annually to undertake stock assessments of other Pandalus stocks.

3.3.4.2 Results of assessment

UoC1 Offshore fishery

The most recent stock survey was undertaken in July 2017. A total of 86 fixed stations in depths of up to 700m was surveyed during daylight hours. Full details of the stock survey methodology are described by Jónsdóttir *et al*. (2017). Four survey indices are calculated based on all stations available in each year – total biomass, fishable biomass, female biomass and juvenile biomass. (Juveniles are defined as all individuals ≤13mm CL and half of the individuals between 13 and 15.5mm CL, and fishable biomass is defined as all individuals ≥15.5mm CL and half of the individuals between 13 and 15.5mm CL.)

Total biomass increased from 1988 to 1996, but then declined significantly until 2004, since when it has been relatively stable, but with the lowest value in the time series observed in 2015 (Figure 7). The fishable biomass index has shown the same trend over time. Female biomass increased until 1996, fluctuated at lower levels until 2010, but the lowest value in the time series was observed in 2015. The juvenile index showed a similar trend to the other indices with the index fluctuating around a relatively low level from 2004 to 2014, but then historical low values were observed in 2015 and 2016. The juvenile index did however increase in 2017. In addition to the survey estimates of shrimp abundance, there are fisheries-dependent data on catch per unit effort (CPUE), which is an index of stock abundance. CPUE in the offshore fishery has fluctuated between 2001 and 2013, but then declined significantly in 2014, before recovering by 2016 (

Figure 8).

Cod abundance in the area of the shrimp fishery has increased significantly since 2013 suggesting increased predation on shrimps (MFRI, 2017a). Similar high levels of cod were also observed in the spring and autumn groundfish surveys (MFRI, 2017b). Greenland halibut has remained relatively stable in recent years, but at lower levels than in 2008 to 2013, when abundance was very high.

All indices show that shrimp biomass is currently at much lower levels in the offshore areas than in previous years, but it is likely that such declines may be partially attributable to higher levels of predation.

Figure 7: Offshore shrimp fishery. Total stock biomass index, fishable stock biomass index, female biomass index and juvenile stock biomass index. The horizontal line shows the proxy for Blim. Source: MFRI, 2017a.

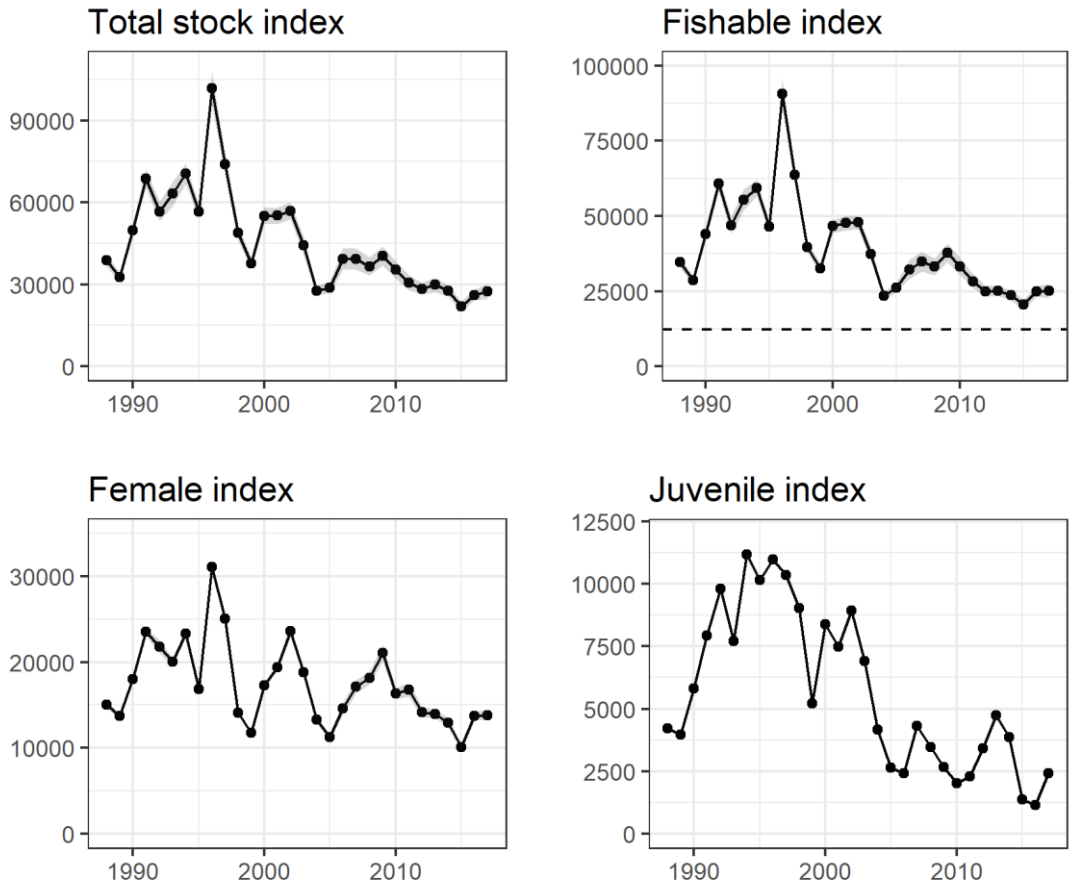
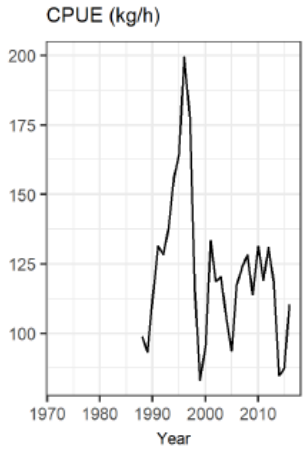


Figure 8: Offshore shrimp fishery. Catch per unit effort from 1988 to 2016. Source: MFRI, 2017a.



<u>UoC 2 Eldey</u>

The most recent stock survey was undertaken in June 2017. A total of 11 fixed stations in depths from 116-226 m was surveyed during daylight hours. Full details of the stock survey methodology are described by Jónsdóttir et al. (2017). As for the offshore fishery, four survey indices are calculated based on all stations available in each year – total biomass, fishable biomass, female biomass and juvenile biomass.

All the stock indices were high in 1994-1996, but then declined sharply. All stock indices have declined steadily since 2012, and the total biomass index has declined below the proxy Blim in 2017 (Figure 9). CPUE declined markedly in 1998 when the fishery was closed but had recovered from its lowest level when the fishery re-opened in 2012 (Figure 10). In Eldey cod abundance has been relatively low, and haddock abundance has been extremely low over the period 1994 to 2017 (MFRI, 2017c).

Figure 9: Inshore shrimp fishery - Eldey. Total stock biomass index, fishable stock biomass index, female biomass index and juvenile stock biomass index. The horizontal line shows the proxy for Blim. Source: MFRI, 2017c.

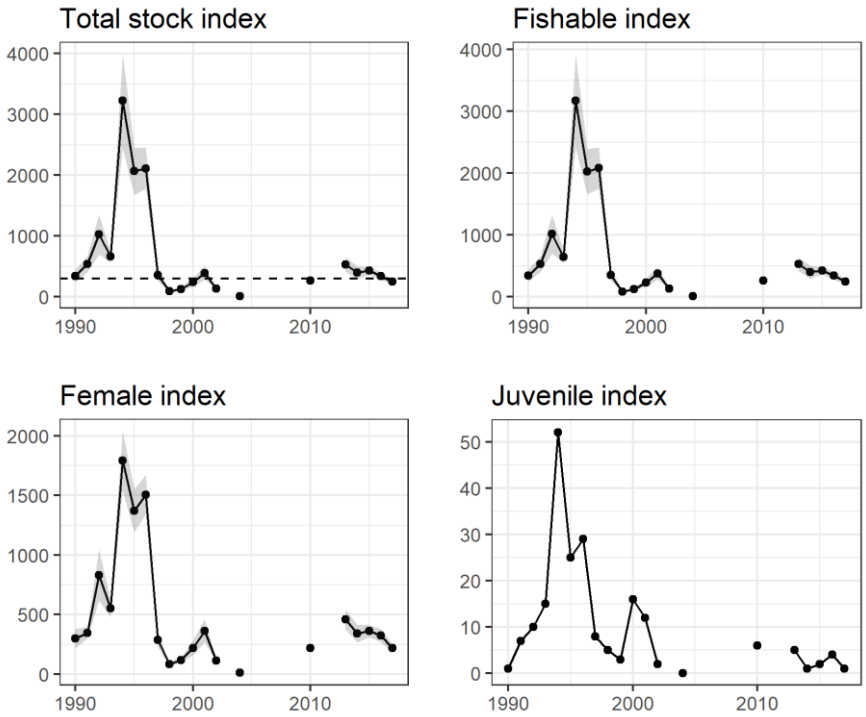
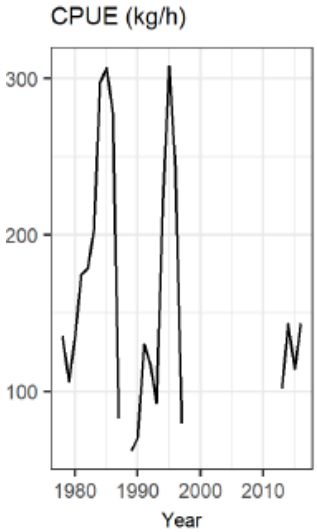


Figure 10: Inshore shrimp fishery - Eldey. Catch per unit effort from 1978 to 2016. Source: MFRI, 2017c.



UoC3 Snæfellsnes

The most recent stock survey was undertaken in April 2017. A total of 31 fixed stations in depths from 110-330 m was surveyed during daylight hours. Full details of the stock survey methodology are described by Jónsdóttir et al. (2017). As for the offshore fishery, four survey indices are calculated based on all stations available in each year – total biomass, fishable biomass, female biomass and juvenile biomass.

All stock indices have fluctuated greatly without an obvious long-term trend, although the indices decreased sharply from 1995 to 1998 during the time of high fishing pressure (Figure 11). Since 2008 the indices have fluctuated around the long-term mean, but in 2017 the indices were substantially lower compared to 2016 and were the lowest observed since 2007. The total biomass index was well above the proxy Blim. The juvenile index has been very low since 2014. CPUE increased from 1998 to 2014, but fluctuated considerably during that period, before declining sharply in 2015 and then recovering partially in 2016 (
Figure 12). In Snæfellsnes both cod and haddock abundance have been relatively low in recent years (MFRI, 2017e).

Figure 11: Inshore shrimp fishery - Snæfellsnes. Total stock biomass index, fishable stock biomass index, female biomass index and juvenile stock biomass index. The horizontal line shows the proxy for Blim. Source: MFRI, 2017e.

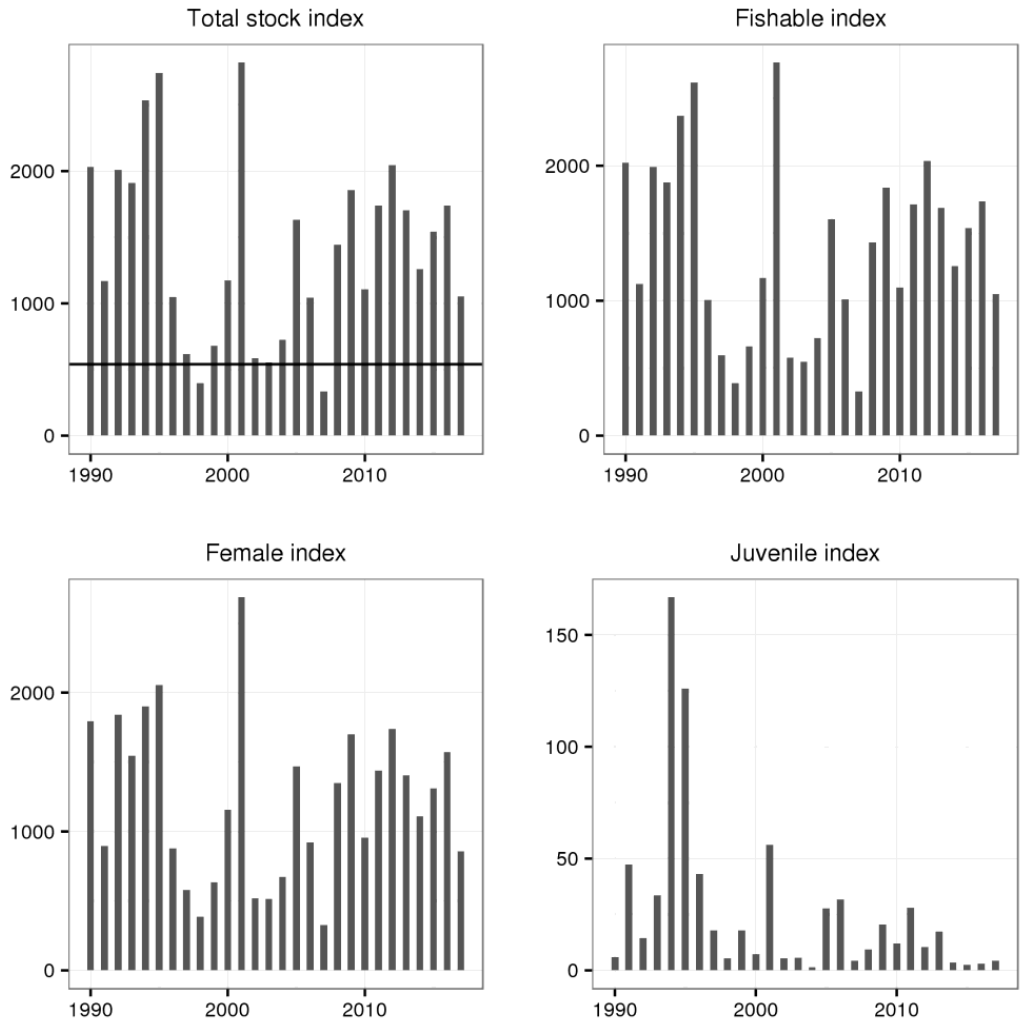
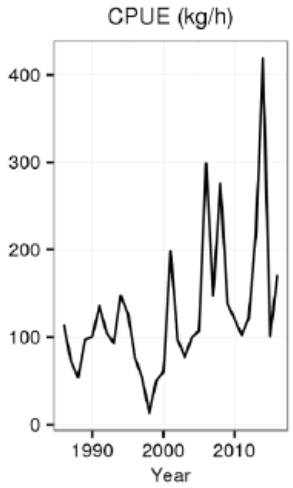


Figure 12: Inshore shrimp fishery - Snæfellsnes. Catch per unit effort from 1988 to 2016. Source: MFRI, 2017e.



UoC4 Arnarfjörður

The most recent stock survey was undertaken in October 2017. A total of 22 fixed stations in depths from 38-97 m was surveyed during daylight hours. Full details of the stock survey methodology are described by Jónsdóttir et al. (2017). As for the offshore fishery, four survey indices are calculated based on all stations available in each year – total biomass, fishable biomass, female biomass and juvenile biomass.

Shrimp were found throughout the fjord from 1998-1996, but since 2005 shrimp have been found only in the innermost area of the fjord and these changes in distribution are thought to be the result of increased abundance of cod and haddock in the outer parts of the fjord (MFRI, 2017g). The total and fishable stock indices declined to a very low level in 2005, but recovered partially in subsequent years, but a further decline in 2016 and 2017 has seen the fishable stock biomass drop below the proxy Blim. Both the female and juvenile indices declined to the lowest point in the time series in 2017 (Figure 13). CPUE increased continuously from the early 1980s to 2013, but has since declined significantly, although it is still at a relatively high level due to high densities of shrimp within the inner parts of the fjord (

Figure 14). In Arnarfjörður cod has been declining recently and haddock has been decreasing since 2008 (MFRI, 2017g).

Figure 13: Inshore shrimp fishery - Arnarfjörður. Total stock biomass index, fishable stock biomass index, female biomass index and juvenile stock biomass index. The horizontal line shows the proxy for Blim. Source: MFRI, 2017g.

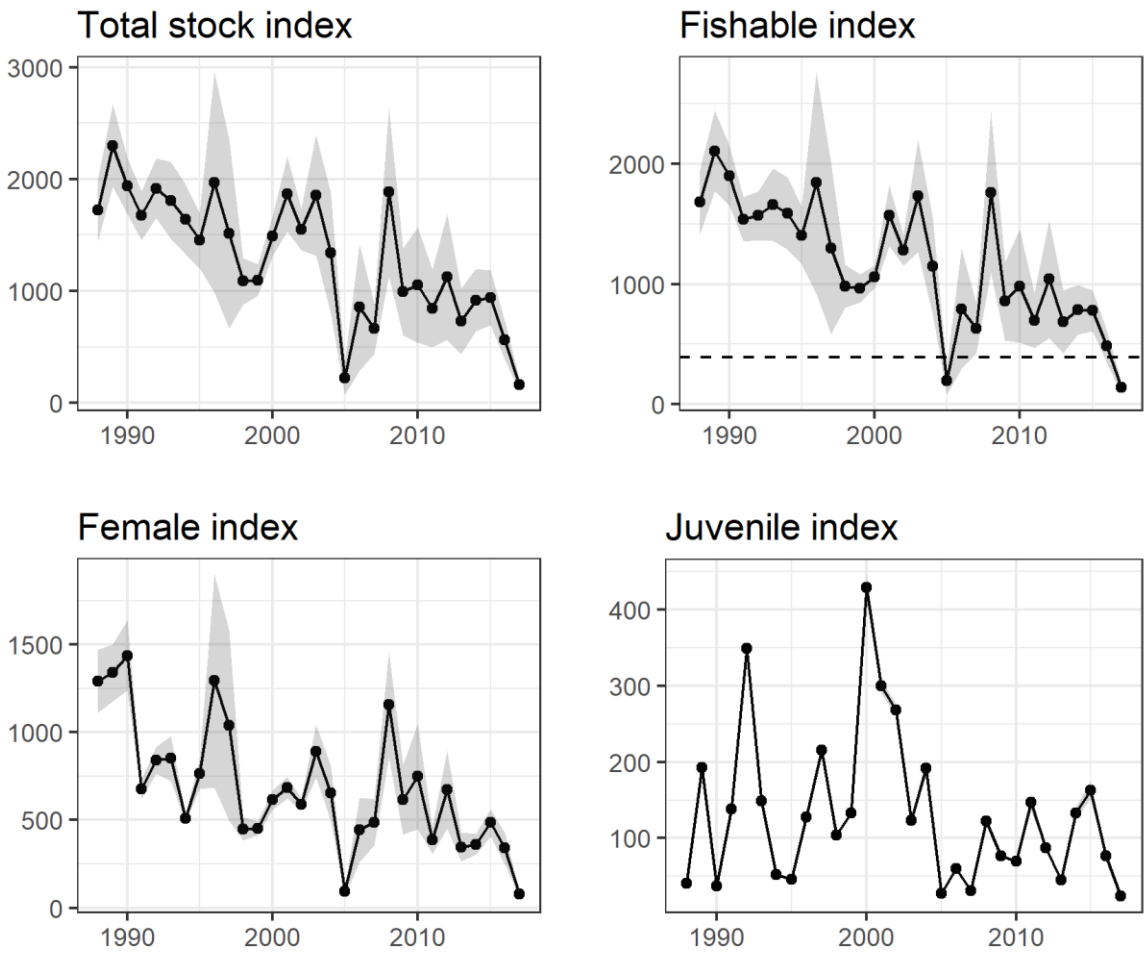
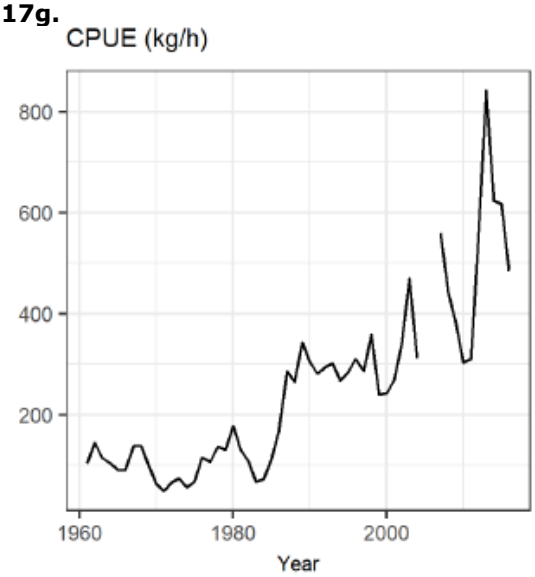


Figure 14: Inshore shrimp fishery - Arnarfjörður. Catch per unit effort from 1960 to 2016. Source: MFRI, 2017g.



UoC5 Ísafjarðardjúp

The annual autumn stock survey was undertaken in October/November 2017. A total of 26 fixed stations and 10 random stations in depths from 49-133 m was surveyed during daylight hours. An additional survey was conducted in February 2018 and included 21 fixed stations and 23 random stations. Full details of the stock survey methodology are described by Jónsdóttir et al. (2017). As for the offshore fishery, four survey indices are calculated based on all stations available in each year – total biomass, fishable biomass, female biomass and juvenile biomass.

Shrimp were previously found throughout the fjord and in the Jökulfirðir, but since 2011, shrimp has been found only within a small area at the innermost part of the fjord and in less density at the outermost part of the fjord (MFRI, 2017i). All stock indices declined from 1990 to 2004 reaching historical lows but increased from 2011 to 2015 before declining in 2016 and 2017 such that biomass in the most recent autumn survey had dropped below the proxy Blim (Figure 15). However, in the February 2018 survey the fishable biomass index was higher than in November 2017. CPUE remained relatively stable between 1978 and 2002, but since 2011 CPUE has been higher, mainly due to increased density of shrimp within the innermost part of the fjord (
Figure 16). In Ísafjarðardjúp cod abundance had been at high levels recently but declined to a very low level in 2017 whereas haddock has been at relatively high levels in the last few years (MFRI, 2017i).

Figure 15: Inshore shrimp fishery - Ísafjarðardjúp. Total stock biomass index, fishable stock biomass index, female biomass index and juvenile stock biomass index. October/November survey (solid line) and February survey (dotted line). The horizontal line shows the proxy for Blim. Source: MFRI, 2017i.

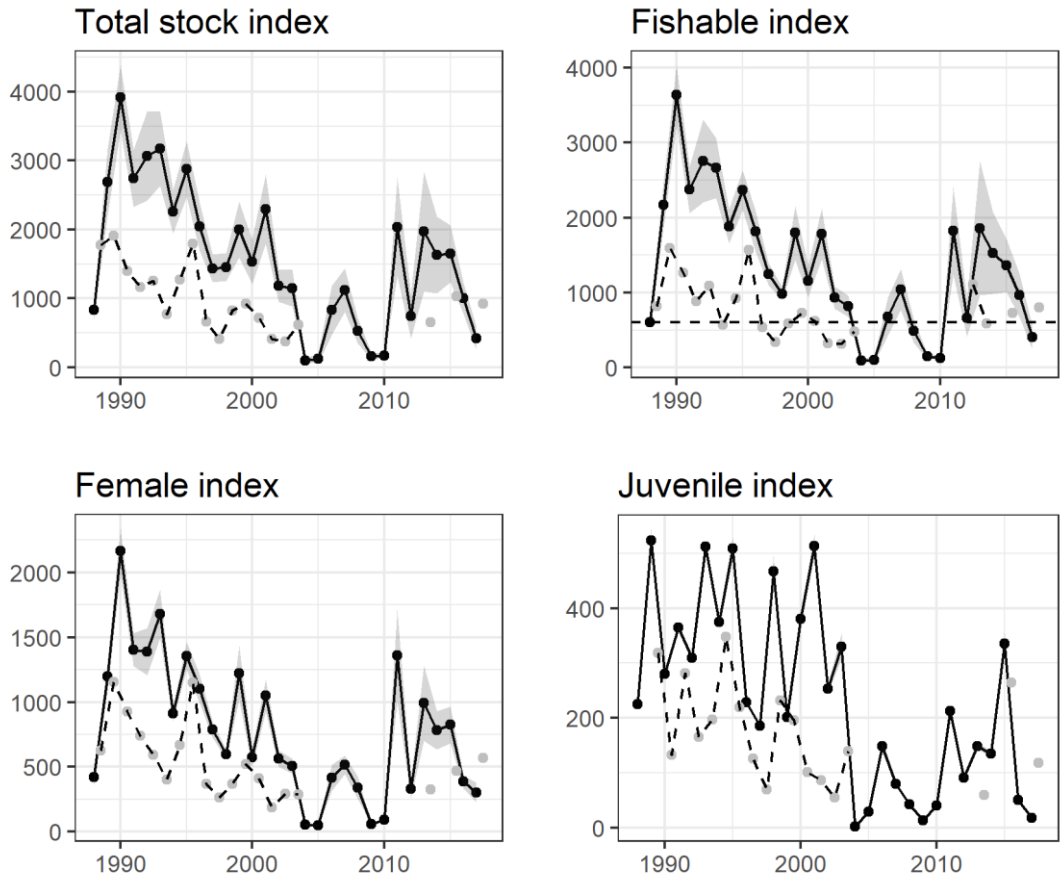
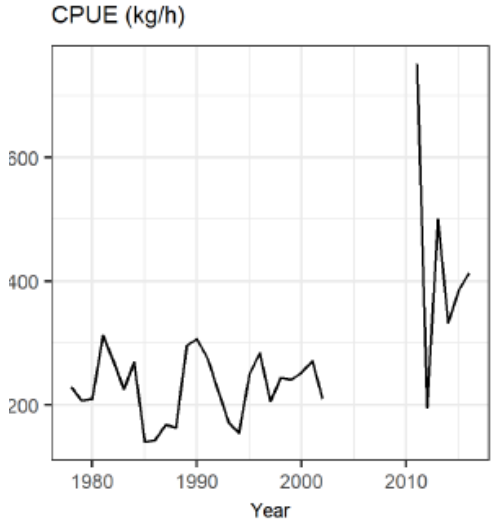


Figure 16: Inshore shrimp fishery - Ísafjarðardjúp. Catch per unit effort from 1978 to 2016. Source: MFRI, 2017i.



<u>UoC6 Skjálfandi and UoC7 Húnaflói, Öxarfjörður and Skagafjörður</u>

The 2016 stock survey for UoC6 (Skjálfandi) and UoC7 (Húnaflói, Öxarfjörður and Skagafjörður) provides the most recent survey data available on the MFRI website (MFRI, 2016a). There are no details of the survey stations, but the distribution of survey stations is shown in Figure 17. The survey was not undertaken in autumn 2017 due to problems with the research vessel, and the next survey is scheduled for autumn 2018. The total stock index in 2016 in UoC6, Skjálfandi, was very low (

Figure 18), and although some fishing was permitted in Skjálfandi in fishing year 2015/2016, the index in 2016 was below the Blim, and therefore the fishery is closed. In Skjálfandi abundance of cod was higher in fall 2015 compared to previous years, but abundance of haddock was lower. For UoC7, the total stock index in Öxarfjörðu was very low, and in Húnaflói and Skagafjörður was zero (

Figure 18). In Húnaflói, Öxarfjörður and Skagafjörður the abundance of cod and haddock had been decreasing but increased in 2015.

Figure 17: Distribution of survey stations in the 2016 stock survey of the Norwegian fjords. Source: Ingibjörg G. Jónsdóttir, MFRI.

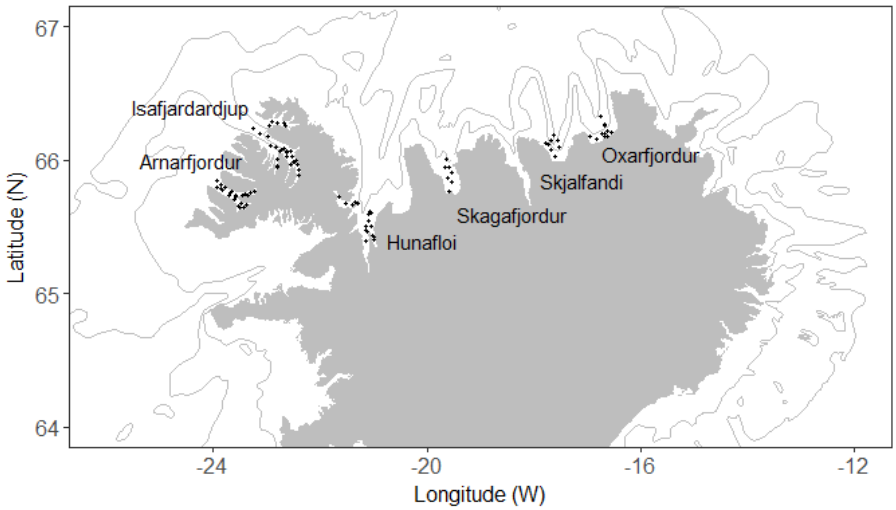
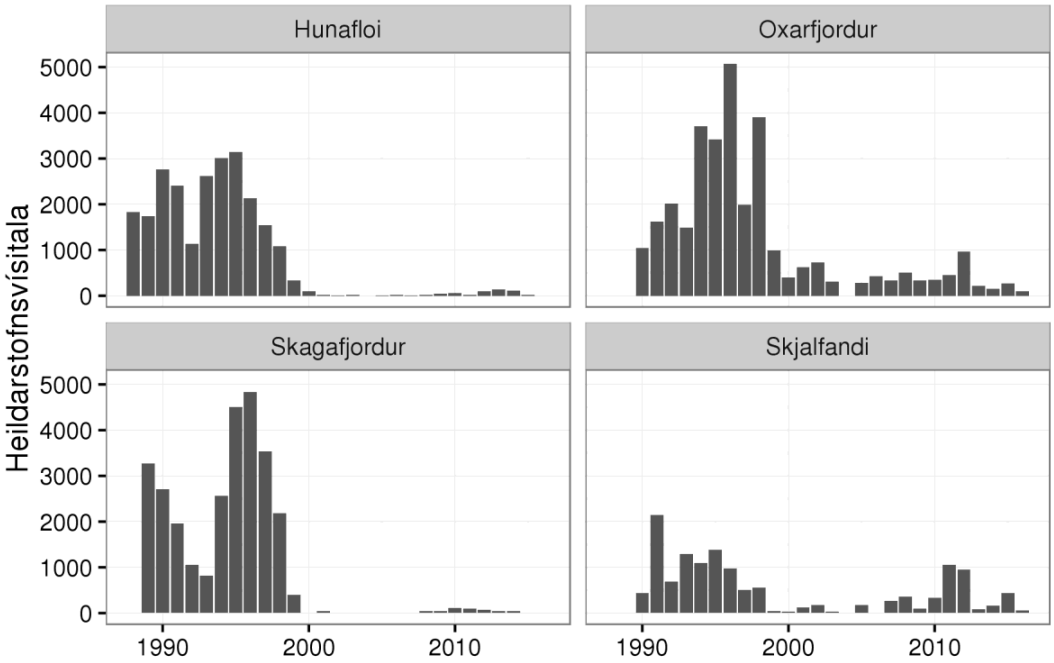


Figure 18: Total stock biomass index for UoC6, Skjálfandi and UoC7, Húnaflói, Öxarfjörður and Skagafjörður. Source: MFRI, 2016a.



3.3.4.3 Management advice based on assessment of status

Following completion of the stock survey, MFRI produces a stock assessment report, and consequently an advice report is published. This advice is reviewed by an advisory committee of stakeholders which provides its review of the advice to the Ministry. The Ministry then makes the final decision on the TAC to be set for the upcoming fishing season. In recent years, the Ministry has not deviated from the scientific advice provided by MFRI despite occasional criticisms by stakeholders of the scientific advice.

<u>UoC1 Offshore fishery</u>

The Offshore shrimp fishing started in Iceland in the mid-1970s, and by the mid-1990s catches reached nearly 70,000 tonnes. Since 2010 catches have fluctuated around 4-7,000 tonnes (Figure 19,

Table 13) with the main fishing grounds in 2016 to the north of Iceland (Figure 20). In 1988, there were 152 commercial shrimp vessels fishing offshore, but currently there are only around 20 vessels.

Management advice for the fishery is based upon the index of stock biomass from the stock survey and a target Fproxy (catch/biomass) of 0.2 based on the mean Fproxy from 2010-2015, which is a very low value in comparison with observed catch/biomass ratios when the stock biomass was consistently high, and therefore the target Fproxy is a precautionary level and should be sustainable. The fishable stock biomass index has been relatively stable from 2012 to 2017, and from 2014 to 2016 Fproxy was close to the target Fproxy (Figure 19). If the fishable biomass is above the proxy Blim or Ilim of 12,200 tonnes, then the advice is based upon multiplying the most recent stock biomass estimate by the target Fproxy of 0.2. In July 2017 the fishable stock biomass was 25,000 tonnes, so MFRI advises that catches in the offshore fishery should be no more than 5,000 tonnes in 2017/18. The low level of the juvenile biomass index suggests that the stock will remain low in the near future. A history of biomass indices, TAC advice, catches and estimates of Fproxy are shown in

Table 13.

Figure 19: Offshore shrimp fishery. Catches, fishable biomass index and Fproxy for 1988 to 2016. Horizontal lines in the middle and right-hand graphs represent Blim and target Fproxy respectively. Source: MFRI, 2017b.

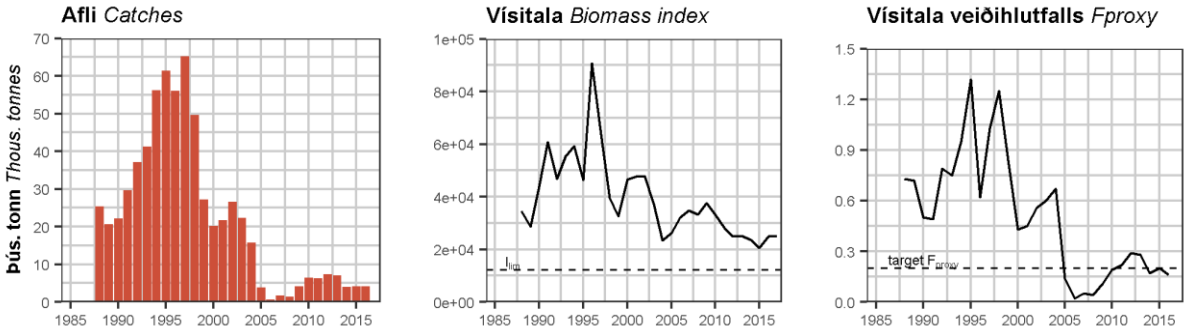


Figure 20: Offshore shrimp fishery. Fishing grounds in 2016. Source: MFRI, 2017b.

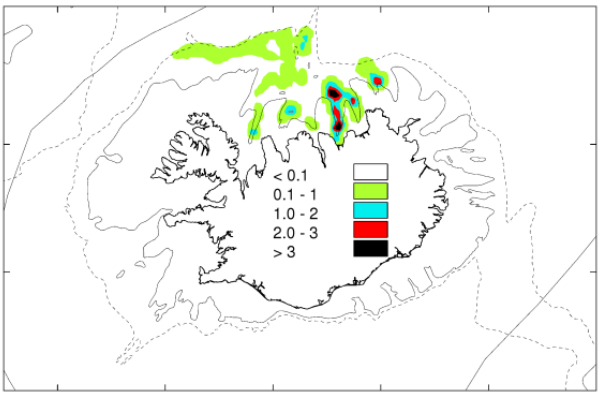


Table 13: Offshore shrimp fishery. Fishable stock biomass index (BI), state of the stock (relative to the three highest biomass indices), TAC, catch and Fproxy for 1988 to 2017. Note that prior to 2016, advice was based on the index value of the previous year. From 2016, advice is based on the current year. Source: MFRI, 2017a.

Year	BI	Relative state	Rec. TAC	Catch	F_{proxy}
1988	34 600	0.57	30	25 353	0.73
1989	28 600	0.47	21	20 699	0.72
1990	44 000	0.72	25	22 125	0.50
1991	60 800	1		29 600	0.49
1992	46 900	0.77	40	37 102	0.79
1993	55 400	0.91	40	41 283	0.75
1994	59 300	0.97	52	56 150	0.95
1995	46 400	0.76	62	61 334	1.32
1996	90 700	1.49	63	55 996	0.62
1997	63 600	1.05	60	65 298	1.03
1998	39 700	0.65	75	49 667	1.25
1999	32 500	0.53	40	27 142	0.84
2000	46 600	0.77	20	20 196	0.43
2001	47 700	0.78	25	21 653	0.45
2002	47 900	0.79	35	26 656	0.56
2003	37 300	0.61	30	22 332	0.60
2004	23 500	0.39	20	15 799	0.67
2005	26 200	0.43	10	3 792	0.14
2006	32 200	0.53	10	608	0.02
2007	34 800	0.57	7	1 681	0.05
2008	33 200	0.55	7	1 450	0.04
2009	37 700	0.62	7	4 122	0.11
2010	33 300	0.55	7	6 400	0.19
2011	28 300	0.47	7	6 300	0.22
2012	25 000	0.41	5	7 340	0.29
2013	25 100	0.41	5	7 020	0.28
2014	23 700	0.39	5	4 020	0.17
2015	20 500	0.34	4	4 067	0.20
2016	25 000	0.41	4.1	4 109	0.16
2017	25 000	0.41	5		

<u>UoC 2 Eldey</u>

The inshore shrimp fishery in Eldey started in 1970 and has fluctuated greatly since then with the fishery closed from 1998 to 2012 due to low biomass caused by high levels of shrimp predators (Figure 21, Table 14). In 1994, there were 18 commercial shrimp vessels, but currently there are only 4 vessels fishing this area.

Management advice for the fishery is based upon the index of stock biomass from the stock survey and a target Fproxy (catch/biomass) of 0.5 based on the historical relationship between catch and survey indices of inshore shrimp stocks. The proxy Blim is the biomass index value of 12% of the mean of the three highest indices. The fishable stock biomass index has been fluctuating around the proxy Blim in recent years, and Fproxy has ranged from 0.3 to 0.5 since the fishery re-opened in 2013 (Figure 21). If the stock biomass is above the proxy Blim or Ilim of 300 tonnes, then the advice is based upon multiplying the most recent stock biomass estimate by the target Fproxy of 0.5. However, in June 2017 the stock biomass was below 300 tonnes, so MFRI advises that there

should be no shrimp fishing in the Eldey area in 2017. The low level of the juvenile biomass index suggests that the stock will remain low in the near future. A history of biomass indices, TAC advice, catches and estimates of Fproxy are shown in Table 14.

Figure 21: Inshore shrimp fishery – Eldey area. Catches, fishable biomass index and Fproxy for 1980 to 2016. Source: MFRI, 2017d.

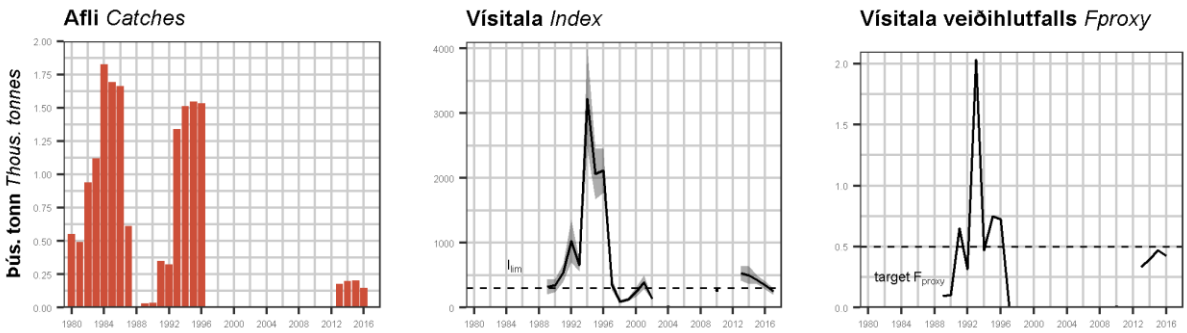


Table 14: Inshore shrimp fishery – Eldey area. Stock biomass index (BI), state of the stock (relative to the three highest biomass indices), TAC, catch and Fproxy for 1989 to 2017. Source: MFRI, 2017c.

Year	BI Total	Relative state	Rec. TAC	Catch	F_{proxy}
1989	319	0.13		30	0.09
1990	343	0.14		36	0.10
1991	537	0.22	100	350	0.65
1992	1023	0.42	800	690	0.67
1993	658	0.27	600	607	0.92
1994	3221	1.31	1500	1505	0.47
1995	2052	0.83	1500	1511	0.74
1996	2112	0.86	1600	1548	0.73
1997	357	0.15	500	537	1.50
1998	91	0.04	0	0	-
1999	127	0.05	0	0	-
2000	242	0.10	0	0	-
2001	390	0.16	0	0	-
2002	134	0.05	0	0	-
2003	-	-	-	0	-
2004	11	0	0	0	-
2005	-	-	-	0	-
2006	-	-	-	0	-
2007	-	-	-	0	-
2008	-	-	-	0	-
2009	-	-	-	0	-
2010	267	0.11	0	0	-
2011	-	-	-	0	-
2012	-	-	-	0	-
2013	532	0.22	250	179	0.34
2014	400	0.16	200	197	0.49
2015	428	0.17	200	202	0.46
2016	343	0.14	171	146	0.43
2017	246	0.10	*0*		

UoC3 Snæfellsnes

The inshore shrimp fishery in Snæfellsnes recorded high landings from 1992 to 1995 but declined subsequently due to high fishing pressure. The stock recovered to achieve landings of nearly 2000

tonnes in 2012 (Figure 22). In 1994, there were 47 commercial shrimp vessels, but currently there are around only 10-12 vessels fishing this area.

Management advice for the fishery is based upon the index of stock biomass from the stock survey and a target Fproxy (catch/biomass) of 0.5 based on the historical relationship between catch and survey indices of inshore shrimp stocks. The proxy Blim is the biomass index value of 20% of the mean of the three highest indices. The fishable stock biomass index has been fluctuating around a relatively high level over the last 10 years, and Fproxy has been below the target Fproxy since 2014 (Figure 22). If the stock biomass is above the proxy Blim or Ilim, then the advice is based upon multiplying the average of the two most recent stock biomass estimates by the target Fproxy of 0.5. The biomass indices in 2016 and 2017 were 1739 and 1054 tonnes respectively, and consequently MFRI advises that catches in the Snæfellsnes fishery should be no more than 698 tonnes in the 2017/18 fishing season. The low level of the juvenile biomass index suggests that the stock may decline in the near future. A history of biomass indices, TAC advice, catches and estimates of Fproxy are shown in

Table 15.

Figure 22: Inshore shrimp fishery – Snæfellsnes area. Catches, fishable biomass index and Fproxy for 1980 to 2016. Source: MFRI, 2017f.

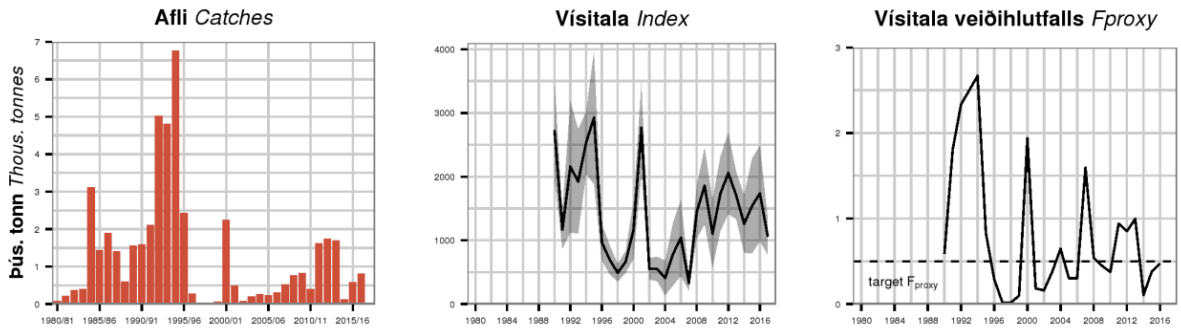


Table 15: Inshore shrimp fishery – Snæfellsnes area. Stock biomass index (BI), state of the stock (relative to the three highest biomass indices), TAC, catch and Fproxy for 1990 to 2017. Source: MFRI, 2017e.

Year	Biomass index	Relative state	Rec. TAC	Catch	F_{proxy}
1990	2 736	0.97		1 597	0.58
1991	1 169	0.42		2 111	1.81
1992	2 158	0.77		5 035	2.33
1993	1 923	0.68		4 809	2.50
1994	2 535	0.90		6 765	2.67
1995	2 928	1.04		2 432	0.83
1996	967	0.34		283	0.29
1997	693	0.25		11	0.02
1998	492	0.18		8	0.02
1999	662	0.24		65	0.10
2000	1 164	0.41		2 257	1.94
2001	2 770	0.99		506	0.18
2002	554	0.20		89	0.16
2003	551	0.20	200	209	0.38
2004	409	0.15	200	265	0.65
2005	785	0.28	200	238	0.30
2006	1 042	0.37	200	316	0.30
2007	3 32	0.12	400	530	1.60
2008	1 445	0.51	400	779	0.54
2009	1 858	0.66	900	830	0.45
2010	1 106	0.39	450	414	0.37
2011	1 735	0.62	850	1 632	0.94
2012	2 057	0.73	1 000	1 755	0.85
2013	1 704	0.61	950	1 698	1.00
2014	1 258	0.45	600	133	0.11
2015	1 540	0.55	700	589	0.38
2016	1 739	0.62	820	826	0.47
2017	1 054	0.37	*698*		

UoC4 Arnarfjörður

The inshore shrimp fishery in Arnarfjörður started in the 1930s and landings fluctuated around 300 to 800 tonnes from the late 1960s to 2005, following which the fishery was closed for two years due to low stock biomass. Catches have decreased in the last few years (Figure 23, Table 16).

Management advice for the fishery is based upon the index of stock biomass from the stock survey and a target Fproxy (catch/biomass) of 0.346 based on the mean of the Fproxy from 1988 to 2004, but from a precautionary approach reduced by a further 20% because of high levels of predation. The proxy Blim is the biomass index value of 20% of the mean of the three highest indices. The fishable stock biomass index has been declining in recent years and is now below the proxy Blim, and Fproxy has fluctuated around 0.4 in recent years, but declined significantly in 2016 (Figure 23). If the stock biomass is above the proxy Blim or Ilim of 390 tonnes, then the advice is based upon multiplying the most recent stock biomass estimate by the target Fproxy of 0.346. However, in October 2017 the stock biomass was below 390 tonnes, so MFRI advises that there should be a zero quota in the Arnarfjörður area in 2017/18. The low level of the juvenile biomass index suggests that the stock will remain low in the near future. A history of biomass indices, TAC advice, catches and estimates of Fproxy are shown in Table 16.

Figure 23: Inshore shrimp fishery – Arnarfjörður area. Catches, fishable biomass index and Fproxy for 1988 to 2016. Source: MFRI, 2017h.

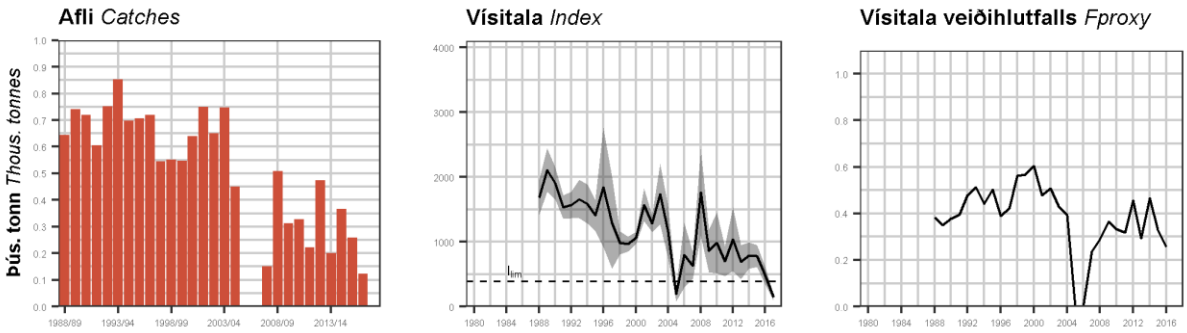


Table 16: Inshore shrimp fishery – Arnarfjörður area. Stock biomass index (BI), state of the stock (relative to the three highest biomass indices), TAC, catch and Fproxy for 1988 to 2017. Source: MFRI, 2017g.

Year	BI Fishable	Relative state	Rec. TAC	Catch	F_{proxy}
1988	1683	0.86			
1989	2107	1.08			
1990	1902	0.97	700	720	0.38
1991	1536	0.79	600	605	0.39
1992	1569	0.80	750	751	0.48
1993	1660	0.85	850	853	0.51
1994	1588	0.81	700	699	0.44
1995	1406	0.72	700	708	0.50
1996	1843	0.94	700	720	0.39
1997	1296	0.66	550	546	0.42
1998	982	0.50	550	551	0.56
1999	965	0.49	550	548	0.57
2000	1060	0.54	650	639	0.60
2001	1569	0.80	750	752	0.48
2002	1281	0.66	650	637	0.50
2003	1733	0.89	750	748	0.43
2004	1149	0.59	450	440	0.38
2005	195	0.10	0	9	-
2006	793	0.41	0	3	-
2007	632	0.32	150	158	0.25
2008	1762	0.90	500	508	0.29
2009	857	0.44	300	314	0.37
2010	984	0.50	400	337	0.34
2011	697	0.36	200	224	0.32
2012	1040	0.53	450	475	0.46
2013	687	0.35	200	201	0.29
2014	786	0.40	350	366	0.47
2015	779	0.40	250	258	0.33
2016	484	0.25	167	124	0.26
2017	140	0.07	*0*		

<u>UoC5 Ísafjarðardjúp</u>

The inshore shrimp fishery in Ísafjarðardjúp started in the 1930s and catches fluctuated between 1000 and 3100 tonnes between 1978 and 2002. No fishing was allowed in 2003-2010 due to low biomass indices, but since 2011 annual catches have been 500-1100 tonnes (Figure 24, Table 17).

Management advice for the fishery is based upon the index of stock biomass from the stock survey and a target Fproxy (catch/biomass) of 0.5 based on historical relationships between catch and survey indices of inshore shrimp stocks. However, as there is uncertainty regarding the relationship between the autumn and the February survey in terms of the effects of seasonal changes in spatial distribution, environmental factors and catchability the precautionary buffer is applied (20%). The proxy Blim is the biomass index value of 20% of the mean of the three highest indices. The fishable stock biomass index has been declining in recent years and in October/November 2017 it dropped below the proxy Blim. In February 2018, the stock biomass had recovered to be above the proxy Blim. Fproxy has been above the target Fproxy in the last few years (Figure 24). If the stock biomass is above the proxy Blim or Ilim of 604 tonnes, then the advice is based upon multiplying the most recent stock biomass estimate by the target Fproxy of 0.5 but reduced by 20% due to uncertainties regarding the relationship between the October/November and February surveys. Following the October/November 2017 survey, MFRI advised a zero quota for the 2017/18 season, but following the increased biomass observed in the February 2018 survey, MFRI advised a quota of 322 tonnes for 2017/18. The low level of the

juvenile biomass index suggests that the stock will remain low in the near future. A history of biomass indices, TAC advice, catches and estimates of Fproxy are shown in Table 17.

Figure 24: Inshore shrimp fishery – Ísafjarðardjúp area. Catches, fishable biomass index and Fproxy for 1988 to 2016. Source: MFRI, 2017j.

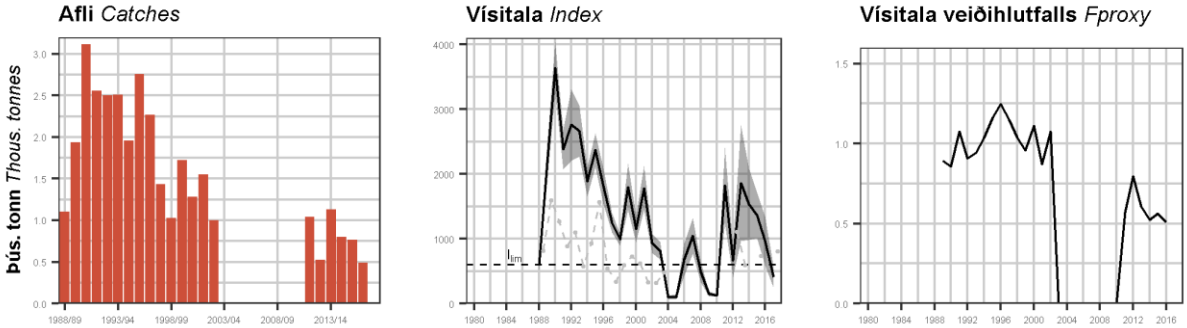


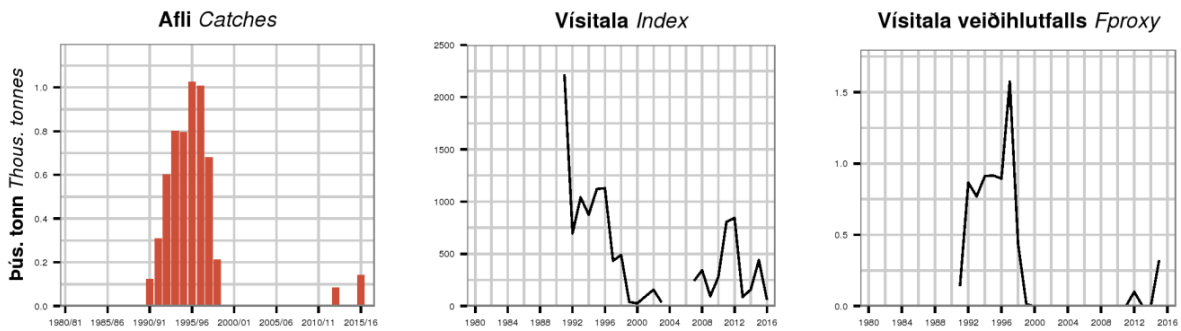
Table 17: Inshore shrimp fishery – Ísafjarðardjúp area. Stock biomass index (BI), state of the stock (relative to the three highest biomass indices), TAC, catch and Fproxy for 1988 to 2017. Source: MFRI, 2017i.

Quota Year	BI Autumn	Relative state	BI February	Rec. TAC	Catch	F_{proxy}
1988/1989	607	0.20	815			1.81
1989/1990	2169	0.70	1595			0.89
1990/1991	3636	1.17	1262	3000	3309	0.86
1991/1992	2377	0.76	882	2500	2554	1.07
1992/1993	2759	0.89	1094	2500	2501	0.91
1993/1994	2663	0.86	573	2500	2511	0.94
1994/1995	1885	0.61	927	2100	1955	1.04
1995/1996	2370	0.76	1569	2700	2756	1.16
1996/1997	1814	0.58	539	2300	2254	1.25
1997/1998	1249	0.40	338	1450	1435	1.15
1998/1999	988	0.32	591	1000	1025	1.04
1999/2000	1799	0.58	727	1800	1722	0.96
2000/2001	1153	0.37	618	1200	1287	1.11
2001/2002	1782	0.57	326	1500	1497	0.87
2002/2003	931	0.30	319	1000	989	1.07
2003/2004	819	0.26	479	0	0	-
2004/2005	94	0.03	-	0	0	-
2005/2006	100	0.03	-	0	3	-
2006/2007	680	0.22	-	0	3	-
2007/2008	1044	0.34	-	0	9	-
2008/2009	489	0.16	-	0	2	-
2009/2010	151	0.05	-	0	1	-
2010/2011	129	0.04	-	0	0	-
2011/2012	1823	0.59	-	1000	1040	0.57
2012/2013	663	0.21	1105	500	527	0.79
2013/2014	1858	0.59	590	1100	1128	0.61
2014/2015	1532	0.48	-	750	801	0.52
2015/2016	1365	0.42	732	700	767	0.56
2016/2017	967	0.31	-	484	491	0.51
2017/2018	404	0.13	*806*	*320*		

<u>UoC6 Skjálfandi</u>

The shrimp fishery in Skjálfandi had significant landings of up to 1000 tonnes from 1990/91 to 1998/99, but apart from 2012/13 and 2015/16 when TACs of 400 and 140 tonnes respectively were set, the fishery has remained closed (Figure 25). In the autumn survey in 2016, the biomass was very low and was below the precautionary reference biomass level, Ilim, of 277 tonnes (MFRI, 2016b). Note that this value of Blim or Ilim is a preliminary value set by MFRI and is not based on a percentage of the highest observed stock levels as is the case for other UoCs. No target Fproxy has been defined for this fishing area. MFRI advised that that there should be a zero TAC for this area in 2016/17 (MFRI, 2016b). The autumn survey was not undertaken in 2017, so no new advice has been issued by MFRI.

Figure 25: Inshore shrimp fishery – Skjálfandi area. Catches, fishable biomass index and Fproxy for 1990 to 2016. Source: MFRI, 2016b.



UoC7 Húnaflói, Öxarfjörður and Skagafjörður

The results from the annual shrimp survey in 2016 indicated no significant changes in the shrimp stock size in Húnaflói, Öxarfjörður and Skagafjörður. No value is given for the Proxy Blim for this fishery and no target Fproxy has been defined.

Shrimp stocks from these three areas have been in decline in recent years and no fishing has occurred in these areas since 2000. Stock declines have been linked to the increased fish abundance in the areas. MFRI advice remains that there should be zero quotas for shrimp in Húnaflói, Öxarfjörður and Skagafjörður for 2016/17 (MFRI, 2016b). The autumn survey was not undertaken in 2017, so no new advice has been issued by MFRI.

3.4 Principle Two: Ecosystem Background

3.4.1 Primary and secondary species

According to MSC CR v2.0, SA 3.1.3, primary species are those where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit or target reference points. These measures can vary from an allocated TAC to specific management plans. For more information on management measures and allocated quota for each of the primary species please check the http://www.fisheries.is/ (with management measures), http://www.fiskistofa.is/ (with allocated quotas), http://www.hafro.is/ (with information on MRFI recommended quotas against allocated quotas) and https://www.reglugerd.is/ (for Icelandic regulations).

Secondary species are those species of the catch that are neither considered as primary species (covered under PI 2.1) nor as endangered, threatened or protected species (covered under PI 2.3). MSC CR v2.0, SA 3.4.1, establishes when the species shall be considered as main (when the catch of a species comprises 5% or more by weight of the total catch of all species, or when the catch of a species comprises 2% or more of the global catch as long as the species is considered 'less resilient'). Species with lower catch proportion are considered as minor primary or secondary species.

The management of fisheries in Iceland is responsibility of the Minister of Fisheries and Agriculture and is based on law. Regulations are issued annually and can differ in different years. Both MFRI and ICES issue scientific advice on fisheries and harvesting of fish stocks. All primary species in the UoA's catch composition are subject to MFRI advice with an adjusted quota. Fishing quotas are set taking into consideration the scientific advice and shall be consistent with the national TAC for each species. MFRI advice also provides guidelines on possible management measures to implement for the different species when needed. The enforcement of laws and regulations falls under the responsibility of the Directorate of Fisheries and the Coast Guard. MFRI also provides scientific advice for some secondary species.

Some species in Iceland are subject to a management plan (such as cod, saithe and haddock), which aims to maintain the exploitation rate at levels which are consistent with the precautionary approach that generates MSY (maximum sustainable yield) in the long term. For species for which there is no specific management plan, the management strategy relies on general provisions such as gear and mesh restrictions, landing obligation, monitoring of the catch in the landing points, protection of spawning areas and temporary or permanent closed areas when a high number of juvenile fish is detected in the catch.

Regarding the available information on the different primary species, the implementation in Iceland of landing obligation in 1973 serves to provide verifiable quantitative information on the impact that Icelandic vessels (and the different UoAs) have on the different species. Besides, there is a landing sampling system (with registered operators sampling the catch in the different registered ports) which serves to monitor the accuracy of landing records by fishing vessels.

MFRI conducts two annual research surveys in order to sample catch composition (size and age) of commercial catches. Data collected serves to support the annual MFRI advice of fish catches. MFRI advice gives trends of biomass and harvest in the past and also estimations of the future development of the different stocks. Information on stock status and fishing advice for most species in the catch composition can be found in the MFRI and ICES webpages.

Table 18 and Table 19 below show catch composition for UoAs 1-7 in the course of a calendar year, and regardless of the fishing season. Table 18 shows landings of the targeted prawns by the different UoAs, while Table 19 shows landings of all species by the offshore prawn fleet. While catches by UoA 2-7 are very clean with no main nor minor primary or secondary species to consider in the different UoAs, offshore vessels (UoA1) carry a collection sac to retain other species apart from shrimp, mainly cod and Greenland halibut. The use of tunnel sacs is not allowed in waters closer than 12 nm to the shore, and mesh size in the tunnel shall be at least 135 mm. The use of sorting grids is mandatory for the offshore fleet.

Table 18: Prawn landings by the different UoAs

UoA	Fishing area	Scientific name	Prawn catch in 2016 (kg)	Relative prawn proportion in the different UoAs
UoA 1	Offshore	*Pandalus borealis*	4,526,451	69.69 %
UoA 2	Eldey	*Pandalus borealis*	146,229	2.25 %
UoA 3	Snæfellsnes	*Pandalus borealis*	1,422,285	21.90 %
UoA 4	Arnarfjörður	*Pandalus borealis*	258,358	3.98 %
UoA 5	Ísafjarðardjúp	*Pandalus borealis*	0	0.00 %
UoA 6	Skjálfandi	*Pandalus borealis*	141,737	2.18 %
UoA 7	Húnaflói, Öxarfjörður and Skagafjörður	*Pandalus borealis*	0	0.00 %
Total catch of prawns in all areas (kg)			6,495,060	100 %

Table 19: Total catch in UoA 1 (offshore, with tunnel sac allowed for the catch of fish species)

English name	Scientific name	Catch in 2016 (kg)	% of the catch in UoA 1
Prawn	*Pandalus borealis*	4,526,451	64.69
Cod	***Gadus morhua***	**1,440,301**	**20.59**
Greenland halibut	***Reinhardtius hippoglossoides***	**735,169**	**10.51**
Deep water redfish	*Sebastes mentella*	76,792	1.10
Long rough dab	*Hippoglossoides platessoides*	72,910	1.04
Golden redfish	*Sebastes norvegicus*	64,369	0.92
Stary ray	*Amblyraja radiata*	23,059	0.33
Greater silver smelt	*Argentina silus*	12,839	0.18
Haddock	*Melanogrammus aeglefinus*	12,507	0.18
Spotted wolfish	*Anarhichas minor*	11,903	0.17
Saithe	*Pollachius virens*	10,221	0.15
Black scabbardfish	*Aphanopus carbo*	3,248	0.05
Witch	*Glyptocephalus cynoglosus*	1,908	0.03
European Plaice	*Pleuronectes platessa*	1,089	0.02
Ling	*Molva molva*	813	0.01
Skate spp.	*Hypotremate spp.*	803	0.01
Atlantic wolfish	*Anarhichas lupus*	559	0.01
Atlantic halibut	*Hippoglossus hippoglossus*	465	0.01
Blue ling	*Molva dypterygja*	457	0.01
Anglerfish	*Lophius piscatorius*	305	0.00
Greenland shark	*Somniosus microcephalus*	301	0.00

English name	Scientific name	Catch in 2016 (kg)	% of the catch in UoA 1
Lemon sole	*Microstomus kitt*	172	0.00
Tusk	*Brosme brosme*	66	0.00
Shagreen skate	*Leucoraja fullonica*	9	0.00
Lump fish	*Cyclopterus lumpus*	7	0.00
Whiting (merling)	*Merlangius merlangus*	3	0.00
Total		6,996,726	100

Most landed species would be considered by MSC as primary species, as there are management measures that apply to them. The only main primary species to consider would be cod and Greenland halibut.

According to MFRI 2017 advice for cod in Icelandic EEZ, the estimated spawning stock biomass (SSB) has increased in recent years and has not been larger in 40 years. Harvest rate has declined and is at its lowest value in the assessment period. The increase in SSB is primarily the result of lower harvest rate. It is expected that for 2018 and 2019 the stock will increase in size, due to the abundance of year classes 2014 and 2015. The cod stock is subject to a management plan. MFRI advises that when the management plan is applied, catches in the fishing year 2017/2018 should be no more than 257,572 tonnes.

Figure 26: Fishing mortality and harvest rate, reference stock biomass (B4+) and spawning stock biomass for cod stock. Source: MFRI advice for cod for 2018.

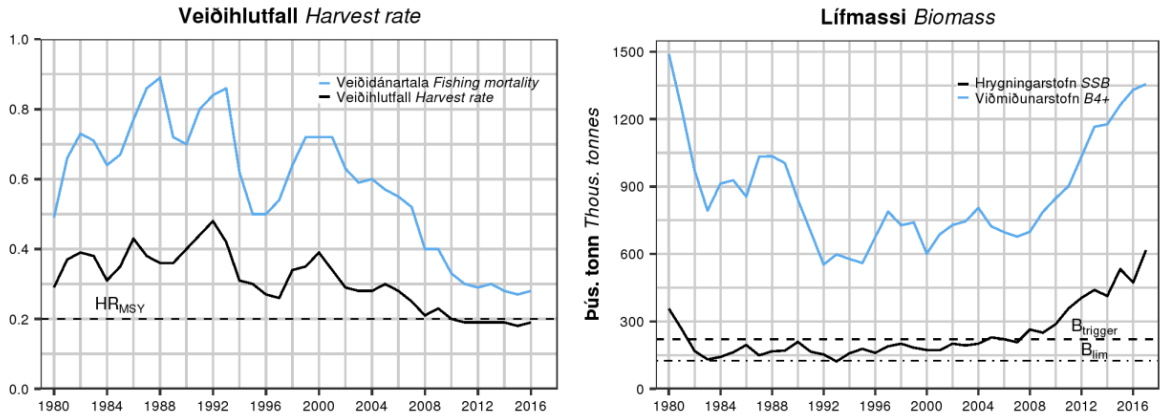
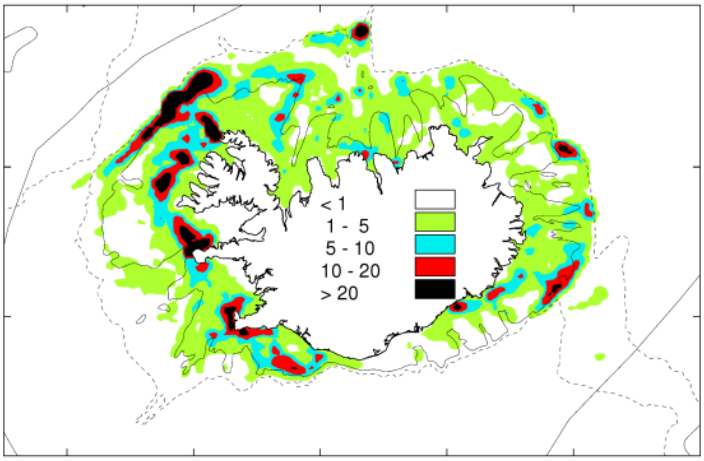


Figure 27: Location of the cod fishing grounds in 2016 (t/nmi2). Source: MFRI advice for 2017.



As regards Greenland halibut, according to MFRI advice for 2017, the stock is currently above MSY Btrigger. Fishing mortality has decreased in recent year and is estimated to be relatively close to FMSY. The survey biomass estimates indicate that the harvestable biomass has been stable in recent years while recruitment has declined. It is therefore expected that the stock size will decline. In 2014 a formal management plan was agreed between Greenland and Iceland. According to an agreement between Iceland and Greenland, 56.4% of the TAC is allocated to Iceland. MFRI and ICES advise that when the MSY approach is applied, catches in the 2017/2018 fishing year should be no more than 24,000 tonnes.

The stock identity for Greenland halibut remains uncertain. Tagging of Greenland halibut in the Barents Sea has demonstrated a connectivity with Greenland halibut in Iceland and the Faroe Islands. The biomass indicators used in the present advice only represent Division 5.a and Subarea 14.

Figure 28: Historical trends in relative fishing mortality (F/FMSY) and changes in relative biomass (B/BMSY) for Greenland halibut stock. Source: MFRI advice for Greenland halibut.

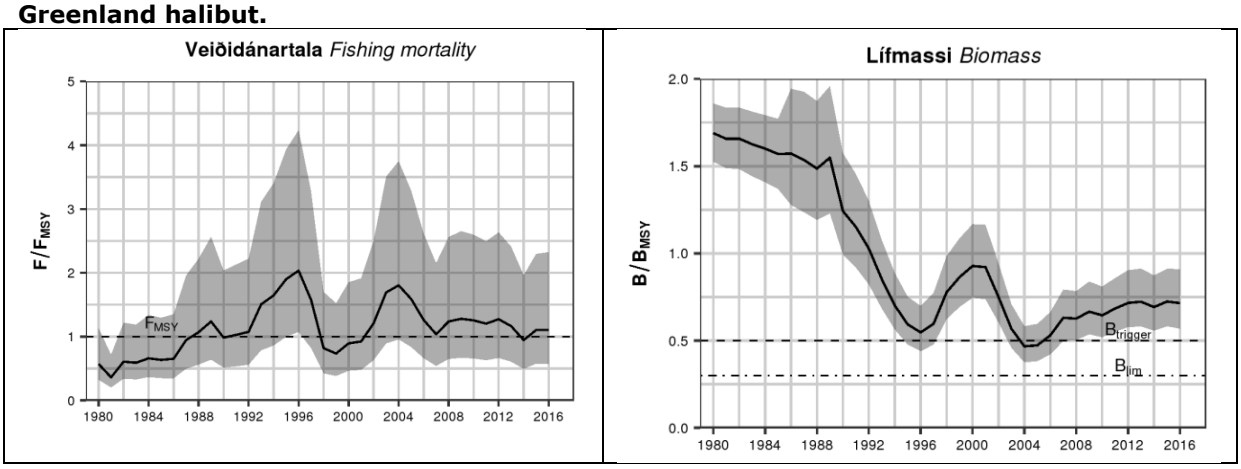
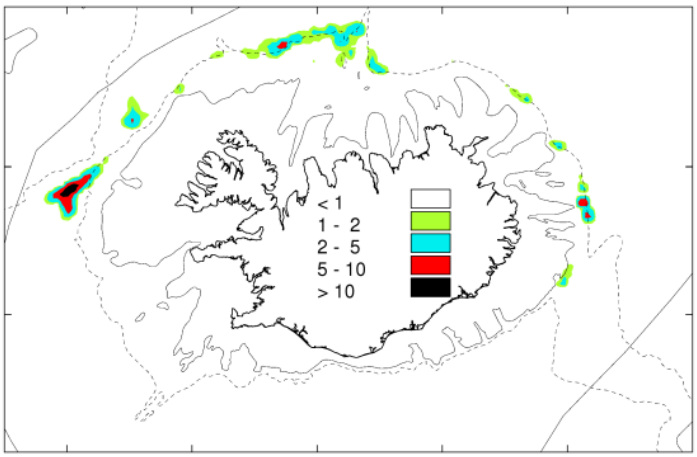
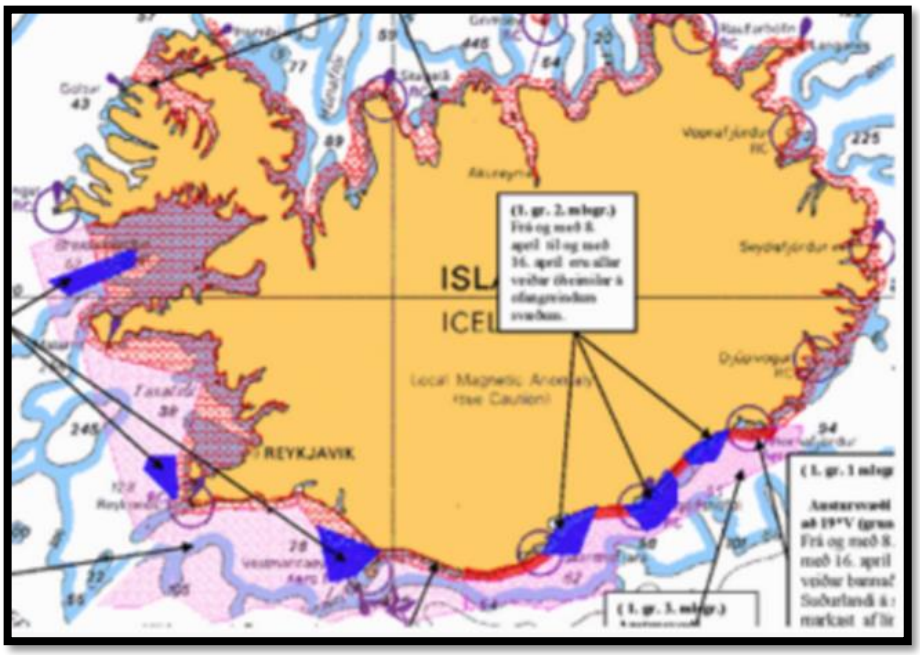


Figure 29: Location of Greenland halibut fishing grounds in 2016 (t/nmi2). Source: MFRI advice.



Primary species in the catch composition are managed through the establishment of individual transferable fishing quotas. There is also an agreed management plan for certain species, such as cod, Greenland halibut, haddock, saithe and golden redfish. Besides, there are also different area closures (temporary, seasonal or permanent) in order to protect spawning areas or juvenile fish. Selectivity devices such as fishing grids are mandatory in the offshore prawn fleet as in all deep-sea trawling fisheries. Distance between bars ranges from 19 to 22 mm. Besides, there are limitations both in net and mesh sizes (40 mm). These measures are described in the Fisheries Management Act (Act 116/2006) and in Iceland Regulation 543/2002. Enforcement relies on the Icelandic Coast Guard.

Figure 30: Map of spawning area closures (only in Icelandic). Source: [Directorate of Fisheries.]



3.4.2 Secondary species

According to MSC FCR v2.0 SA 3.1.4, the team shall assign secondary species as species in the catch that are within scope of the MSC program but are not covered under P1, nor under the primary species definition, and species that are out of the scope of the program, but where the definition of ETP species is not applicable. This is, secondary species would be those which are not subject to management measures and their population status is listed by IUCN as non-vulnerable. The proportion of all secondary species in the catch of UoA 1 in 2016 did not exceed 2% of the landings. There were no landings of any secondary species by UoA 2 - UoA 7.

While there are no management measures directed to the management of secondary species, there is scientific advice for some of the secondary species present in the catch composition of UoA 1 (as for long rough dab, starry ray, spotted wolfish, black scabbardfish, lump fish and whiting). There is no scientific advice for other secondary species present in the catch of UoA 1 such as skates (*Hypotremate spp*.), Greenland shark and shagreen skate, which along with starry rays, are especially vulnerable to fishing pressure.

As mentioned above, for species for which there is no specific management plan, the management strategy relies on general provisions such as gear and mesh restrictions, landing obligation, monitoring of the catch in the landing points, protection of spawning areas and temporary or permanent closed areas when a high number of juvenile fish are detected in the catch.

Table 20 below lists vulnerable secondary species, their status according to IUCN red list, the catch taken in 2016 by UoA1, the catch taken in 2016 by all Icelandic vessels, and the proportion of those landings that was due to vessels in UoA 1.

Table 20: Vulnerable secondary species present in the catch composition. Source: DNV-GL.

English name	Scientific name	IUCN status	Icelandic catch for 2016 (kg)	Catch by the UoA in 2016	% of landings due to landings by UoA 1
Starry ray	*Amblyraja radiata*	Vulnerable	1273159	23059	1.8%
Greenland shark	*Somniosus microcephalus*	Near Threatened	25809	301	1.2%
Skate (unespecified)	*Hypotremate spp.*	N/A	131937	803	0.6%
Shagreen skate	*Leucoraja fullonica*	Vulnerable	13014	9	0.06%

Other secondary species to take into account would be bird species present in Iceland. Iceland holds important bird colonies and are stops for migrating birds between Europe and North America. According to Icelandic Institute of Natural History website (which lists seabird species present in the island (or exticted: see Great auks), the following (non-vulnerable) seabirds can be found in the UoA. None of the bird species listed in Table 21 below is listed in CITES Appendix 1. It is noteworthy to mention that interviews with the MFRI and the fishermen both reported that bird interactions with the prawn fishery is very unlikely. There were no landings by any UoA during 2016.

Table 21: Bird species present in Iceland and their IUCN status. (NT: Near Threatened; LC: Least Concern). Source: DNV-GL.

Scientific name	Common name	IUCN status
Alca torda	Razorbill	NT
Cepphus grylle	Black guillemot	LC
Fulmarus glacialis	Northern Fulmar	LC
Hydrobates pelagicus	European storm petrel	LC
Larus argentatus	European Herring gull	LC
Larus canus	Common/Mew gull	LC
Larus fuscus	Lesser black-backed gull	LC
Larus hyperboreous	Glaucous gull	LC
Larus marinus	Great black-backed gull	LC
Larus ridibundus	Black-headed gull	LC
Morus bassanus	Northern gannet	LC
Phalacrocorax aristotelis	European shag	LC
Phalacrocorax carbo	Great Cormorant	LC
Puffinus puffinus	Manx sheerwater	LC
Rissa tridactyla	Black legged kittiwake	LC
Somateria molissima	Common eider duck	NT
Stercorarius/Catharacta skua	Great skua	LC
Sterna paradisea	Arctic tern	LC
Uria aalge	Common murre/guillemot	LC
Uria lomvia	Thick-billed Murre /Brünnich's guillemot	LC

There are also marine mammals present in Icelandic waters which don't fall under the ETP category and are therefore considered as secondary species. The Icelandic Institute of Natural History lists whales and seals present in the area. Table 22 below lists marine mammals which are not listed in CITES Appendix 1 and are not considered as vulnerable by IUCN. No fatal interactions with marine mammals have been recorded in the fishery.

Table 22: Non-vulnerable marine mammals (secondary species) present in Icelandic waters. (NT: Near Threatened; LC: Least Concern; DD: Data deficient). Source: DNV-GL.

Marine mammals	IUCN Status
Arctic ringed seal (*Phoca hispida hispida*)	LC
Atlantic white-sided dolphin (*Lagerorhynchus acutus*)	LC
Bearded seal (*Erignathus barbatus*)	LC
Beluga (Delphinapterus leucas)	LC
Blainville's beaked whale (*Mesoplodon densirostris*)	DD
Bottlenose dolphin (*Tursiops truncatus*)	LC
Common dolphin (*Delphinus delphis*)	LC
Cuvier's beaked whale (*Ziphius cavirostris*)	LC
Grey seal (*Halichoerus grypus*)	LC
Harbour porpoise (*Phocoena phocena*)	LC
Harbour seal (*Phoca vitulina*)	LC
Harp seal (*Pagophilus groenlandicus*)	LC
Killer whale (*Orchinus orcha*)	DD
Long-finned pilot whale (*Globicephala melas*)	DD
Minke whale (*Balaenoptera acutorostrata*)	LC
Narwhal (*Monodon monocerus*)	LC
Sowerby's beaked whale (*Mesoplodon bidens*)	DD
Striped dolphin (*Stenella coeruleoalba*)	LC

Marine mammals	IUCN Status
White-beaked dolphin (*Lagerorhynchus albirostris*)	LC

3.4.3 Endangered, threatened or protected species

According to MSC CR v2.0, ETP Species are those that are recognised by national ETP legislation or by an international binding agreement, such as CITES, to which Iceland is a signatory country. It also includes species classified by MSC as "out of scope" (amphibians, reptiles, birds and mammals) that are listed in the IUCN Red list as vulnerable (VU), endangered (EN) or critically endangered (CE). Iceland is not a signatory country of any other international agreements described in MSC CR v2.0 SA 3.1.5.

There are 2 regulations protecting endangered species in Iceland:

- Regulation 456/2017, prohibiting direct fishing for spurdogs (*Squalus acanthias*), portbeagle (*Lamna nasus*) and basking shark (*Cetorhinus maximus).*
- Regulation 1164/2011, prohibiting direct fishing for halibut (Hippoglossus hippoglosus).

Both regulations prohibit fishing for the above mentioned species in Icelandic EEZ, and establish measures to manage individuals in the event of catch, such as the obligation to release any animal if it is viable or to land it if its dead, the establishment of a special fee for illegal catches, the collection of the value of landed individuals at auction places for marine research, the obligation to record fatal interactions on the logbook, and the establishment of penalties in case of violation of the regulation. The fulfillment of these measures is enforced by the Coast Guard. The Directorate of Fisheries confirms no infractions at this regard.

Sampling of landings serve to monitor catch composition and provide records of species identification and quantities landed. It also serves as a historical collection of ETP fatal interactions caused by the fishing fleet. Data on the sampling of the landings are reviewed annually both by management authorities and by MFRI, who gives scientific advice for some ETP species. This has resulted in the implementation of management measures when necessary. Besides, there is a marine mammal monitoring program which monitors the population of these species every 7 years to update information on populations. Seals are also monitored through a monitoring program which estimates the number of individuals in seal colonies in the North part of Iceland.

As regards specific interactions by the fishery, UoA 1, fishing with a tunnel sac in offshore waters, landed 465 kg of halibut in 2016, this is, the 0.01% of the UoA total catch. During 2016, 123 tons of halibut were landed by all Icelandic vessels. The catch taken by UoA 1 represents the 0.38% of total landings of halibut. In 2016 there were no landings of halibut by UoA 2 – UoA 7, nor landings of any shark by any UoA.

Table 23: Landings of halibut in 2016. Source: DNG-GL.

English name	Scientific name	Scientific advice	Icelandic catch for 2016 (tons)	UoA1 catch for 2016 (tons)	Proportion of halibut landings by UoA1 vessels.
Halibut	*Hippoglossus hipoglossus*	MFRI	123	0.465	0.38%

Table 24: Annual landings of halibut by all Icelandic vessels. Source: http://www.fiskistofa.is/english/quotas-and-catches/

Year	2009	2010	2011	2012	2013	2014	2015	2016
Catch (tones)	531	561	548	35	41	59	87	123

MFRI 2017 advice on halibut confirms that this regulation should be maintained until clear indications of improvement in the stock are evident. Around 2000 tonnes of Atlantic halibut were landed annually from Icelandic waters in 1984–1991. The stock suffered a recruitment failure and following that, a steady decline in catch from 1991 to 1997, after which the catch stabilized between 500 and 800 tonnes until the ban on targeted fishing in 2012. Halibut is now only caught as bycatch in bottom gear all around the island. Halibut landings were 36–119 t in 2012–2016, which (due to Regulation 1164/2011) is the lowest landings since the beginning of the fishery. The stock is expected to remain low over the next years. 90% of present landings of halibut are caught as bycatch by bottom trawl vessels.

Figure 31 and

Figure **32** below show biomass index and fishing grounds for halibut in the past years.

Figure 31: Historical biomass index for halibut. Source: MFRI advice.

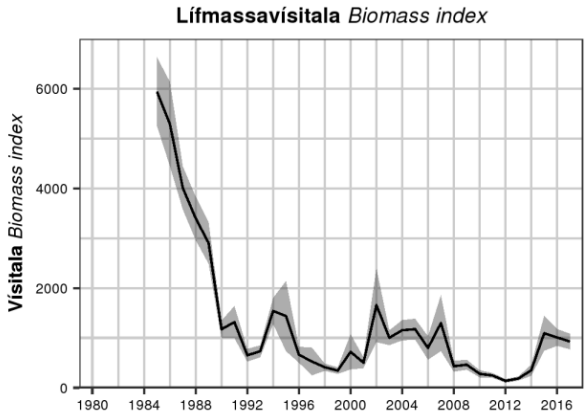
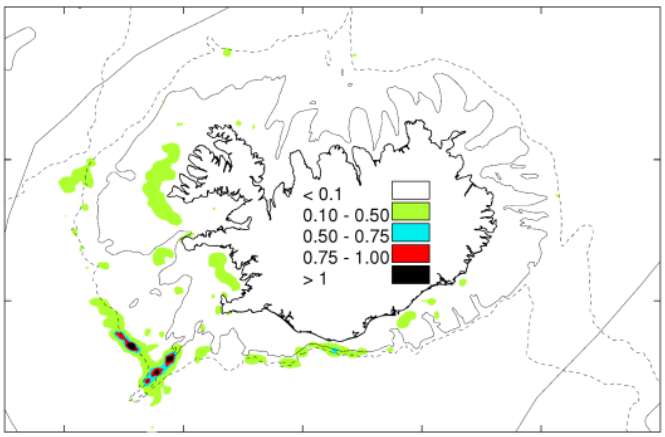


Figure 32: Fishing grounds for halibut in 2000–2016 (t/nmi2). Source: MFRI advice.



There are six different species of marine mammals which are listed in CITES Appendix 1 and present in Icelandic waters. There are also other 4 species which, although not listed by CITES Appendix 1, are considered by IUCN as vulnerable, and therefore considered as ETP species. There are no interactions between ETP marine mammals and the prawn fishery.

Table 25: ETP marine mammals present in Icelandic waters. Source: DNV-GL.

Marine mammals	CITES Appendix 1	IUCN Status
Blue whale (*Balaenoptera musculus*)	Yes	Endangered
Bowhead whale (*Balaena mysticetus*)	Yes	LC
Gray whale (*Eschrichtius robustus*)	Yes	N/A
Humpback whale (*Megaptera novaeangliae*)	Yes	LC
North Atlantic right whale (*Eubalaena glacialis*)	Yes	Endangered
Northern bottlenose whale (*Hyperoodon ampullatus*)	Yes	DD
Fin whale (*Balaenoptera physalus*)	No	Endangered
Hooded seal (*Cystophora cristata*)	No	Vulnerable
Sei whale (*Balaenoptera borealis*)	No	Endangered
Walrus (*Odobenus rosmarus*)	No	Vulnerable

As regards ETP bird species, according to Icelandic Institute of Natural History website, the following endangered seabirds (none of which is listed in CITES Appendix 1) can be found in Iceland. Bird interactions with the prawn fishery are very unlikely, and there were no interactions reported in the past years.

Table 26: Bird species present in Iceland and their IUCN and CITES Appendix I status. Source: DNV-GL.

Scientific name	Common name	IUCN status	CITES Appendix I
Fratecula arctica	Atlantic puffin	Vulnerable	No
Hydrobates leucorhous	Leach's Storm-petrel	Vulnerable	No
Pinguinus impennis	Great auk	Extinct since 1844	No

3.4.4 Habitats

The fishery takes place in Icelandic offshore waters (for UoA 1) but also in different fjords around Icelandic coast (for UoA 2 to UoA 7). Table 27 below lists the fishing grounds of the different UoAs. Figure 33 and Figure 34 below represent the location of the different fishing grounds.

Table 27: Fishing grounds for the different UoAs. Source: DNV-GL.

Unit of Assessment	Fishing grounds
UoA 1	Offshore
UoA 2	Eldey
UoA 3	Snæfellsnes (Breiðafjörður,Kollual and Snæfellsnes)
UoA 4	Arnarfjörður
UoA 5	Ísafjarðardjúp
UoA 6	Skjálfandi
UoA 7	Húnaflói, Öxarfjörður and Skagafjörður

Figure 33: Fishing grounds for the offshore prawn fishery in 2016, as described in MFRI advice. Different colours represent the average catch in tonnes per square nautical mile (t/nm2). Source: MFRI advice for offshore shrimp.

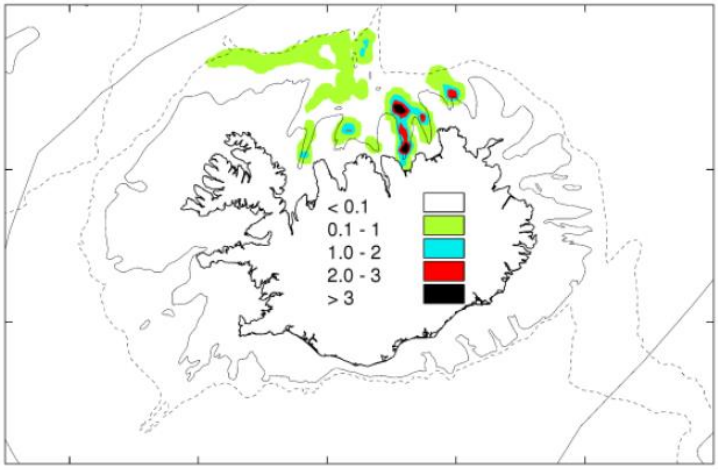
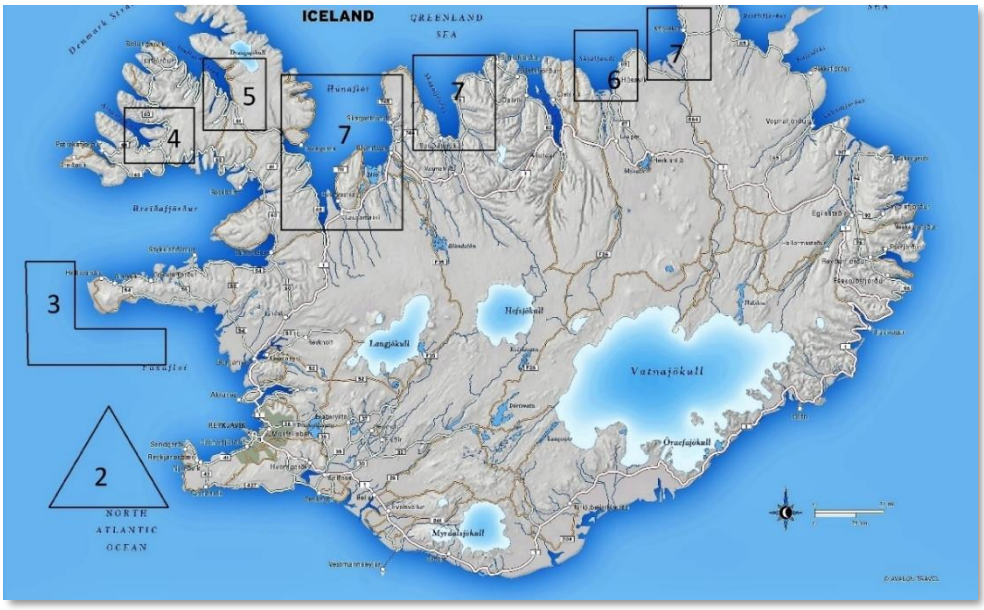


Figure 34: Location of the fishing grounds for the inshore UoAs (UoA 2 – UoA7), as described by the client. Numbers represent the different UoAs. (UoA 2: Eldey; UoA 3: Snæfellsnes; UoA 4: Arnarfjörður; UoA 5: Ísafjarðardjúp; UoA 6: Skjálfandi, and UoA 7: Húnaflói, Öxarfjörður and Skagafjörður). Source: DNV-GL. Original from Moon Iceland Travel Guide.



Bottom trawling affects benthic habitats through relocation of shallow burrowing infaunal species to the surface of the seafloor, and by resuspension of surface sediment. The fact that bottom trawlers fish once and again over the same areas serves to reduce the area affected by the trawling. Kaiser et al. (2006) concluded that otter trawling produced a significant, negative, short-term effect on soft habitats such as mud and sand, but no detrimental effects were seen in the long term once the fishing stops. Data on the persistence of trawl marks in different environments are relatively scarce because only immediate physical effects are observed in most studies owing to their relatively short time frames. However, there are some studies of recovery times after otter

trawling in soft or sandy bottoms, as described in FAO's link to physical impacts of the fishing gears (http://www.fao.org/docrep/008/y7135e/y7135e06.htm). These observations show that the most noticeable marks are those caused by the doors, and only faint marks are created by other parts of the trawl. Trawl door marks have been shown to be from 1 to 5 cm deep (Brylinski, Gibson and Gordon Jr., 1994), but may reach about 20 cm in certain parts of the tracks (Krost *et al.,* 1990). The penetration depth depends on the weight and performance of the doors (type, angle of attack, speed) and on sediment grain size and hardness, being deeper in mud than in sand (Churchill, 1989; Krost *et al.,* 1990; Tuck *et al.,* 1998). The persistence of marks produced by trawl doors depends on their original depth, the sediment type, the current, wave action and biological activity (Tuck *et al.,* 1998; Fonteyne, 2000; Smith, Papadopoulou and Diliberto, 2000; Humborstad *et al.,*2004). Research undertaken in different soft sediment areas (such as the UoA fishing grounds) showed that trawl door marks were shown to disappear within less than five months in an area of strong currents as in the Barents Sea (Humborstad *et al.,* 2004). In a sheltered Scottish loch, however, faint marks could still be seen 18 months after the trawling treatment (Tuck *et al.,* 1998), and the same trawl track could be identified for almost five years in a sandy mud area in Kiel Bay that is not exposed to tidal currents (Bernhard, 1989, cited in Krost *et al.,* 1990).

As regards the impact of bottom trawling in VME, according to ICES 2017 Ecosystem overview on Icelandic ecoregion, abrasion caused by bottom trawls has been shown to impact fragile three-dimensional biogenic habitats in particular (e.g. sponge aggregations, coral gardens, and coral reefs), with impacts happening mainly in deeper waters (> 200 m). Remote Operated Vehicle surveys, carried out under the auspices of the CoralFISH project (data from 2004), indicated widespread damage to corals on the Icelandic outer continental shelf, but undamaged colonies on the continental slope. While most cold-water coral reefs are located south of Iceland, sponge aggregations are distributed all around the island (OSPAR Commission 2010c), including the northern area where the fishery takes place. According to Webster, C. (2016), heavy trawling significantly impacts the sponge communities in the western seas around Iceland, showing a lower diversity of sponge taxa and smaller size of sponges in higher fished sites. Overall abundance, on the other hand, is similar in non-fished and heavily-fished sites, due to the high abundance of certain species like *Quasillina brevis,* which may be successful in these disturbed environments, and when removed from analyses, the impacts of heavy fishing effort are seen to be adverse to the abundance of other sponges.

There a different management measures in place to manage the impact of fisheries in Icelandic EEZ habitats. These include the following elements:

- Bottom trawling is generally not allowed within 12 nm from the coast (however there is an exemption for shrimp fisheries in-fjord waters).
- The Icelandic National Biodiversity Strategy and Action Plan (Ministry for the Environment, 2008) and the Ministry of Fisheries work for the protection of vulnerable ecosystems and threatened species by regulating closed areas and developing lighting fishing methods.
- Iceland has a detailed management strategy for protecting certain areas (permanent, seasonal or temporary closures), in order to protect both fish spawning areas (Fisheries Management Act:116/2006) or vulnerable habitats such as cold-water corals or hydrothermal chimneys (Ministry of Fisheries Act: No. 942/2016; Nature Conservation Act: 44/1999) or other VME when these are identified.
- Iceland has ratified different international conventions intended to protect habitats and ecosystems, such as the OSPAR Convention, the CITES Convention and the Convention on Biological Biodiversity.
- Iceland is a Contracting Party to the North East Atlantic Fisheries Commission (NEAFC). In 2014 NEAFC adopted Recommendation 19 (amended in 2015) that requires vessels to move 2 nautical miles away from trawl tracks when encountering "the presence of more than 30 kg of live coral and/or 400 kg of live sponge of VME indicators". Icelandic vessels

abide by commonly accepted move-on rules when encountering VMEs, however these remain informal.

- Vulnerable areas are closed for fishing: There is a comprehensive mapping project in place by MFRI, and limited size of the fishing grounds, which reduces the possibility of encounters with VME. There are area closures to protect certain habitat types such as coral reefs but which also protect associated sponge communities.
- There is a strong enforcement in place ensuring that vessels do not enter MPA. Conversations with the Coast Guard, which monitors all vessels at real time through the VMS system, confirm that vessels comply with measures related to Marine Protected Areas, as no infringements were reported in the past years.

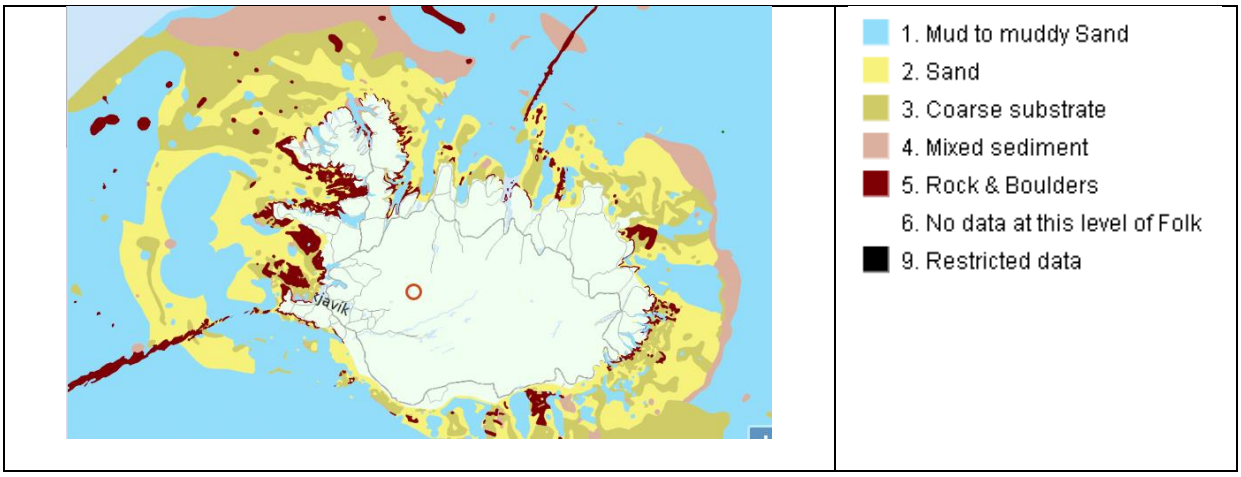
As shown in the different figures below, there is detailed information on Icelandic habitat types, including information on the geomorphology of Icelandic EEZ and on its substratum. There is also information on the distribution of VME species present in the area (OSPAR threatened habitats, *Lophelia pertusa* reefs, soft corals, sponge aggregations and Zostera beds).

Information on habitats is collected through different means:

- The Mapping European Seabed Habitats portal (www.searchmesh.net) provides accurate information on the distribution of the different habitats in European waters, including Icelandic EEZ.
- Vulnerable habitats are identified and mapped by the OSPAR Commission (www.ospar.org).
- The CoralFISH project works in assessing the interaction between cold water corals, fish and fisheries.
- MFRI conducts two annual demersal research trips in off-shore waters which serve to identify areas of vulnerable benthic habitats in Icelandic waters, such as cold- water corals, large sponge aggregation areas, or maerl beds, in relation to bottom trawl fishing activities. Since 2000, MFRI maps Icelandic EEZ waters with a multi beam echo sounder and plans to conclude this project by 2026. Besides, MFRI also conducts research on benthic habitats in-fjord waters (https://www.hafogvatn.is/is/midlun/utgafa). According to MFRI website, over the next few years priority will be given to map the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances. MFRI is at present also involved in the project "Mapping benthic flora and fauna in Icelandic EEZ", for which the first sampling took place in 2016.
- Research on benthic habitats is also undertaken by other institutions such as the University of Iceland (http://luvs.hi.is/fjolrit_liffraedistofnunar_1972_2008) and the Westfjord Nature Research Center (http://www.nave.is/utgefid_efni/).
- Catch and catch rates of VME indicator organisms is collected by different research programs (BIOICE, NovasArc) by MFRI and other institutions (OSPAR Commission, CoralFISH), however there isn't yet any established recording system by the fleet in order to identify, monitor and manage these encounters.

Benthic habitats in Icelandic EEZ waters are studied by different organizations. The European Marine Observation and Data Network (EMODnet) has mapped Icelandic waters to find out that the most common seabed is comprised by sandy mud (blue light) or sandy bottoms (yellow). There are also some smaller patches of sandy gravel (light brown) and muddy gravel (pink). Rocky areas (dark brown) are only found surrounding the ridges of Reykjanes and Kolbeinsey.

Figure 35: Icelandic habitat types. Blue light indicates sandy mud, yellow indicates sand, light brown indicates sandy gravel and pink indicates muddy gravel. Source: http://www.emodnet-geology.eu/map-viewer/



The Marine and Freshwater Research Institute (MRFI) is at present involved in the project of mapping all Icelandic EEZ waters with a multi-beam echo sounder. This project collects information about the shape, structure and geological features of the continental shelf. Emphasis is focussed on mapping fishing grounds and sensitive habitats such as corals. This information shall be useful in the study of the marine environment and the physical characteristics of marine geology and seabed. The project began in year 2000 and is expected to be finished by 2026.

Figure 36: Areas of Icelandic EEZ already mapped in this project. Detailed maps of each area, which can be downloaded at https://www.hafogvatn.is/is/rannsoknir/kortlagning-hafsbotnsins, show that depths inside the fjords can reach depths of 70-100 m close to the shoreline. Source: [https://www.hafogvatn.is/is/rannsoknir/kortlagning-hafsbotnsins.](https://www.hafogvatn.is/is/rannsoknir/kortlagning-hafsbotnsins)

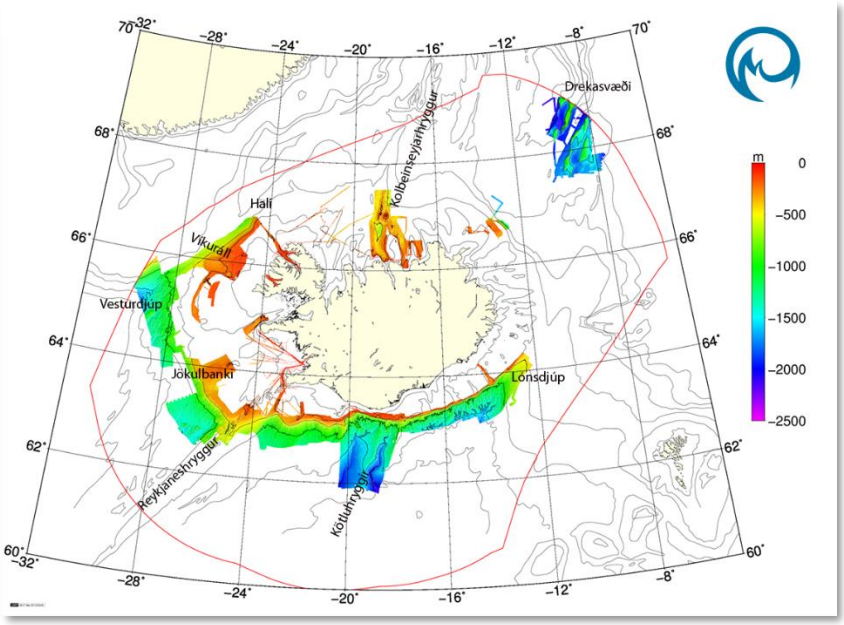


Figure 37: Map of Arnarfjörður (UoA 4), showing depths of 100 m in the UoA 4 fishing grounds. Note that the colour scale changes from the colour scale in the previous map. Source: https://www.hafogvatn.is/is/rannsoknir/kortlagning-hafsbotnsins/arnarfjordur

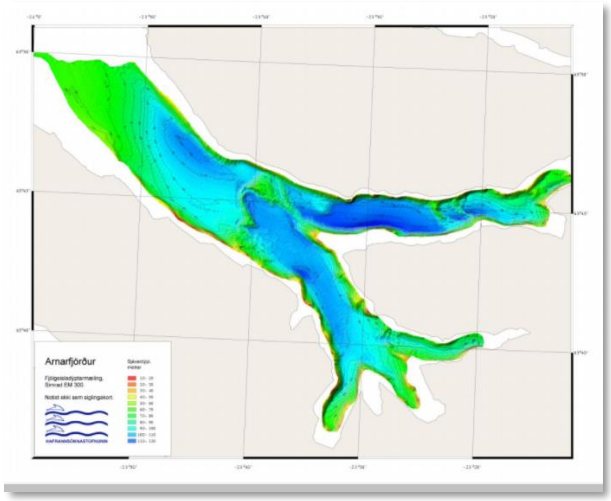
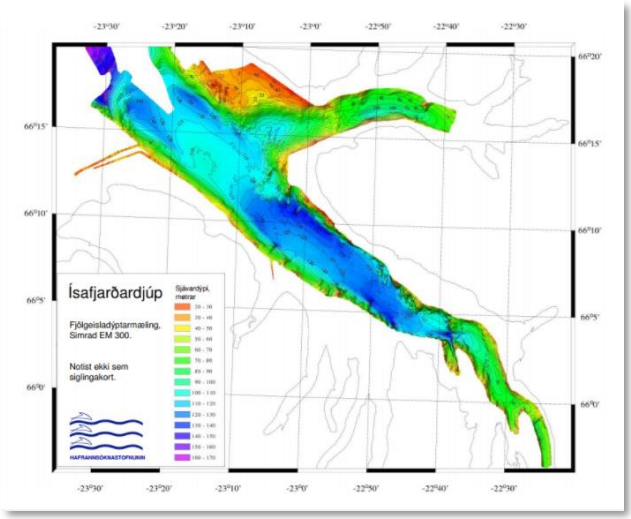


Figure 38: Map of Ísafjarðardjúp (UoA 5), showing depths of 70 m in the fishing grounds. Source:https://www.hafogvatn.is/is/rannsoknir/kortlagning-hafsbotnsins/isafjardardjup



Besides MFRI habitat mapping project (which also includes the use of underwater cameras with high spatial accuracy to collect data on benthic flora and fauna), the location of Icelandic VME indicator species is also studied by the NovasArc 2016-2018 Project (Nordic Project on Vulnerable Marine Ecosystems and Anthropogenic Activities in Arctic and Sub-Arctic Waters: http://novasarc.hafogvatn.is/). The project includes the undertaking of benthic research trips in which information on benthic species is collected. More information on the results of this research can be found at https://hafsbotninn.wordpress.com/ and http://novasarc.hafogvatn.is/news/.

Furthermore, there is ongoing registering of VME indicator species in Icelandic waters by different means:

- MFRI - Groundfish survey – Autumn: Includes recording of all benthic fauna
- MFRI – Groundfish survey – Spring: Includes recording of selected vulnerable benthic groups

- MFRI - Flatfish survey (which is focused in shallow waters and infjords): For the first time now in August 2018, benthic bycatch will be recorded.
- There is an ongoing observer program in which observers are placed in fishing vessels (at present not necessarily in the shrimp fishery) in order to collect information on the benthic species encountered by the different gear types in the different Icelandic fishing grounds.
- Fisheries inspectors also collect pictures of corals and sponges encountered when onboard.

The BIOICE program (Benthic Invertebrates of Icelandic waters) is a research program on Icelandic benthic species, which was established in 1992 and was run until 2012. Its main objective was to investigate the types of invertebrates living in Icelandic EEZ and assess their spread and prevalence. In the years 1991-2004, 1412 samples were taken at 579 stations within Icelandic EEZ. About 4,700,000 animal specimens were classified into 52 major groups and cultures of the animal kingdom. An individual of each species of invertebrates was preserved for the Icelandic Natural History Institute. This collection is an invaluable source of information. Information collected on this program is still used and analysed by the Icelandic Institute of Natural History, MFRI and the University of Iceland. Further information can be found at http://utgafa.ni.is/skyrslur/2014/NI-14004.pdf

Vulnerable marine ecosystems are studied not only by MFRI, but also by the OSPAR Commission. Iceland is a signatory party of the OSPAR Convention. The OSPAR threatened or declining habitats maps show that vulnerable habitats are often encountered close to the continental shelf break or in deeper waters. The following list shows which habitats are endangered in the different OSPAR regions. Iceland is located in Region 1.

Table 28: OSPAR threatened or declining habitats. Source: https://www.ospar.org/work-areas/bdc/species-habitats/mapping-habitats-on-the-ospar-list-of-threatened-or-declining-species-and-habitats

Desription	OSPAR Regions where the habitat occurs	OSPAR Regions where such habitats are under threat and/or in decline
Carbonate mounds	**I, V**	**V**
Coral Gardens	**I, II, III, IV, V**	**All where they occur**
Cymodocea meadows	**IV**	**All where they occur**
Deep-sea sponge aggregations	**I, III, IV, V**	**All where they occur**
Intertidal *Mytilus edulis* beds on mixed and sandy sediments	**II, III**	**All where they occur**
Intertidal mudflats	**I, II, III, IV**	**All where they occur**
Littoral chalk communities	**II**	**All where they occur**
***Lophelia pertusa* reefs**	**All**	**All where they occur**
Maerl beds	**All**	**III**
***Modiolus modiolus* beds**	**All**	**All where they occur**
Oceanic ridges with hydrothermal vents/fields	**I, V**	**V**
Ostrea edulis beds	**II, III, IV**	**All where they occur**
Sabellaria spinulosa reefs	**All**	**II, III**
Seamounts	**I, IV, V**	**All where they occur**
Sea-pen and burrowing megafauna communities	**I, II, III, IV**	**II, III**
***Zostera* beds**	**I, II, III, IV**	**All where they occur**

According to the OSPAR Commission, most common Vulnerable Marine Ecosystems (VME) in OSPAR Region 1 are: coral gardens, deep-sea sponge aggregations, intertidal mudflats, *Lophelia*

pertusa reefs, *Modiolus modiolus* beds, seamounts and *Zostera* beds. OSPAR map of threatened habitats in Icelandic waters (

Figure 39 below) shows the following endangered VME species: cold water corals hard corals (*Lophelia pertusa*) and soft corals (*Gorgonacea* & *Pennetulacea*) and sponge aggregations (*Geodia spp*.). Other habitats such as maerl beds and hydrothermal vents are found in coastal waters, however OSPAR does not consider these habitats as vulnerable in Region 1.

ICES 2015 Report of the Workshop on Vulnerable Marine Ecosystem Database (WKVME), in its Annex 4, lists the following VME indicators and VME habitat types:

- List of VME indicators
    - Black coral
    - Cup coral
    - Gorgonian
    - Lace coral
    - Sea-pen
    - Soft coral
    - Sponge
    - Stony coral
    - Anemones
    - Xenophyophores
    - Stalked crinoids
    - Chemosynthetic species (seeps and vents)

- List of VME Habitat Types
    - Cold-water coral reef
    - Coral garden
    - Deep-sea sponge aggregations
    - Sea-pen fields
    - Anemone aggregations
    - Mud and sand emergent fauna
    - Bryozoan patches
    - Hydrothermal vents/fields
    - Cold seeps

- List of VME Habitat Subtypes
    - *Lophelia pertusa*/*Madrepora oculata* reef
    - *Solenosmilia variabilis* reef
    - Hard-bottom coral garden

Figure 39: Location of OSPAR threatened or declining habitats in Icelandic EZZ (as downloaded in February 2017). Source: https://odims.ospar.org/maps/298

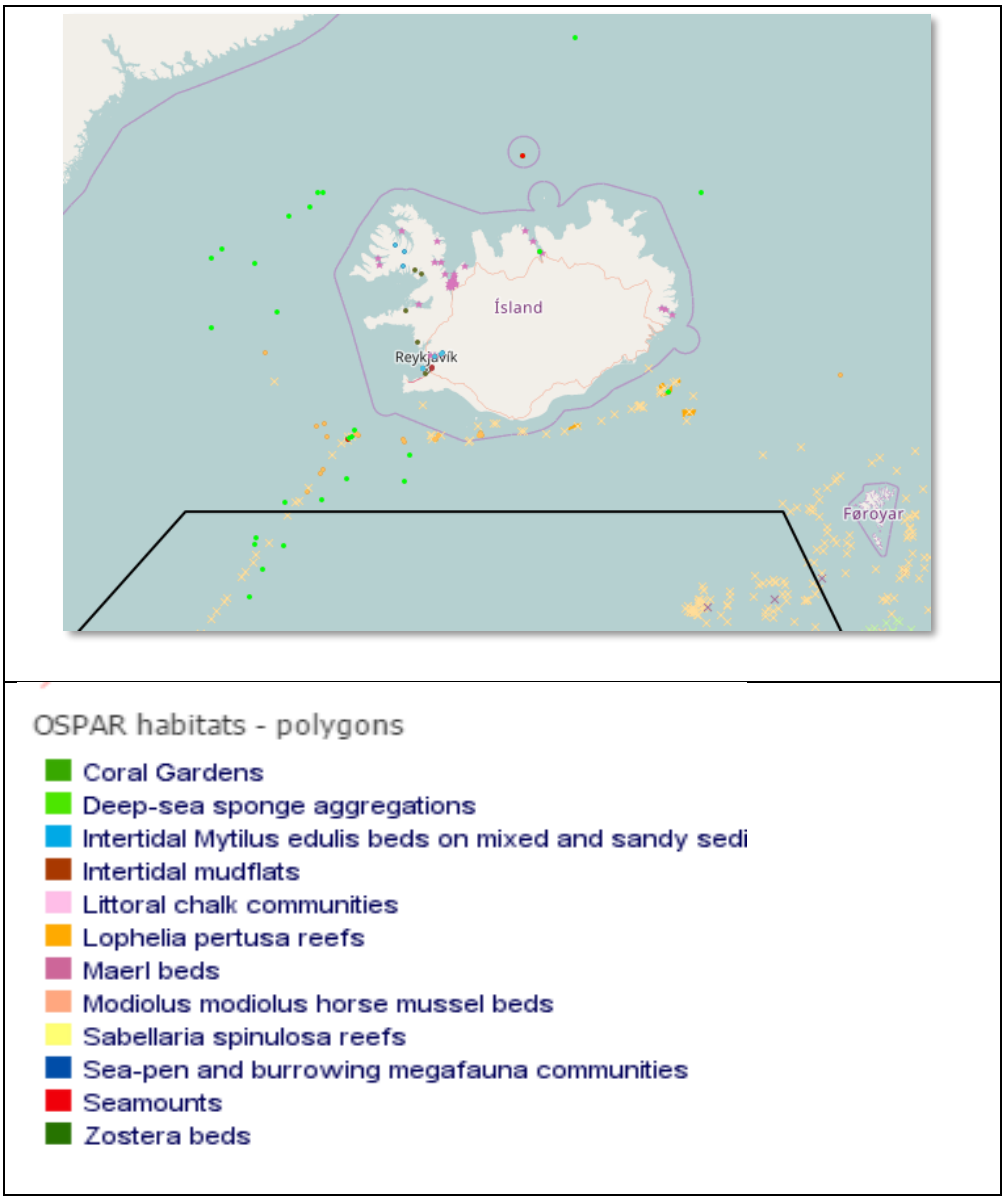
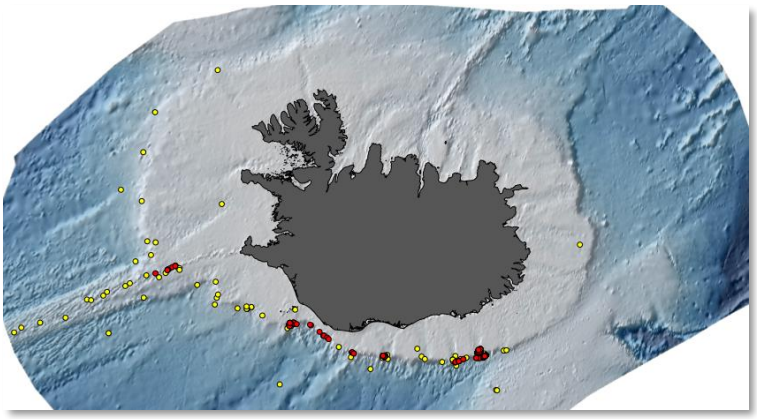


Figure 40: Distribution of Cold water *Lophelia pertusa* coral reefs in the Icelandic EEZ. Red dots indicate information collected by MFRI's Habitat Mapping Programme and CoralFISH Project, while yellow dots indicate information collected by the BIOICE Programme (Benthic Invertebrates of Icelandic waters). Burgos et al., 2014. Source: http://www.hafro.is/rad-hafsbotn14/glaerur/Julian%20Burgos.pdf

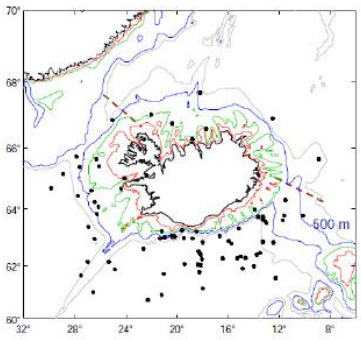
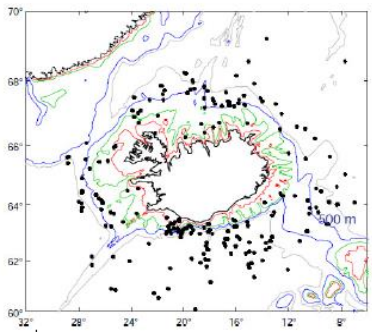
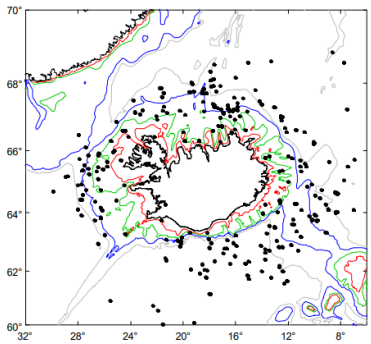


As shown in

Figure 40, most cold-water reefs are located close to the shelf break in the South and West coast of Iceland and along the Reykjanes Ridge, and therefore do not interact with the prawn fishery.

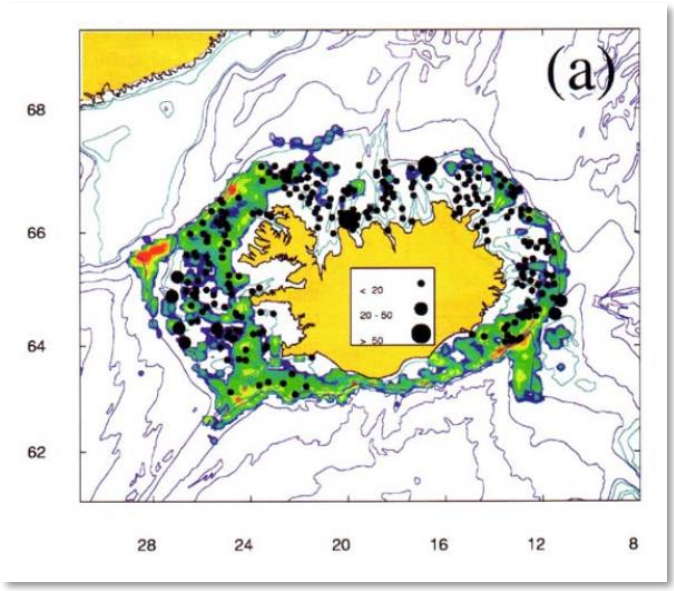
Figure 41: Distribution of soft corals (Alcyonacea, Gorgonacea, Pennatulacea and Alcyoniina) in Icelandic EEZ (at depths of 500 m or more). Black dots represent

individuals of one or more soft coral species such as Alcyonacea, Gorgonacea and Pennatulacea (the presence of individuals of these species does not necessarily mean the existence of a VME habitat, as this needs to be defined by further research, preferably video recording). Source: Olafsdottir et al, 2014. http://www.hafro.is/rad-hafsbotn14/glaerur/Steinunn%20Hilma%20glaerur.pdf

Alcyonacea and Gorgonacea	Pennatulacea	Alcyoniina
		

The distribution of soft corals is not as well-known as the distribution of *Lophelia pertusa* reefs. Gorgonians are found in relatively high numbers in deeper waters (> 500m) off south, west and north Iceland but are relatively uncommon on the shelf (< 500m depth). Pennatulacea are also rare in water shallower than 500m, but they are more common in deeper waters, especially south of Iceland. Soft corals do not form coral reefs, but where they occur they tend to be in high densities (Tendal 1992; Buhl-Mortensen 2014). Soft coral species are also vulnerable to trawling, although if the applied pressure is low they have the ability to bend or to retract into the seafloor.

Figure 42: Biomass of sponge bycatch in 2002, superimposed on fishing effort as mean annual swept area (nm2 per 1° latitude x 1° longitude cell). Black dots indicate total biomass (kg/h otter trawl haul) of sponges in 2002 groundfish survey by Marine Research Institute. Source: OSPAR Commission (2010c).



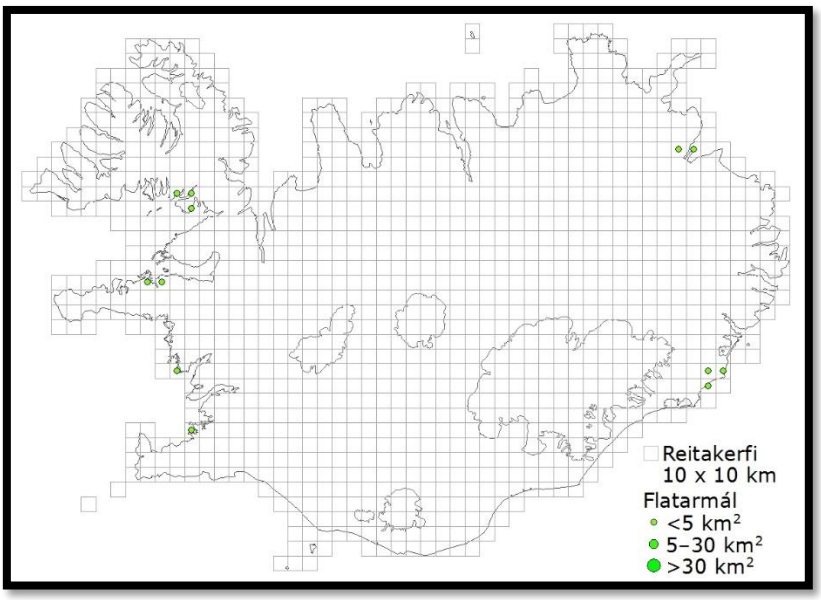
Sponges communities are abundant in Icelandic waters in shallow waters down to 500 m depth, with Geodia species been abundant (*Geodia atlantica, G. mesotriaena* and *G. barretti* as well as *Isops phlegraei*) (Klitgaard and Tendal, 2004). Very large catches of sponges (up to >20000 kg) were reported to Klitgaard and Tendal (2004) from the eastern and western flanks of the northern part of Reykjanes Ridge at more than 1000 m depth. Bycatch analysis carried out during the 2002

groundfish survey enabled the estimation of the distribution of mass sponge occurrences on the Iceland shelf as shown above.

Bottom trawling damages sponge colonies. Recovery takes place mostly in the summer time, which can lead to slow recovery rate. The size structure within sponge populations indicates slow reproduction and recruitment, and high age of the large specimens. Repeated disturbance may lead to permanent extirpation of sponge species in an area, while recovery, once the disturbance stops, takes a long time. Comparable investigations in Antarctica point to decades if not centuries to recover damaged sponge communities (Dayton 1979; Gatti 2002). Fishermen tend to avoid known areas of sponge occurrences as it makes more difficult the hauling operation.

The distribution of *Zostera* beds is studied by the Icelandic Institute of Natural History (http://en.ni.is/). Distribution map of these seagrass beds show that these do not overlap with the shrimp fishing grounds.

Figure 43: Known distribution of seagrass beds on littoral sediments, dominated by *Zostera angustifolia*. They cover around 1% of the coast (11km2). Source: http://www.ni.is/greinar/marhalmsgraedur



In-fjord studies of marine habitats around Iceland are conducted not only by MFRI (see https://www.hafogvatn.is/is/midlun/utgafa) but also by the University of Iceland (http://luvs.hi.is/fjolrit_liffraedistofnunar_1972_2008) and by the Westfjord Nature Research Center (http://www.nave.is/utgefid_efni/). The fjords in general have very soft sediment in the

deeper parts along the centre. Harder substrate (sandy, gravelly) is found in the flanks. Corals (*Scleractinia, Gorgonia*), seapens, *Modiolus modiolus* beds, *Zostera* beds or high densities of deep-water sponge aggregations have never been reported in the fjords under assessment, as these species are mainly found in waters deeper than 200 m. The different studies by these institutions cover all inshore UoAs and conclude that there are no VME to consider in the fjords under assessment.

Distribution of soft corals was studied through the BIOICE programme, which showed that gorgonian corals and seapens are common in deep waters all around Iceland (ICES) and aggregation of large sponges occur off northern and southern Iceland and around the Reykjanes Ridge (Guijarro et al., 2006). The CoralFish project is focused on the research on interactions between cold-water corals, fish and fisheries, in order to develop monitoring and predictive modelling tools for ecosystem-based management. The Icelandic National Biodiversity Strategy and Action Plan (Ministry for the Environment, 2008) works for the protection of vulnerable ecosystems and threatened species by regulating closed areas and developing lighting fishing methods. As a result, benthic habitats benefit from area closures. Enforcement in area closures is carried out by the Coast Guard.

There is a comprehensive set of marine protected areas in Iceland EEZ. Most of them are closed for fishing to protect spawning or juvenile fish. Closures can be temporary or permanently. Some areas are closed for certain gears, usually bottom trawl or longlines, but some other are closed for protecting certain vulnerable habitats such as cold-water reefs (Regulation on the protection of coral areas out of South and South East: Regulation nr. 942/2016: https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/0942-2016, Regulation nr. 1140/2005, on the protection of coral areas at the south coast, and Regulation nr. 1095/2011, on the protection of coral areas out of South and South-East Iceland) or hydrothermal chimneys in Eyjafjordud and north of Arnarnesnöfum (Regulation nr. 249/2001 and Regulation nr. 510/2007).

Figure 44 below shows areas with restricted fishing. Associated regulation is:

- In red:
    - Regulation 162/2002
    - Regulation 68/2003
    - Regulation 230/2003
    - Regulation 311/2003
    - Regulation 770/2006
    - Regulation 805/2006
    - Regulation 193/2007
    - Regulation 810/2009
    - Regulation 887/2009
- In green:
    - Regulation 766/2004
- In black:
    - Regulation 1140/2005
    - Regulation 50/2006
    - Regulation 693/2007
    - Regulation 742/2009
- In pink:
    - Regulation 310/2007
- In blue:
    - Regulation 794/2004
    - Regulation 696/2005
    - Regulation 875/2005
    - Regulation 747/2006
    - Regulation 748/2006

- Regulation 749/2006
- Regulation 751/2006
- Regulation 752/2006
- Regulation 861/2006
- Regulation 310/2007
- Regulation 1271/2007
- Regulation 100/2008
- Regulation 881/2009

Figure 44: Areas with restricted fishing. Shadings indicate different levels of restriction and type of gear involved (only in Icelandic). January 2018. Source: [Directorate of Fisheries]

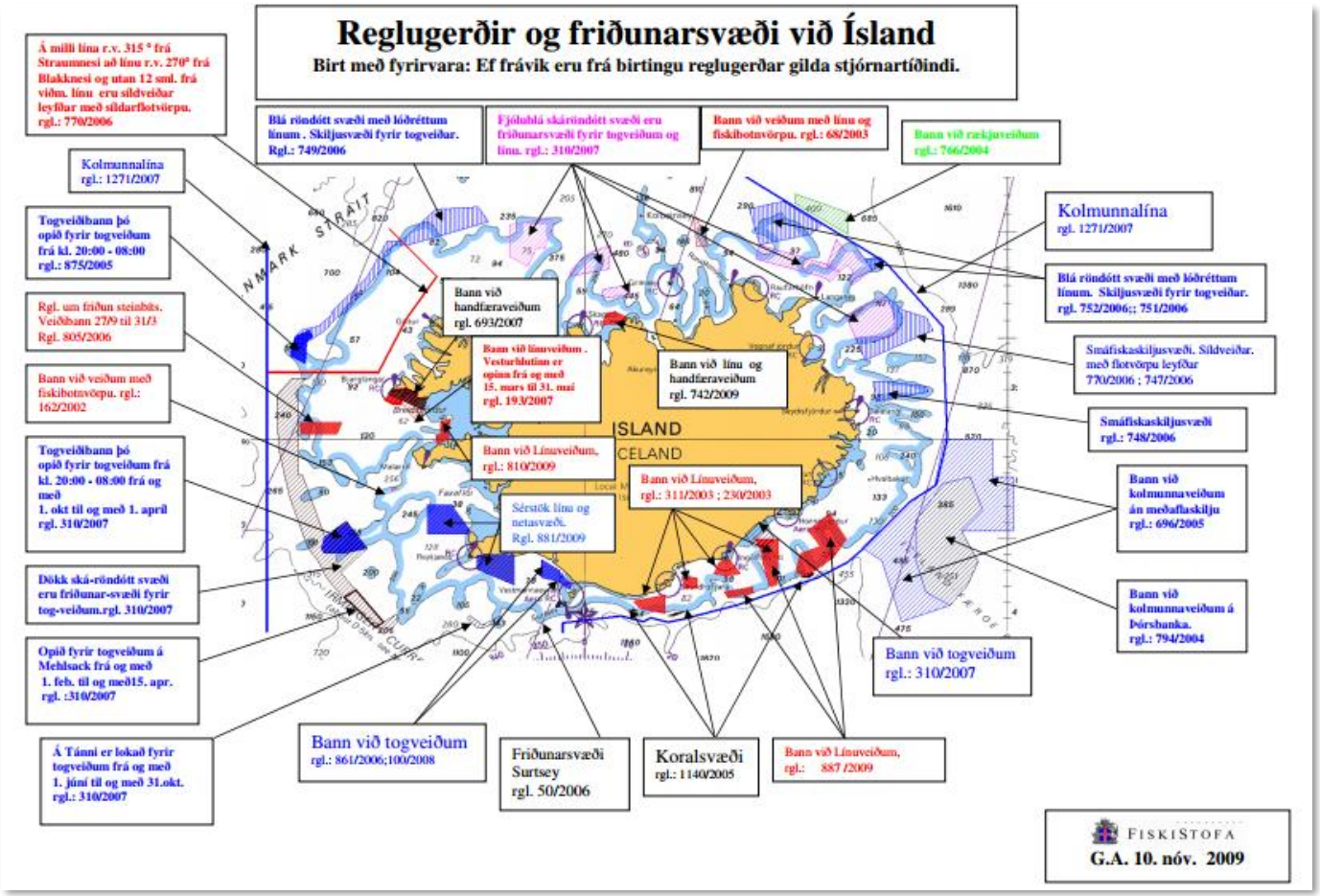
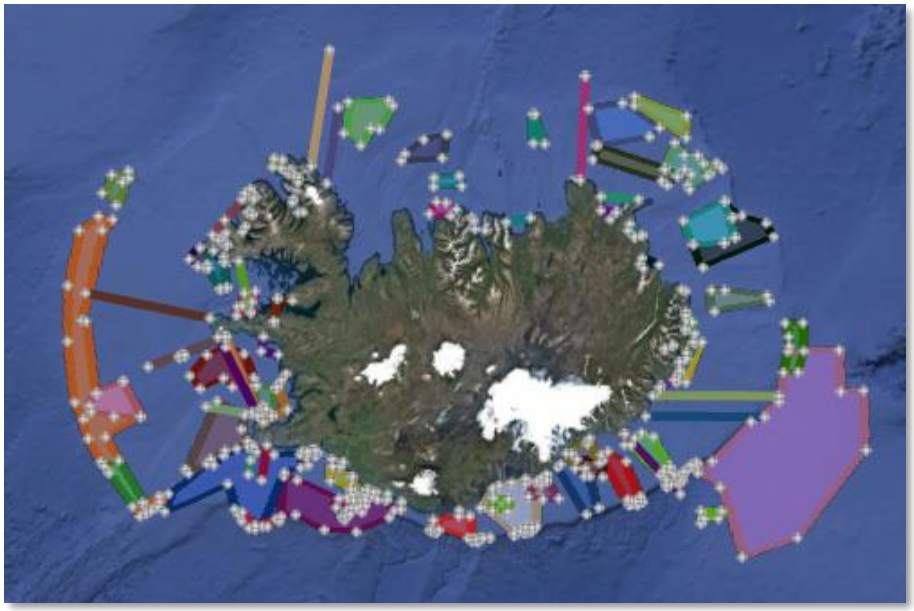


Figure 45: Marine regulated and protected areas in Iceland (as downloaded in December 2017). Information on reasons and rules for the different area closures can be found here: click this link. (requires the installation of Google Earth). Source: Google Earth, click this link.

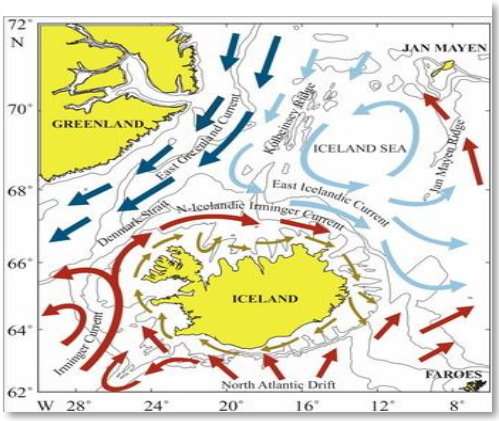


3.4.5 Ecosystem

Iceland is located in the Mid-Atlantic Ridge just south of the Arctic Circle. The shelf around Iceland is narrow in the south coast and relatively broad in the west, north, and east coasts.

The Polar Front lies between Greenland and the west coast of Iceland and separates the cold East Greenland Current from the warmer Irminger Current. The south and east coasts are bathed by the warm North Atlantic Drift which flows towards the Norwegian Sea. As a consequence, Icelandic waters are generally relatively warm and ice free. Icelandic ocean temperature ranges from 4 to 10 degrees depending on the area. There is also a coastal water mass running clockwise around Iceland, characterized by its low salinity, and which comes from runoff of continental waters in the spring and summer time.

Figure 46: Marine currents around Iceland. Source: MFRI



Climate variability has been noticed in these waters, where water temperature has increased 1ºC in the past ten years and has affected the distribution of different components of the marine ecosystem, such as capelin, which has also led to changes in the distribution of fish species such as cod and seabirds such as puffins. Besides, a decline in the stock size of capelin has also been noticed.

The Icelandic ecosystem has been studied by different researches (*Astthorssona, O.S., Gislasona, A., and Jonssona S. 2007; Valdimarsson, H., Astthorsson, O. S., and Palsson, J. 2012*) and institutions, such as the Icelandic Marine and Freshwater Research Institute, ICES or the Icelandic Institute of Natural History. Such research serves to describe the main impacts and interactions between the UoAs and the different ecosystem elements, such as fishery biomass removal, trophic interactions and prey relationships or impacts on the seabed.

The Icelandic shelf is a high productivity ecosystem with phytoplankton blooms in spring and autumn. The spring zooplankton biomass is dominated by copepods such as *Calanus finmarchicus* and biomass abundance is related to temperature (ICES). Icelandic waters contain more than 20 commercially exploited fish species (which are managed through the Directorate of Fisheries) and other non-commercial species. Of those, capelin is known to be important in the diet of other fish stocks, such as cod, but also in the diet of marine mammals and seabirds as puffins. Besides, Astthorsson and Palsson (2006) have reported on 22 southern fish species that in past 10 years have been recorded for the first time within the Icelandic 200 mile EEZ. The change in the distribution of these southern species is believed to be related to the increase in water temperature.

Most fish species spawn in the southern and southwestern coasts, and marine protected areas have been established to protect spawning seasons and areas. Skates and sharks are also present in the area but the status of these species is not known (ICES Iceland ecosystem overview).

Shrimp research was initiated in the early 1970's but since 1988 the Marine Research Institute has conducted a standardized annual shrimp survey in inshore and off shore areas to provide an index of the northern shrimp biomass to inform fishery management. The species lives at depths of 20–1,330 m, usually on soft muddy bottoms in waters with a temperature of 0–5 °C. The warming of water temperature negatively affects the recruitment of the stock (Jónsdóttir et al, 2017). The shrimp mainly feed on detritus but may also be a scavenger. Shrimp is also important as a food item for many fish species. They are preyed upon by cod, Greenland halibut, haddock, and other fish species so abundance of these stocks negatively affects shrimp stocks.
The trophic relationships of prawn with other species are reasonably well known and are described in the Icelandic Atlantis Ecosystem Model (Sturludottir et al, 2016). According to MFRI, the shrimp stocks are environmentally driven and the fishery has limited impact on stock status. Shrimps have a short life span and a rapid growth rate, so populations can built-up quite rapidly after disturbance or habitat destruction.

In 2016 the Icelandic Atlantis ecosystem model was developed integrating physical, chemical, ecological and anthropogenic processes. The model has 52 biological functional groups: 25 are vertebrates with some at a species level, 16 invertebrates, 6 primary producers, 2 bacteria and 3 detritus groups. There is one group for prawns. The Atlantis model also incorporates a fisheries model which includes 11 fishing fleets all with its one characteristics such as selectivity, target species and by-catch.

As mentioned in the P1 background section, the shrimp fishery is subject to different quotas in the different fishing grounds. On an annual basis, MFRI conducts a shrimp survey trip in the different fishing grounds and elaborates a different fish advice for each one of these areas, which takes into account the biomass of the stock, the population trends, and predator needs. The allocated fishing quota follows this advice ensuring that the stock is sustainable harvested. When the stock declines in certain areas effort is limited accordingly, leading to annual fishing closures when necessary. As shrimps are a short-lived species, stocks can recover within a few years after a serious decline.

As described in the primary and secondary species background section, catch composition for all UoAs is very clean. For the offshore fleet (UoA 1), the targeted shrimp comprises 65% of the total catch, however the fishery also targets cod and Greenland halibut (which account for another 30% of the catch) with the use of a tunnel sac. As for the inshore fleet (UoAs 2-7), there aren't any other species to consider in the catch composition, and the whole catch is the targeted shrimp.

Fishing in these UoAs takes place in very localised fishing grounds, limiting the localization of the fishing impacts.

The Icelandic Fisheries Management Act, agreed in August 2006, serves as a strategy to address all main impacts of the UoA on the ecosystem. The objective of the Act is to promote conservation and efficient utilization of marine stocks. There are different measures to accomplish this goal:

- Establishment of both permanent and temporary fishing closures. These have been designed either to protect fish spawning areas or vulnerable marine ecosystems.
- Establishment of closed areas in case of risk depletion for the prawn stocks.
- Establishment of TACs and quotas for prawn in the different UoAs and also for most commercial fish species in Iceland.
- Landing obligation and official weighting and sampling of the landings.
- Strong enforcement system through the Directorate of Fisheries and the Coast Guard. Conversations with these agencies report that infringements are negligible.
- Mandatory VMS and logbook
- Scientific advice for many fish species, including fishing advice for prawn in the different UoAs.
- Promotion of research on marine species (including an annual trip to study the shrimp development in the different UoAs) and habitats.
- Natural mortality is an important element in the stock assessment program.

Information on the Icelandic ecosystem and the impacts by the fishery are collected through different means, including sampling of fishing removals, research by MFRI on the status of prawn in the different fishing grounds as well as the evaluation of other fish stocks, record of VMS tracks, mapping of benthic areas and study of benthic organisms (both inside the fjords and in offshore waters), monitoring of protected areas, monitoring of marine mammals and bird populations, and ecosystem modelling of the Icelandic ecosystem.

3.5 Principle Three: Management System Background

3.5.1 Jurisdiction

The UoA fishery takes place in the Icelandic EEZ.

3.5.2 Legal basis and management set-up

Iceland has a well-established system for fisheries management in place, now codified in the 1990 Fisheries Management Act, amended in 2006. The Act details procedures for the determination of TAC and allocation of harvest rights, including permits and catch quotas. It also lays out the system for individual transferable quotas and procedures for monitoring, control and surveillance and the application of sanctions. Further provisions are provided in a number of other acts, such as the 1997 Act on Fishing in Iceland's Exclusive Fishing Zone and the 1996 Act concerning the Treatment of Commercial Marine Stocks, as well as in regulations at lower levels of the legal hierarchy, issued by the relevant management authorities. Iceland is also signatory to, and has ratified, the major international agreements pertaining to fisheries management, such as the 1982 Law of the Sea Convention and the 1995 Fish Stocks Agreement.

The Ministry of Industries and Innovation – which has two ministers: one for Industry and Commerce and one for Fisheries and Agriculture – is the policy-making body in Icelandic fisheries management and sets annual TAC based on scientific recommendations from the Marine Research Institute. The Directorate of Fisheries is the implementing body within the management system, formally subordinate to the Ministry as an agency. It issues fishing licenses, allocates annual vessel quotas and oversees the daily operation of the individual transferable quota system. The

Directorate is also responsible for monitoring, control and surveillance, in cooperation with the Coast Guard, which is a civilian law enforcement agency under the Ministry of the Interior.

3.5.3 Objectives

The objective of Icelandic fisheries management, as stated in the Fisheries Management Act, is to ensure conservation and efficient utilization of marine living resources in the Icelandic EEZ. The precautionary approach is not mentioned explicitly in the Act, but the requirement to protect marine resources and take the best scientific knowledge into account, e.g. through the use of reference points, equals the requirements of the precautionary approach, as laid out in the FAO Code of Conduct. Short- and long-term objectives consistent with achieving the outcomes of MSC Principles 1 and 2 are explicit in the Fisheries Management Act and supporting legislation, including the overarching objective to maintain the shrimp stock at sustainable level, to reduce bycatch and negative impact on ETP species and habitats, including protecting vulnerable habitat types by implementing permanent area closures where chimneys or coral reefs have been localized.

A further objective, also founded in the Fisheries Management Act, is to ensure stable employment and settlement throughout Iceland.

3.5.4 Stakeholders and consultation processes

Iceland has a consensus-based system for fisheries management and long tradition of continuous consultation and close cooperation between government agencies and user-group organizations. As emphasized by all stakeholders interviewed during the site visit, lines of communication are short and much consultation takes place informally, in direct and often spontaneous contact between representatives of user groups and authorities. At a more formal level, all major interest organizations are regularly invited to sit on committees established to review changes in government, and they meet for regular consultations with the Ministry, the Directorate and the Parliament's (Althing) Permanent Committee for Fisheries and Agriculture. These include, but are not restricted to, Iceland Fisheries (which was established in 2014 as the result of a merger between two of the most influential user-groups in Icelandic fisheries: the Federation of Icelandic Fishing Vessel Owners and the Federation of Icelandic Fish Processing Plants) and the Fisheries Association of Iceland (which also incorporates the two latter as well as the Federation of Owners of Small Fishing Vessels, the Icelandic Seamen's Federation and others). Also local authorities are actively engaged in fisheries management and have easy access to the management system. There are no NGOs that show any interest in fisheries management in Icelandic waters at the moment. Major international NGOs that usually engage actively in discussions about fisheries management, such as Greenpeace and WWF, do not have offices in Iceland. Local NGOs are more concerned with nature protection on land.

Consultation processes cover policies and regulatory issues, and also include discussions of the annual scientific recommendations by the Marine Research Institute. Shortly after presenting the recommendations to the Ministry, representatives of the Institute enter into dialogue with the fishing industry regarding the status of the stocks and the nature of the recommendations. The Ministry also consults with the industry before setting the final TACs.

3.5.5 Enforcement and compliance

Monitoring, control and surveillance is taken care of by the Directorate of Fisheries, in collaboration with the Coast Guard, the Marine Research Institute and coastal municipalities. The enforcement system is based on reports from the vessels, physical inspections at sea and weighing in harbour, as well as information exchange with other states' enforcement authorities. The structure and procedures of the enforcement system are codified in the Fisheries Management Act, while

requirements to the weighing system are laid out in the Act concerning the Treatment of Commercial Marine Stocks.

Fishing vessels are required to keep an electronic logbook and report catches to the Directorate of Fisheries using an electronic recording and reporting system (ERS). VMS is obligatory. Inspectors from the Directorate may accompany fishing vessels on trips or operate from Coast Guard vessels. The Coast Guard has three offshore patrol vessels, as well as a number of smaller boats, helicopters and a surveillance aircraft. At-sea inspections include control of the logbook, catch and gear. If a certain amount of the catch is found to be below size limit, the inspector can initiate a short-term close (usually two weeks) for the fishery of that particular species, vetted by the Marine Research Institute and confirmed by the Directorate of Fisheries.

Inspections are conducted using a risk-based framework aimed at utilizing resources to optimize compliance at any given moment. Most importantly, 100 % of the landed fish is weighed by an authorized 'weighmaster', employed by the municipality and hence independent of both buyer and seller. Landing data are immediately added to the Directorate's catch database, where the reported quantities of fish are deducted from the vessel's quota. The Directorate operates a dynamic and interactive website, where stakeholders at all times can monitor the precise quota status for each species and observe the performance of individual vessels, their catch from each fishing trip and vessel quota status. The fact that the vast majority of fish is exported provides a further control mechanism enabling a mass balance comparison of fish in (i.e. landing declarations) with fish out (i.e. production or export volumes).

Hence, Iceland has in place a comprehensive and transparent system for monitoring, control and surveillance, and there are a number of possibilities for enforcement authorities to physically check whether the data provided by fishers through self-reporting are indeed correct.

The sanctioning system in Icelandic fisheries is codified in the Fisheries Management Act and the Act concerning the Treatment of Commercial Marine Stocks. A system for graduated sanctions is applied. For a first-time offence, a warning ('reprimand') is given if the infringement is of a less serious nature. In the other end of the spectrum, serious or repeated deliberate violations can be liable to imprisonment of up to six years. Fines for first offences shall not exceed ISK 4,000,000 depending upon the nature and scope of the violation. Repeated offences shall be fined by a minimum of ISK 400,000 and a maximum of ISK 8,000,000. Withdrawal of fishing permit can be applied in a number of situations. As an example, if information of the Directorate of Fisheries suggests that a vessel has caught in excess of its catch quotas for any species, the Directorate must notify this to the vessel operator and master of the vessel concerned, stating in addition that the vessel's commercial fishing permit is suspended on the fourth working day thereafter unless sufficient catch quotas have been transferred to the vessel within that time. If the recipient of the notification is of the opinion that the information of the Directorate of Fisheries concerning the vessel's catch is incorrect and that the vessel has not caught in excess of its catch quotas, he/she must convey such objections to the Directorate of Fisheries within three days. If a permit is suspended for the second time during the same fishing year due to catch exceeding catch quotas, the Directorate of Fisheries shall suspend a vessel's commercial fishing permit for two weeks in addition to the time resulting from the suspension provided for in the first paragraph, for six weeks if it occurs for the third time and for twelve weeks if it occurs more often. As another example, the Directorate of Fisheries shall suspend the commercial fishing permits of vessels failing to submit catch log books; such suspensions shall remain in force until submissions are received or explanations provided for the reasons for failure to submit.

In the first instance of a violation which is liable to suspension of fishing permit, the suspension shall apply for at least one week and no longer than 12 weeks, depending upon the nature and scope of the violation. In the case of repeated violations, a suspension shall apply for at least four weeks and not longer than one year. If a vessel's commercial fishing permit has repeatedly been suspended, the Directorate of Fisheries may decide that a fishing inspector shall be stationed aboard the vessel at the expense of the vessel operator for a specific period of up to two months. The vessel operation must then pay all cost arising from the presence of the fishing inspector

aboard, including salary cost. If there is suspicion of more serious infringements, the case may be transferred to the Ministry or to a court. All decisions on the suspension of harvest rights are to be made publicly available.

The Icelandic Directorate of Fisheries produces detailed overviews of compliance levels among Icelandic fisheries, in aggregate form in its annual reports and on a running basis on its website. This information suggests that there is a high degree of confidence that fishers comply with regulations. According to the Directorate, the Icelandic shrimp fishery is very clean; in recent years, no 'substantial' infringements (affecting the sustainability of the stock) have been detected, only 'technical' infringements such as forgetting to apply for the annual renewal of the fishing license.

3.5.6 Review of the management system

The Ministry of Industries and Innovation, the Fisheries Directorate and the Coast Guard report that there is a constant process of internal review and consultation, including of scientific advice, and that there is a patchwork review of technical regulations and enforcement measures. Key aspects of the fisheries management system are continuously reviewed by the Icelandic Parliament, in committee hearings but more often at ad hoc meetings, which reflects that Iceland is a small and fishery-dependent country, with short lines of communication. The National Audit Office is an independent body operating under the auspices of the Parliament, as part of the legislature's monitoring of the executive branch. In addition to traditional financial audits, the office conducts so-called performance reviews, aimed at evaluating the effectiveness of the executive's implementation of parliamentary decisions, including within fisheries management.

4 EVALUATION PROCEDURE

4.1 Harmonised Fishery Assessment

4.1.1 Overlapping fisheries

The Icelandic shrimp fishery takes place in Icelandic EEZ. The UoA includes all Icelandic vessels in the shrimp fishery. Foreign vessels are not entitled to fish for shrimp in Icelandic waters. There are no overlapping shrimp fisheries and harmonization is not relevant for the Icelandic shrimp fishery.

Nevertheless, Icelandic Sustainable Fisheries is an engaged fishing group which has carried out several successful MSC certification processes. These include:

- ISF Norwegian and Icelandic herring trawl and seine (MSC V1.3)
- ISF Iceland cod (MSC v2.0)
- ISF Iceland haddock (MSC v2.0)
- ISF Iceland golden redfish, blue ling and tusk (MSC v1.3)
- ISF Iceland saithe, ling, Atlantic wolfish and plaice (MSC v1.3)
- ISF Iceland mackerel (MSC V2.0)
- ISF Iceland capelin (MSC v2.0)
- ISF anglerfish (MSC v2.0)
- ISF Greenland halibut (MSC v2.0)
- ISF blue whiting (MSC V2.0)

Besides, the client is currently undergoing MSC certification process of the Icelandic lemon sole.

Care attention has been paid to the different MSC v2.0 certified bottom trawl fisheries in Icelandic waters, as regards the results of Principle 2, however no harmonization activities as such have taken place. The team came to their own independent conclusions based on the information available, but these were not substantially different to the scoring in other assessments. Discrepancies have been found in different PI but these differences are believed to be justified due to the different species considered under each PI and the catch composition of the different UoAs. Where common conditions could be applied, these were harmonised with conditions already in place for Icelandic fisheries.

The following tables show the Principle 2 PI scores given to MSC fisheries fishing with bottom trawls in Icelandic EEZ.

Table 29: Principle 2 scores for overlapping bottom trawl fisheries. Source: DNV-GL.

			Principle 2														
Report	**MSC Standard**	**CAB**	**2.1.1**	**2.1.2**	**2.1.3**	**2.2.1**	**2.2.2**	**2.2.3**	**2.3.1**	**2.3.2**	**2.3.3**	**2.4.1**	**2.4.2**	**2.4.3**	**2.5.1**	**2.5.2**	**2.5.3**
ISF shrimp (Offshore UoA)	**v2.0**	DNV-GL	100	95	100	90	85	95	85	90	80	70	75	85	80	95	90
ISF Blue whiting	**v.2**	DNV-GL	85	95	95	80	85	90	85	85	80	70	75	85	80	95	85
ISF haddock	v.2	Vottunarstofan Tun ehf.	95	95	100	90	90	85	100	100	100	70	75	85	80	95	85
ISF cod	v.2	Vottunarstofan Tun ehf.	95	95	100	90	90	85	100	100	100	70	75	85	80	95	85
ISF anglerfish	v.2	Vottunarstofan Tun ehf.	95	95	100	80	95	90	90	100	100	75	75	85	100	85	85
ISF Greenland halibut	V2.0	Vottunarstofan Tun ehf.	100	95	100	80	90	85	100	100	100	70	75	85	80	95	85

Table 30 below shows the Principle 3 PI scores of different Icelandic MSC certified fisheries.

Table 30: Principle 3 scores for overlapping Icelandic fisheries. Source: DNV-GL.

			Principle 3						
Report	**MSC Standard**	**CAB**	**3.1.1**	**3.1.2**	**3.1.3**	**3.2.1**	**3.2.2**	**3.2.3**	**3.2.4**
ISF shrimp	**V2.0**	DNV-GL	100	100	100	80	95	100	80
ISF Blue whiting	v.2	DNV-GL	65	100	100	90	95	100	80
ISF capelin	v.2	SAI Global	85	95	100	100	80	100	90
ISF cod	v.2	Vottunarstofan Tun ehf.	100	100	100	90	100	100	80
ISF haddock	v.2	Vottunarstofan Tun ehf.	100	100	100	90	100	100	80
ISF Greenland halibut	v.2	Vottunarstofan Tun ehf.	75	85	100	90	85	100	80
ISF Anglerfish	v.2	Vottunarstofan Tun ehf.	100	95	100	90	85	95	80

4.1.2 Harmonisation activities

There haven't been any harmonization activities as these are not relevant for the UoA.

4.1.3 Harmonisation outcomes

There are no harmonization outcomes to consider.

4.2 Previous assessments

No previous assessments have been made of these fisheries

4.3 Assessment Methodologies

Table 31 Assessment methodologies

Standard	MSC Fishery Certification Requirements and Guidance version 2.0.
Report template	MSC Full Assessment Reporting Template v2.0
Assessment tree	Default assessment tree

4.3.1 The MSC fisheries standard

The MSC fisheries standard sets out requirements that a fishery must meet to enable it to claim that its fish come from a well-managed and sustainable source. The MSC standard applies to wild-capture fisheries that meet the scope requirements as confirmed in section 3.1.

The MSC fisheries standard comprises three core principles:

Principle 1: Sustainable target fish stocks

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

Principle 2: Environmental impact of fishing

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Principle 3: Effective management

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

4.3.2 The assessment tree structure

The default tree structure is divided into four main levels for the purposes of scoring, as summarised below and illustrated in

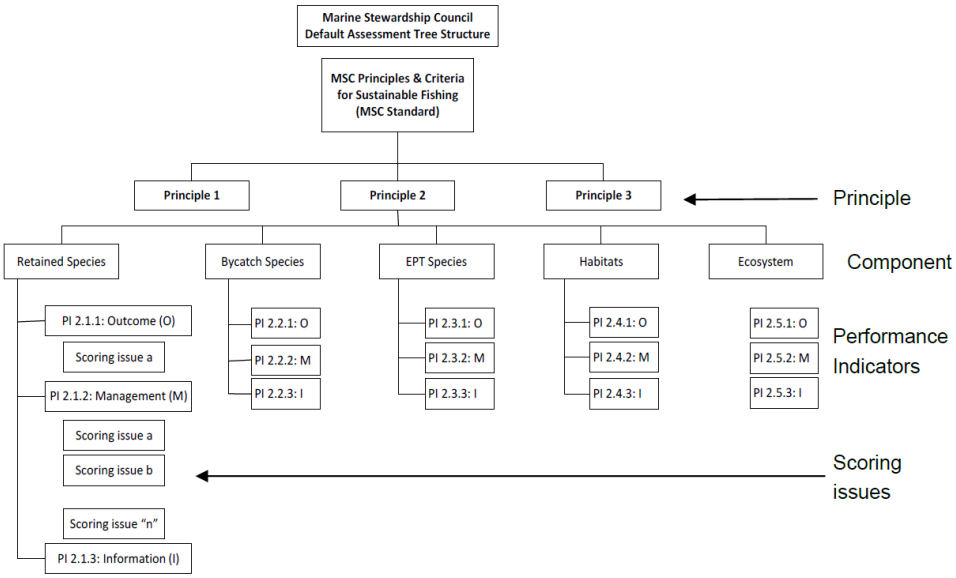
Figure 47:

- Principle: The Principles represent the overarching basis for the assessment tree
- Component: A high level sub-division of the Principle
- Performance Indicator (PI): A further sub-division of the Principle

- Scoring Issue (SI): A sub-division of the PI into related but different topics. Each PI has one or more scoring issues against which the fishery is assessed at the SG 60, 80, and 100 levels.

The detailed assessment tree used in this assessment is included in Appendix 1.

Figure 47: The assessment tree structure.



4.4 Evaluation Processes and Techniques

Site visits to the fishery were performed by the assessment team of DNV G and consultations were done with interested stakeholders. The performance indicators and the pertaining scoring systems were evaluated, and it was judged if the fishery meets the requirements for MSC certification.

To fulfil the requirements for certification the following minimum scores are required:

> The fishery must obtain a score of 80 or more for each of the three MSC Principles, based on the weighted aggregate scores for all Performance Indicators under each Criterion in each Principle.
>
> The fishery must obtain a score of 60 or more for each Performance Indicator under each Criterion in each Principle.

Even though a fishery fulfils the criteria for certification, there may still be some important potential risks to future sustainability that are revealed during assessment. These are performance indicators that score less than 80, but more than 60. To be granted a MSC fishery certificate the client must agree to further improvements to raise the score to 80. The certification body (here DNV GL) sets a timescale for the fishery to improve the relevant areas, so that the certification process can continue.

Default performance indicators and the scorings given in the evaluation are enclosed in the section 6.2.

4.4.1 Site Visits

Relevant stakeholders have been identified and stakeholder meetings were scheduled and carried out as planned in Reykjavik (Iceland) in November 2017. Persons consulted and key issues discussed during these site-visits are outlined in Table 32. Information gathered was used as a basis for this report and is presented throughout several chapters and in the scoring tables.

Table 32 Itinerary of field activities

Date	Name and affiliation Location of the meeting	Summary of information obtained. The following topics were included in the agenda for the meetings.
Tuesday 28.11.2017	Client: Erla Kristinsdottir Kristinn Hjálmarsson Jon E. Halldorsson (remote) Venue: Client office – ISF Offices –Grandagarði 16, Reykjavik	1. Update on ISF 2. Review of fishing operations: • Fishing season • Fishing area • Gear used • Historical fishing levels (quotas and catches) 3. Review of impact on ecosystem: • List of all by-catch of fish species: (species and quantities) • By-catch of marine mammals, ETP species, birds. • List of commercial/non-commercial species which are usually discarded (quantities/if known) • Loss of fishing gear 4. Compliance with rules and regulations • Disputes with national/ international authorities for the last 5 years. • Records of sanctions and penalties (if any). 5. Traceability: • Review of traceability system on board and at landing • Labelling of products • First point of landing • First point of sale • Main products • Main markets

Date	Name and affiliation Location of the meeting	Summary of information obtained. The following topics were included in the agenda for the meetings.
Wednesday 29.11.2017	Directorate of Fisheries: Sævar Guðmundsson Þorsteinn Hilmarsson Venue: Dalshrauni 1, 220 Hafnarfjörður	Inspection and monitoring • Control, surveillance and monitoring routines/regulations applied to the fishery in (area) • Logbooks: recording of non-commercial species • Significant discrepancies found at landing control. • Quota and level of catches (2010-2012) • Observed fishing patterns (gear used, fishing area, number of boats, fishing season). • Level of slipping/discards in the fisheries. • Fishermen's compliance with laws and regulations. • Consultation and decision-making process • Mechanisms for resolution of legal disputes • Review of regulations for the fisheries • Harvest strategy for the target species • Long-term objectives for the fisheries • Strategy for minimising or eliminating ETP by-catch • Strategy in scientific research. • Research programmes for fishery under assessment • Strategy and plans for protection of sensitive habitats
Friday 24.11.2017	Marine and Freshwater Research Institute: Guðmundur Þórðarson Venue: Skype meeting	• Stock status, stock structure and recruitment • Review of Limit and Target reference points established for the stock • Approach to stock assessments • Sampling programes and level of sampling • Level of discards (composition of species, quantities) • Level of by-catch (composition of species, quantities) • Monitoring programmes for ETP species. • Impact of fisheries on ecosystem • Impact of fisheries on marine habitats • Long term objectives and fishery specific objectives.
Wednesday 29.11.2017	Ministry of Industries and Innovation, Department of Fisheries and Aquaculture: Annas Jón Sigmundsson Brynhildur Benedicktdottir Venue: Skúlagötu 4, 150 Reykjavík.	Fisheries Management • Consultation and decision-making process • International negotiations • Mechanisms for resolution of legal disputes • Review of regulations for the fishery in (area) • Harvest strategy for shrimp • Long-term objectives for the fisheries • Strategy for minimising or eliminating ETP by-catch • Strategy in scientific research. • Research programmes for fishery under assessment • Strategy and plans for protection of sensitive habitats

4.4.2 Consultations

4.4.2.1 Site visit consultations

The assessment team met with relevant stakeholders as outlined in the table above. Information gathered is presented in this report and in the enclosed scoring tables.

4.4.2.2 Process consultations

Several stakeholders have been identified and contacted during the assessment of the Northern shrimp fishery.

Information was made publicly available at different stages of the assessment (Table 33). Notifications on the MSC website (www.msc.org) were distributed to listed stakeholders in directed mails.

Table 33 Process announcements and consultations

Consultation subject	Consultation date	Consultation channels
Announcement of full assessment and assessment team	2017-10-24	Msc.org and e-mails
Notification of assessment timeline	2017-10-24	Msc.org
Public comment draft report	2018-08-16	Msc.org and e-mails
Final report		
Public certification report		

4.4.3 Evaluation Techniques

4.4.3.1 Announcements

The assessment was announced at MSC.org to reach international stakeholders and e-mails were used to reach local stakeholders.

At the beginning of the full-assessment, the CAB compiled a stakeholder list based on a guidance from the client and existing stakeholder list from the full-assessment and subsequent surveillances. The list covers 108 stakeholders and has been used at every stage of the consultation process undertaken for this fishery.

4.4.3.2 Methodology used

The assessment was made against the MSC Principles and Criteria for Sustainable Fishing v. 1.1. The methodology applied is specified in the MSC Certification Requirements, Version 2.0 (1st October 2014). The MSC Full Assessment Reporting Template v2.0 is used as basis for this report. assessment team proposed the use of the Default Assessment Tree as the main assessment framework. No comments or objections were received and therefore the Default Assessment Tree was used.

4.4.3.3 Scoring process

After all relevant information was compiled and analysed, the assessment team scored the Unit of Assessment against the Performance Indicator Scoring Guideposts (PISGs) in the final tree. The team discussed evidence together, weighed up the balance of evidence and used their judgement to agree on a final score following MSC FCR processes and based on consensus.

Preliminary scoring was made in meetings in site after the stakeholder meetings. The report was then prepared and the team jointly agreed on the final scorings.

In Principle 1 and 2 the scoring may include PI with multiple scoring elements. Scoring is then applied to the individual scoring elements and the overall score for the PI is determined based on

the score of the different scoring elements. Scoring elements considered in this assessment are listed in Table 34.

In order to fulfil the requirements for certification the following minimum scores are required:

- The fishery must obtain a score of 80 or more for each of the three MSC Principles, based on the weighted aggregate scores for all Performance Indicators under each Principle.
- The fishery must obtain a score of 60 or more for each individual scoring issue under each Performance Indicator in each Principle.

The final scores are based on group consensus within the assessment team. The assessment team will recommend certification where the weighted average score is 80 or more for all the three Principles, and were all individual scoring issues are met at the SG60 level.

Conditions are set where the fishery fails to achieve a score of 80 to any Performance Indicators. Conditions with milestones are set to result in improved performance to at least the 80 level within a period set by the assessment team. The client is required to provide a client action plan to be accepted by the assessment team. The client action plan shall detail:

- how conditions and milestones will be addressed
- who will address the conditions
- the specified time period within which the conditions and milestones will be addressed
- how the action(s) is expected to improve the performance of the UoA
- how the CAB will assess outcomes and milestones in each subsequent surveillance or assessment
- how progress to meeting conditions will be shown to CABs.

According to MSC CR v2.0, SA 3.4.1, a species shall be considered main if: The catch of a species by the UoA comprises 5% or more by weight of the total catch of all species by the UoA or if the species is classified as 'Less resilient' and the catch of the species by the UoA comprises 2% or more by weight of the total catch of all species by the UoA. Landings by all Icelandic vessels is known thanks to the thorough landing system and landing obligation which was implemented in 1973. The Data deficient column refers to those species where stock status is unknown.

Table 34 Scoring elements

Component	Scoring elements	Main / not main	Justification for main/not main [primary and secondary species]	Data-deficient or not
P1	Prawn	N/A	N/A	No
Primary	Cod	Main	>5% of the catch	No
Primary	Greenland halibut	Main	>5% of the catch	No
Primary	Beaked redfish	Minor	<5% of the catch	No
Primary	Golden redfish	Minor	<5% of the catch	No
Primary	Greater silver smelt	Minor	<5% of the catch	No
Primary	Haddock	Minor	<5% of the catch	No
Primary	Saithe	Minor	<5% of the catch	No
Primary	Witch	Minor	<5% of the catch	No
Primary	European plaice	Minor	<5% of the catch	No
Primary	Ling	Minor	<5% of the catch	No
Primary	Atlantic wolfish	Minor	<5% of the catch	No

Component	Scoring elements	Main / not main	Justification for main/not main [primary and secondary species]	Data-deficient or not
Primary	Blue ling	Minor	<5% of the catch	No
Primary	Anglerfish	Minor	<5% of the catch	No
Primary	Lemon sole	Minor	<5% of the catch	No
Primary	Tusk	Minor	<5% of the catch	No
Secondary	Long rough dab	Minor	<5% of the catch	No
Secondary	Starry ray	Minor	<5% of the catch	Yes
Secondary	Spotted wolfish	Minor	<5% of the catch	No
Secondary	Black scabbardfish	Minor	<5% of the catch	No
Secondary	Skate (*Hypotremate spp*.)	Minor	<5% of the catch	Yes
Secondary	Greenland shark	Minor	<5% of the catch	Yes
Secondary	Shagreen skate	Minor	<5% of the catch	Yes
Secondary	Lumpfish	Minor	<5% of the catch	No
Secondary	Whiting (Merling)	Minor	<5% of the catch	No
ETP	Atlantic halibut	N/A	N/A	No

4.4.3.4 Risk Based Framework

The RBF has not been used to score any PI of this assessment.

5 TRACEABILITY

5.1 Eligibility Date

Products from the certified fishery are eligible to be sold as MSC certified or bear the MSC ecolabel from 2018-05-16 PENDING APPROVAL OF VARIATION REQUEST.

The eligibility date is the 2018-05-16 [PENDING APPROVAL OF VARIATION REQUEST]

The eligibility date is set before the certification date. Any fish harvested after the eligibility date and sold or stored as under-MSC-assessment fish shall be handled in conformity with relevant under-MSC-assessment product requirements in the MSC Chain of Custody standard.

The traceability and segregation systems in the fishery is in place and implemented by the eligibility date.

5.2 Traceability within the Fishery

In general, the fishery is restricted to members of the client group, ISF, which consist of the whole Icelandic fleet fishing for shrimps in Iceland. Other vessels are not allowed to enter the fishing grounds. Fishing activities within the Iceland EEZ is monitored by the coast guard, including through the use of VMS (see further description under chapter 3.5.5 Enforcement and compliance). This means that there is no risk of non-certified vessel to enter the fishery.

On board the Icelandic vessels, the geographic location of the fishing activities is recorded in catch diaries. The catch stored in tubs, iced (chilled) and labelled (see Figure 48).

Figure 48: Labelling of catch

Tubs with labels (numbering, indicating date)

LESTARKORT

MÚLABERG

Veiðif. 2 2018 Rækja

	B	C	D	E	F	G	H	I	J	K	L
3	Dags.	Veiðid.	veiðisv	Rækja	Undirm.	Ysa		Þorskur	ufsi	Þorsk	Hlýri
4		Dagm.						Rammi		mark	
5	9.jan	1	617	5							
6	10.jan	2	669	2				2			
7	11.jan	3	719/720	6				6			
8	12.jan	4	719	2							
9	13.jan	5	719/768	9				1			
10	14.jan	6	667	5				0,5			

16/02/2018 14:06

Landing record. Tub label number shown in column C which links the tub to the date in column B.

Products are sold to factories at the landing sites and first point of sales is upon landing.

Landing sites: Landings and landing sites for each vessel are recorded. Landing sites are: Akureyri. Bíldudalur, Bolungarvík, Dalvik, Grundarfjörður, Hólmavík, Húsavík, Ísafjörður, Keflavik, Ólafsvík, Patreksfjörður, Reyðarfjörður, Reykjavik, Rif, Sandgerði, Sauðárkrókur, Siglufjörður, Skagaströnd,

Súðavík, Þingeyri and Þorlákshöfn (2014-2017, Source: Client and Fiskistofa). The locations of the landing sites are shown in the map below.

Figure 49: Landing sites for ISF shrimp. Source: Client and Fiskistofa.

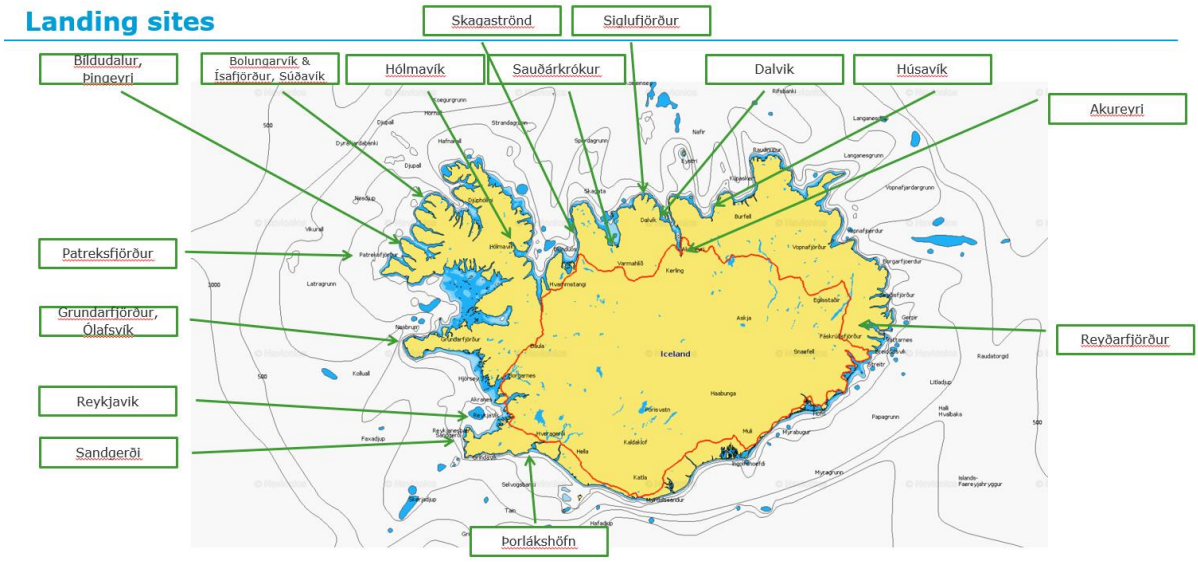


Table 35: Overview of which landing sites that are used for the difference units of certification. Source: Client.

	UoC1	UoC2	UoC3	UoC4	UoC5	UoC6	UoC7
Landing sites:	Offshore	Eldey	Snæfellsnes	Arnarfjörður	Ísafjarðardjúp	Skjálfandi	Húnaflói, Öxarfjörður and Skagafjörður
Akureyri	■					■	■
Bíldudalur	■			■			
Bolungarvík	■				■		
Dalvik	■					■	■
Grundarfjörður	■	■	■				
Hólmavík	■					■	■
Húsavík	■					■	■
Ísafjörður	■				■		
Keflavik	■	■					
Ólafsvík	■	■					
Patreksfjörður	■						
Reyðarfjörður	■						
Reykjavik	■	■					
Rif							
Sandgerði	■	■					
Sauðárkrókur	■					■	■
Siglufjörður	■					■	■
Skagaströnd	■					■	■
Súðavík	■				■		
Þingeyri	■			■			
Þorlákshöfn	■	■					
Hvammstangi						■	■

5.2.1 Traceability risk factors

Table 36 Traceability risk factors within the fishery

Traceability factor	Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)
Potential for non-certified gear/s to be used within the fishery	Low risk: only the certified gear is useful for fishing shrimps
Potential for vessels from the uoc to fish outside the uoc or in different geographical areas (on the same trips or different trips)	Low risk: - the vessels are monitored by the Coast Guard and VMS live monitoring is used on a continuous basis. This also applies to UoC 6 and 7 which has passed the assessment for certification. - UoC 6 and 7 are currently closed for fishing. - The fishery is conducted on a day-trip basis which means that vessels fishing in UoC 2,3,4 and 5 do not have the time to also fish in UoC 6 and 7 during the same day. - Landing data from the fishery directorate show that vessels fish within one UoC in each trip. Figures show exceptional cases of vessels fishing in two UoC on a trip, but these are not within the closed UoCs
Potential for vessels outside of the UoC or client group fishing the same stock	Low risk: vessels outside the UoC are not allowed (by law and enforcement) to target shrimps in the area. The vessels are monitored by the Coast Guard and VMS live monitoring is used on a continuous basis. The VMS monitoring is done on a 24/7 basis at the coast guard monitoring centre.
Risks of mixing between certified and non-certified catch during storage, transport, or handling activities (including transport at sea and on land, points of landing, and sales at auction)	Low risk: - Only certified products enter the vessels. - Landings from outside the UoCs does not take place (as UoC 6 &7 are closed) Products landed are packed and labelled onboard and stored in separate and labelled units.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent chain of custody)	Low risk: - only certified products enter the vessels. - Landings from outside the UoCs does not currently take place (as UoC 6 &7 are closed) - Products landed are stored in separate units and labelled.
Risks of mixing between certified and non-certified catch during transhipment	Low risk. No transhipment takes place.
Any other risks of substitution between fish from the uoc (certified catch) and fish from outside this unit (non-certified catch) before subsequent chain of custody is required	No other risks known.

5.3 Eligibility to Enter Further Chains of Custody

Table 37 Eligibility to enter further chains of custody

Conclusion and determination	Northern shrimp caught by and processed on board Icelandic vessels engaged in the Northern shrimp fishery are eligible to enter further certified chains of custody and be sold as MSC certified or carry the MSC ecolabel.
List of parties, or category of parties, eligible to use the fishery certificate and sell product as MSC certified	Icelandic vessels (bottom trawls targeting northern shrimp, inshore and offshore) which are current members of Icelandic Sustainable Fisheries, as per list published on MSC website, with valid licenses to fish Northern shrimp in Icelandic EZZ, are eligible to enter further certified chains of custody and carry MSC logo in case of successful certification. Appendix shows the list of vessels in 2016 and 2017. The exporter of fish to carry the MSC labeling needs to be an ISF member. Only ISF members/certificate sharers can export products to carry the MSC logo. The client will provide DNV-GL with a current list of members of Icelandic Sustainable Fisheries eligible to use the fishery certificate. This list will be published in MSC website. An updated of the list of vessels is also available at the Directorate of Fisheries upon request**.**
Point of intended change of ownership of product	Fishing ports where registration of landings is carried out and weight registered.
List of eligible landing points (if relevant)	Landing sites are: Akureyri. Bíldudalur, Bolungarvík, Dalvik, Grundarfjörður, Hólmavík, Húsavík, Ísafjörður, Keflavik, Ólafsvík, Patreksfjörður, Reyðarfjörður, Reykjavik, Rif, Sandgerði, Sauðárkrókur, Siglufjörður, Skagaströnd, Súðavík, Þingeyr and Þorlákshöfn.
Point from which subsequent Chain of Custody is required	The chain of custody will start at the point of landing.

5.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to Enter Further Chains of Custody

IPI stocks are not relevant for these fisheries.

6 EVALUATION RESULTS

6.1 Principle Level Scores

Table 38 Final Principle scores for Northern shrimp, inshore and offshore, bottom trawl

Units of Certification			**Principle 1 Target species**	**Principle 2 Ecosystem**	**Principle 3 Management system**
Offshore	Offshore (north of Iceland, within ICES area Va2)	UoC 1	81.7	87.7	94.4
Inshore	Eldey	UoC 2	80.0	91.3	94.4
	Snæfellsnes	UoC 3	83.3	91.3	94.4
	Arnarfjörður	UoC 4	80.0	91.3	94.4
	Ísafjarðardjúp	UoC 5	81.7	91.3	94.4
	Skjálfandi	UoC 6	<60	91.3	94.4
	Húnaflói, Öxarfjörður and Skagafjörður	UoC 7	<60	91.3	94.4

6.2 Summary of PI Level Scores

Table 39: **Summary of scores.**

Principle	Component	Performance Indicator (PI)		UoC1	UoC2	UoC3	UoC4	UoC5	UoC6	UoC7
One	Outcome	1.1.1	Stock status	70	60	80	60	70	<60	<60
	Outcome	1.1.2	Stock rebuilding	80	80	N/A	80	80	80	80
	Management	1.2.1	Harvest strategy	85	85	85	85	85	85	85
		1.2.2	Harvest control rules & tools	85	85	85	85	85	85	85
		1.2.3	Information & monitoring	90	90	90	90	90	90	90
		1.2.4	Assessment of stock status	80	80	80	80	80	80	<60
Two	Primary species	2.1.1	Outcome	100	100					
		2.1.2	Management strategy	95	100					
		2.1.3	Information/Monitoring	100	100					
	Secondary species	2.2.1	Outcome	90	100					
		2.2.2	Management strategy	85	100					
		2.2.3	Information/Monitoring	95	100					
	ETP species	2.3.1	Outcome	85	85					
		2.3.2	Management strategy	90	90					
		2.3.3	Information strategy	80	80					
	Habitats	2.4.1	Outcome	70	80					

Principle	Component	Performance Indicator (PI)		UoC1	UoC2	UoC3	UoC4	UoC5	UoC6	UoC7
		2.4.2	Management strategy	75	75					
		2.4.3	Information	85	85					
	Ecosystem	2.5.1	Outcome	80	80					
		2.5.2	Management	95	95					
		2.5.3	Information	90	100					
Three	Governance and policy	3.1.1	Legal &/or customary framework	100						
		3.1.2	Consultation, roles & responsibilities	100						
		3.1.3	Long term objectives	100						
	Fishery specific management system	3.2.1	Fishery specific objectives	80						
		3.2.2	Decision making processes	95						
		3.2.3	Compliance & enforcement	100						
		3.2.4	Monitoring & management performance evaluation	80						

6.3 Summary of Conditions

Table 40 Summary of Conditions

Condition number	Condition	Performance indicator	Related to previously raised condition?
1	By the 4th surveillance audit evidence should be provided for all UoCs (UoCs 1,2,4 and 5 that the stock is at or fluctuating around a level consistent with MSY.	1.1.1	N/A
2	There is a requirement to develop appropriate reference points (applies for UoC 7 only). This condition is not binding as UoC 7 fails to meet SG60.	1.2.4	N/A
3	By the fourth surveillance audit necessary conservation and management measures for sponge aggregations shall be in place and implemented, such that the trawl fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function (applies for UoC 1 only)	2.4.1	N/A
4	By the 4th surveillance audit there must be evidence of the implementation of a partial strategy designed to ensure the UoA does not pose a risk of serious or irreversible harm to the different types of encountered habitats, paying special attention to VME, so that the partial strategy is expected to achieve the Habitat Outcome 80 level of performance or above. (Applies to all UoCs).	2.4.2	N/A

6.4 Recommendations

Table 41 Summary of Recommendations

Recommendation number	Recommendation	Performance indicator
1	It is recommended that stock biomass estimates from the stock surveys are presented with confidence intervals around those estimates.	1.2.3
2	It is recommended that annual stock assessment reports should incorporate a temperature or ocean climate index.	1.2.4
3	It is recommended that regular external peer reviews of the stock assessments should be undertaken.	1.2.4
4	Different Principle 2 PI (secondary, ETP species and habitat) would benefit from UoA records of non-fatal interactions with halibuts, sharks, skates, rays and ETP marine mammals sightings. Records on benthic species would benefit the score of bottom trawlers in PI related to habitats	2.2.1, 2.3.1, 2.4.1
5	It is recommended that an estimation of the areal footprint of the fishery in relation to the fishing grounds is calculated, in order to facilitate the estimation of the habitat impact of the fishery.	2.4.3

6.5 Determination, Formal Conclusion and Agreement

[PCDR: Draft determination with supporting rationale.

FR: Final determination

PCR: Formal statement from decision making entity]

Draft determination:

The ISF Northern shrimp fishery (inshore and offshore), UoCs 1, 2, 3, 4 and 5, achieved a score of 80 or more for each of the three MSC Principles and did not score under 60 for any of the set MSC criteria.

Based on the evaluation of the fishery presented in this report, the assessment team recommends the certification of the Northern shrimp (inshore and offshore) fishery (UoCs 1 ,2, 3, 4 and 5) for the ISF (Icelandic Sustainable Fisheries) client.

As the fishery achieved a score of below 80 against 4 scoring indicators, the assessment team has set 4 conditions for the continued certification that the client is required to address. However, condition 2 is not binding as UoC 7 fails to meet the SG60 requirements. The conditions are applicable to improve performance to at least the 80 level within the period set by the assessment team. The assessment team also makes five recommendations for the fishery.

The assessment team therefore recommends the certification of the Icelandic Northern shrimp fishery (inshore and offshore), with 3 conditions, for the client, Iceland Sustainable Fisheries.

6.6 Changes in the fishery prior to and since Pre-Assessment

There are no major changes to highlight.

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APPENDIX 1 SCORING AND RATIONALES

Appendix 1.1 Performance Indicator Scores and Rationale

Principle 1

Evaluation Table for PI 1.1.1 – Stock status

PI 1.1.1		**The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing**		
Scoring Issue		SG 60	SG 80	SG 100
a	Stock status relative to recruitment impairment			
	Guide post	It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.
	UoC 1	Y	Y	N
	UoC 2	Y	N	N
	UoC 3	Y	Y	N
	UoC 4	Y	N	N
	UoC 5	Y	Y	N
	UoC 6	N	N	N
	UoC 7	N	N	N
	Justification	UoC 1. Offshore fishery. The fishable stock biomass has been above Ilim, a proxy for Blim, since the start of the fishery. As Ilim is considered to be a precautionary reference point above the point of recruitment impairment (PRI), and the CPUE index in 2016 was around the average observed over the last 25 years, the stock can be considered to be highly likely to be above the PRI, so the SG80 is met. As the fishable biomass index has been declining in recent years and the juvenile index is at a lower level than in previous years, it cannot be concluded that there is a high degree of certainty that the stock is above the PRI. SG100 is not met. UoC 2 Eldey inshore fishery. The total stock biomass dropped below Ilim, a proxy for Blim, in 2017 for the first time, having been above Ilim for the previous four years. However Ilim is considered to be a precautionary reference point above the point of recruitment impairment (PRI), and the CPUE index in 2016 was around the average observed over the last 25 years. The assessment team concluded that it is likely that the stock is above the point where recruitment would be impaired (PRI). SG60 is met. In addition to the decline in the total stock biomass index, the index of juvenile abundance is also very low, so it cannot be concluded that the stock is highly likely to be above the PRI. SG80 is		

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
		not met. UoC 3 Snæfellsnes inshore fishery. The total stock biomass has been well above Ilim, a proxy for Blim, for the last 10 years, and as Ilim is considered to be a precautionary reference point above the point of recruitment impairment (PRI), and the CPUE index in 2016 was around the average observed over the last 15 years, the stock can be considered to be highly likely to be above the PRI. The SG80 is met. As the total biomass declined significantly in 2017 and the juvenile index has been very low since 2014, it cannot be concluded that there is a high degree of certainty that the stock is above the PRI. SG100 is not met. UoC 4 Arnarfjörður inshore fishery. The most recent survey showed that the fishable stock biomass index has been declining since 2008, and in 2017 declined below Ilim, a proxy for Blim. Ilim is considered to be a precautionary reference point above the point of recruitment impairment (PRI). The index has been above Ilim in recent years, and the stock has demonstrably recovered from a similar level of stock in 2005 as observed currently. In addition the CPUE index in 2016 was still at a relatively high level, around the average observed over the last 15 years, and so all the evidence suggests that the stock can be considered to be likely to be above the PRI. The SG60 is met. Shrimp are now found within a relatively small proportion of the fjord in comparison with earlier years, and so the maintenance of high CPUE may be due to fishing occurring only on high densities of shrimps within the innermost areas of the fjord. It cannot be concluded therefore that the stock is highly likely to be above the PRI. SG80 is not met. UoC 5 Ísafjarðardjúp inshore fishery. The autumn surveys show a continuous decline in fishable stock biomass since 2013 culminating in the biomass index falling below Ilim, a proxy for Blim in 2017. At this point fishery managers closed the fishery. However in the spring survey in 2018 the fishable biomass index had recovered to be above Ilim, and a TAC was subsequently set for 2017/18. The juvenile biomass index was low in the autumn survey but had recovered significantly in the spring survey in 2018. With the biomass index above Ilim, the CPUE at a relatively high level in comparison with historical data, the stock can be considered to be highly likely to be above the PRI. The SG80 is met. As the stock biomass index has only recently recovered to be above Ilim, and high CPUEs are observed because the fishery targets only the high density patches of shrimp in the innermost part of the fjord, it cannot be concluded that there is a high degree of certainty that the stock is above the PRI. SG100 is not met. **UoC 6 Skjálfandi inshore fishery. The total stock index in 2016 (no survey was conducted in 2017) in Skjálfandi was very low (** Figure 18), and although some fishing was permitted in Skjálfandi in fishing year 2015/2016, the index in 2016 was below the Blim, and therefore the fishery was closed. The fishery has been opened only twice since the 1988/89 fishing season. As the stock has been consistently below Ilim, a proxy for Blim, it cannot be concluded that it is likely that the stock is above the PRI. The SG60 is not met. **UoC 7 Húnaflói, Öxarfjörður and Skagafjörður inshore fishery. In the most recent stock survey in 2016 (no survey was conducted in 2017),**		

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
		the total stock index in Húnaflói and Skagafjörður was zero, and in Öxarfjörður was very low (Figure 18). In Öxarfjörður there was a significant stock observed in the 2012 stock survey, but the stock has since declined to levels lower than anything observed in the current time series from 1990. In Húnaflói and Skagafjörður, there has been no significant stock since the late 1990s. For all three fjords, there are no agreed values for Ilim, but it cannot be concluded that it is likely that the stock is above the PRI. The SG60 is not met.		
b	Stock status in relation to achievement of MSY			
	Guide post		The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	UoC 1		N	N
	UoC 2		N	N
	UoC 3		Y	N
	UoC 4		N	N
	UoC 5		N	N
	UoC 6		N	N
	UoC 7		N	N
	Justification	For all UoCs, there is no estimate of Bmsy, and so it is impossible to directly evaluate the status of the stocks in relation to Bmsy. In addition, shrimp stock dynamics are strongly influenced by predation and environmental influences, and therefore Bmsy will not be a constant and may change dependent on the level of predation. However stock status can be evaluated in relation to Ilim, a proxy for Blim, which provides some indication of the current stock biomass index in relation to a level consistent with MSY, and the current Fproxy can be evaluated in relation to the target Fproxy, which represents a low exploitation rate that should over time move the stock towards a level which could be considered consistent with MSY. <u>UoC 1. Offshore fishery</u>. The stock biomass index has been above the Ilim for the last 25-30 years of the fishery. From 1990 to 2003, the stock biomass index was much higher than that observed in the most recent years, but the much higher predation rate now seen in the offshore area may preclude the stock		

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue	SG 60	SG 80	SG 100
	recovering to similar levels unless predation pressure is reduced. Fproxy has fluctuated around the target Fproxy for the last ten years, but in the absence of any quantitative analysis of the relationship between predator abundance and shrimp stock dynamics, the assessment team could not conclude that the stock is fluctuating around a level consistent with MSY. SG80 is not met. UoC 3 Snæfellsnes inshore fishery. The stock biomass index over the last few years has been at or above the average observed in the fishery from 1990 to 2016, and with Fproxy during the last three years being below the target Fproxy, the assessment team concluded that the stock is fluctuating around a level consistent with MSY. The SG80 is met. For UoCs 2, 4, 5, 6 and 7 Eldey, Arnarfjörður, Ísafjarðardjúp, Skjálfandi and Húnaflói, Öxarfjörður and Skagafjörður inshore fisheries, the stock biomass index is just above or below Ilim, and therefore it can be concluded that the stock is not fluctuating around a level consistent with MSY. The SG80 is not met therefore.		
References	MFRI, 2016b. Inshore northern shrimp, *Pandalus borealis* – in Arnarfjörður, Ísafjarðardjúp, Skjálfandi, Húnaflói, Öxarfjörður and Skagafjörður. State of Marine Stocks and Advice 2016. Marine and Freshwater Institute, 1 November 2016. MFRI, 2017b. Offshore northern shrimp, *Pandalus borealis*. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 31 July 2017. MFRI, 2017d. Inshore northern shrimp, *Pandalus borealis* – in the Eldey area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 20 June 2017. MFRI, 2017f. Inshore northern shrimp, *Pandalus borealis* – in the Snæfellsnes area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 2 May 2017. MFRI, 2017h. Inshore northern shrimp, *Pandalus borealis* – in the Arnarfjörður area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 16 November 2017. MFRI, 2017j. Inshore northern shrimp, *Pandalus borealis* – in the Ísafjarðardjúp area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 8 March 2018.		

Stock Status relative to Reference Points			
	Type of reference point	Value of reference point	Current stock status relative to reference point
Reference point used in scoring stock relative to	Ilim, a proxy for Blim	UoC 1: 12,200 tonnes UoC 2: 300 tonnes UoC 3: 562 tonnes	25,000/Ilim=2.05 246/Ilim = 0.82 1054/Ilim = 1.88

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue	SG 60	SG 80	SG 100
PRI (SIa)		UoC 4: 390 tonnes UoC 5: 604 tonnes UoC 6: 277 Tonnes UoC 7: not defined	140/Ilim = 0.36 806/Ilim = 1.33 80/Ilim = 0.29 N/A
Reference point used in scoring stock relative to MSY (SIb)	No biomass target reference point has been set. Target Fproxy	UoC 1: Fproxy = 0.2 UoC 2: Fproxy = 0.5 UoC 3: Fproxy = 0.5 UoC4: Fproxy = 0.346 UoC 5: Fproxy = 0.5 UoC 6: not defined UoC 7: not defined	0.16/target Fproxy =0.80 0.43/target Fproxy =0.86 0.47/target Fproxy =0.94 0.26/target Fproxy =0.75 0.51/target Fproxy =1.02 N/A N/A

OVERALL PERFORMANCE INDICATOR SCORE:	**UoC 1 70**
	UoC 2 60
	UoC 3 80
	UoC 4 60
	UoC 5 70
	UoC 6 <60
	UoC 7 <60
CONDITION NUMBER (if relevant):	**1**

Evaluation Table for PI 1.1.2 – Stock rebuilding – UoCs 1,2,4,5,6,7

PI 1.1.2		**Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Rebuilding timeframes**			
	Guide post	A rebuilding timeframe is specified for the stock that is **the shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.
	All UoCs	Y		N
	Justification	UoCs 1, 2, 4, 5, 6 & 7. The key element of the rebuilding plan for all UoCs is that the fishery is closed if the stock biomass indicator declines below Ilim, the proxy for Blim. When the stock biomass indicator recovers to be above Ilim, the fishery is re-opened but at a highly precautionary exploitation rate based on the target Fproxy, which should allow the stock biomass to increase towards a level consistent with MSY. MSC Guidance for the FCR (GSA2.2.4) states that a reasonable approximation for generation time, when 0.1 ≤ M ≤ 2 is $1/M + A_{m50}$ where A_{m50} is the age at 50% maturity, and M is natural mortality rate. Skúladóttir and Pétursson (1999) estimated that first female maturity of *P. borealis* in Icelandic waters is 5-6 years, but may be only 3 years in some inshore areas where the water temperature is higher. Generation time of *Pandalus borealis* in Icelandic waters could therefore be as low as 4-5 years, but is more likely to be round 7 years, and although there is no explicit rebuilding timeframe stated for the shrimp stocks which are below Blim, the stocks should recover within 2 generations under the highly precautionary exploitation rates that are implemented within the fishery. The SG60 is met. Whilst the precautionary exploitation rates required under the rebuilding plan should ensure that the stocks recover quickly, there is at present no analytical stock assessment model for shrimp which can fully evaluate the time taken to rebuild the stock. The target Fproxy that is applied when the stocks are above Ilim is considered to be highly precautionary, but it is not clearly understood how this relates to Fmsy, the fishing mortality rate that should ensure that the stock recovers to MSY. Nevertheless the Fproxy value has been set based on historical time series of catch/biomass ratios observed in the fishery when the stock was at a high level. The general approach is to set Fproxy at a precautionary value below that observed when the stock was at high levels, i.e. when the observed exploitation rate was clearly sustainable. Setting TACs based on a value of Fproxy less than the target Fproxy would rebuild the stock in a shorter timeframe than the current rebuilding strategy. The SG100 is not met therefore.		

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
b	Rebuilding evaluation			
	Guide post	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is **strong** evidence that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.
	All UoCs	Y	Y	N
	Justification	UoCs 1, 2, 4, 5, 6 & 7. There is an effective monitoring programme in place through annual stock surveys which provide an estimate of stock biomass, which along with annual catch statistics provide an estimate of Fproxy and so permit an evaluation of whether the rebuilding strategies are working. The SG60 is met. For all UoCs there is no evidence at present that stocks are being rebuilt because most stocks have only just fallen below Ilim, and at present there is no analytical stock assessment model for shrimp which can fully evaluate the time taken to rebuild the stock. However the closure of the fishery when the stock declines below Ilim, the precautionary exploitation rate permitted when the fishery is re-opened, the current low levels of Fproxy observed in the fisheries, and previous performance when stocks have been rebuilt, provide evidence that the stock is likely to be rebuilt within two generations. The SG80 is met. Whilst TACs are currently set based on precautionary exploitation rates, there are presently high rates of predation in the shrimp stock and in the absence of any quantitative analysis of the relationship between predator abundance and shrimp stock dynamics, it is difficult to fully evaluate whether the stock will be rebuilt in two generations. In addition, temperature may be an important factor driving Pandalus stock dynamics, and as with predation, in the absence of a time series of temperature or ocean climate index and a quantitative analysis of the effect of such an index on Pandalus recruitment, it is difficult to assess how long it will take for the stock to recover. The SG100 is not met therefore.		
References		ICES. 2012. Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. (http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/ADHOC/DLS%20Guidance%20Report%202012.pdf) MFRI, 2016b. Inshore northern shrimp, *Pandalus borealis* – in Arnarfjörður, Ísafjarðardjúp, Skjálfandi, Húnaflói, Öxarfjörður and Skagafjörður. State of Marine Stocks and Advice 2016. Marine and Freshwater Institute, 1 November 2016. MFRI, 2017b. Offshore northern shrimp, *Pandalus borealis*. State of Marine		

PI 1.1.2	Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe
	Stocks and Advice 2017. Marine and Freshwater Institute, 31 July 2017. MFRI, 2017d. Inshore northern shrimp, *Pandalus borealis* – in the Eldey area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 20 June 2017. MFRI, 2017f. Inshore northern shrimp, *Pandalus borealis* – in the Snæfellsnes area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 2 May 2017. MFRI, 2017h. Inshore northern shrimp, *Pandalus borealis* – in the Arnarfjörður area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 16 November 2017. MFRI, 2017j. Inshore northern shrimp, *Pandalus borealis* – in the Ísafjarðardjúp area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 8 March 2018. MSC, 2014. MSC Guidance for the Fisheries Certification Requirements v2.0. Skúladóttir, U. and Pétursson, G. 1999. Defining populations of northern shrimp, *Pandalus borealis* (Krøyer1938), in Icelandic waters using the maximum length and maturity ogive of females. Rit Fiskideildar 16: 247-262.
OVERALL PERFORMANCE INDICATOR SCORE: UoAs 1,2,4,5,6,7	**80**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guide post	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	Y	Y	Y
	Justification	The harvest strategy is underpinned by the Fisheries Management Act 1990 (revised in 2006) which states that the objective of fisheries management in Iceland is "to ensure conservation and efficient utilization of marine living resources in the Icelandic EEZ". There is a limit on the number of licensed vessels, but no restrictions on the number of days that vessels can fish. The key element of the harvest strategy is the setting of an annual TAC for each of the UoCs based on estimates of stock biomass from annual stock surveys using a target fishing mortality proxy (Fproxy) which is set at a precautionary level. In addition to an overall TAC, quotas are allocated to individual vessels for one fishing area only. Other elements of the harvest strategy include: - a minimum landing size (MLS) of 13mm carapace length (CL) - a prohibition on discarding of small shrimps - a minimum mesh size for the cod end of the shrimp trawl of 36mm - the incorporation of sorting grids in the trawls, which permit the escape of fish bycatch and which are mandatory in the offshore fishery (UoC1) but voluntary in the inshore fishery (UoCs2-7) - a limit on the size of vessel in the inshore fishery - closed areas to protect vulnerable habitats - closure of areas with high catch rates of shrimps under the MLS or high catches of small redfish, cod or halibut The harvest strategy includes a rigorous programme of monitoring stocks and fishing activity through annual stock surveys, electronic log books, mandatory VMS, independent weighing of landings and robust enforcement of regulations by the Directorate of Fisheries in collaboration with the Icelandic Coast Guard. An important element of the harvest strategy for the *P. borealis* fishery is the assessment of stock status against pre-determined reference points and subsequent harvest control rules. The harvest strategy is therefore clearly responsive to the state of the stock through the annual revision of TACs, the closure of the fishery if the stock drops below the precautionary reference point,		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		and the immediate closure of areas with high catches of small shrimps. The MLS, mesh size, the prohibition on discarding and the use of sorting grids and closure of areas with high catches of small shrimps all work together to ensure that exploitation rates on juvenile shrimps is minimised. Although there is no formal management plan in place, the harvest strategy is responsive to the state of the stock and clearly designed to ensure that exploitation rates are set at precautionary levels. The SG100 is met therefore.		
b	Harvest strategy evaluation			
	Guide post	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	Y	Y	N
	Justification	The key element of the harvest strategy is the setting of an annual TAC based on the adoption of a precautionary target Fproxy which ensures that exploitation rates remain at precautionary levels. Cross-checking of log book records, independent weighing of shrimps at landing points and sales notes confirm that TACs are not regularly exceeded. Stock surveys have been undertaken in all years for the various UoCs (except UoCs 6 & 7 in 2017) providing the stock biomass information required to implement the annual TACs. If stock biomass has fallen below the precautionary limit reference point, then the fishery has been closed. Closures required if the proportion of non-commercial-sized shrimps exceeds the threshold or bycatches of small redfish, cod or halibut exceed thresholds are implemented within a few hours through a robust observation and notification programme. The Directorate of Fisheries stated that there is a high degree of compliance with the regulations within the shrimp fishery. There is evidence therefore that the harvest strategy is achieving its objectives. The SG80 is met. As noted above, shrimp stocks have declined significantly in many UoCs in recent years to the point that the fishery has been closed. However the major reason for this decline is considered to be the high level of predation by cod and other predators, and the decline in stock biomass is not therefore due to a deficiency in the harvest strategy. The harvest strategy has not been fully evaluated through, for example, a management strategy evaluation (MSE) and therefore SG100 is not met.		
c	Harvest strategy monitoring			
	Guide post	Monitoring is in place that is expected to		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	There is effective monitoring in place for all UoCs. Annual stock surveys using commercial trawls provide estimates of stock biomass, size distribution and information on predator abundance, electronic log books and VMS are mandatory for all vessels, size distribution is monitored through a market sampling programme, and monitoring of landings is undertaken by official weigh-masters under the direction of the Directorate of Fisheries, in collaboration with the Coast Guard to ensure that quotas are not exceeded. All elements of the monitoring programme allow determination of whether the harvesting strategy is working. SG 60 is met therefore.		
d	Harvest strategy review			
	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			N
	Justification	There appears to be regular formal and informal consultation between stakeholder groups and the Ministry on the annual scientific recommendations by the Marine and Freshwater Research Institute and the setting of annual TACs, and on policies and regulatory issues such as technical conservation measures, but there does not appear to be a regular review of all elements of the harvest strategy. In the absence of a formal fisheries management plan for the *P. borealis* fishery, the assessment team could find no evidence that the full harvest strategy is periodically reviewed and improved. SG 100 is not met.		
e	Shark finning			
	Guide post	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	Sharks are not a target species and therefore this scoring issue is not scored.		
f	**Review of alternative measures**			
	Guide post	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		target stock.	target stock and they are implemented as appropriate.	target stock, and they are implemented, as appropriate.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	The minimum landing size (MLS), the minimum mesh size regulation, mandatory use of sorting grids in the offshore fishery (and voluntary use in the inshore fishery), move-on rules from areas of high numbers of small shrimps and subsequent closure of the areas, and the targeting of commercial-sized shrimps ensure that there is minimal unwanted catch of the target species. In addition, the prohibition of discarding means that there should be no unwanted catch of shrimps. Although there is a minimum landing size for shrimps, the prohibition of discarding, the technical conservation measures in place, and the targeting of larger commercial-sized shrimps by the fleet ensure that the minimum landing size is essentially redundant, except in relation to the move-on rule. All the above regulations are set out in the following website: https://www.reglugerd.is The assessment team concluded that there is no unwanted catch of the target species and therefore this scoring issue was not scored.		
References		Icelandic Fisheries Management Act 1990 (revised 2006) Regulations in the shrimp fishery implemented to reduce the unwanted catch of juvenile shrimps - https://www.reglugerd.is Summary of current closed areas: http://www.fiskistofa.is/media/aflatolur/regugerdir_fridanir_15022016.jpg MFRI. 2016a. Assessment of northern shrimp, *Pandalus borealis*, in Arnarfjörður, Ísafjarðardjúp, Skjálfandi, Húnaflói, Öxarfjörður and Skagafjörður. Marine and Freshwater Institute, 1 November 2016. MFRI. 2017a. Assessment of offshore northern shrimp, *Pandalus borealis*. Marine and Freshwater Institute, 31 July 2017. MFRI. 2017c. Assessment of northern shrimp, *Pandalus borealis*, in the Eldey area. Marine and Freshwater Institute, 20 June 2017. MFRI. 2017e. Assessment of northern shrimp, *Pandalus borealis*, in the Snæfellsnes area. Marine and Freshwater Institute, 2 May 2017. MFRI. 2017g. Assessment of northern shrimp, *Pandalus borealis*, in the Arnarfjörður area. Marine and Freshwater Institute, 16 November 2017. MFRI. 2017i. Assessment of northern shrimp, *Pandalus borealis*, in the Ísafjarðardjúp area. Marine and Freshwater Institute, 9 March 2018.		

OVERALL PERFORMANCE INDICATOR SCORE:	**All UoCs 85**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		**There are well defined and effective harvest control rules (HCRs) in place**		
Scoring Issue		SG 60	SG 80	SG 100
a	HCRs design and application			
	Guide post	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.
	Met?	Y	Y	N
	Justification	The most important harvest control rule (HCR) is the revision of the TAC on an annual basis in each UoC based upon the estimation of stock biomass from annual stock surveys before the start of the main season. The estimate of stock biomass permits an evaluation of stock status against the limit reference point, Ilim, a proxy for Blim, which has been set at a precautionary level considered to be above the point of recruitment impairment (PRI). The HCR states that if the estimated biomass is below the proxy for Blim, then the fishery will be closed ensuring there will be sufficient spawning stock biomass to provide recruitment in the following years. If the estimated biomass is above Blim, then the annual TAC will be fixed by multiplying the target Fproxy by the most recent biomass index value under the assumption that discarding is negligible. The target Fproxy (catch/survey biomass) is defined for each fishing area and is generally based upon setting the Fproxy at a lower level than that observed during periods when stock biomass was high and exploitation rates were clearly sustainable, and therefore continued fishing at the target Fproxy should allow sufficient escapement to generate continued increases in stock biomass. At present there is no upper or biomass target reference point defined for the shrimp stocks, and therefore the TAC is calculated as a simple proportion of the total biomass based upon the agreed Fproxy, whatever the estimate of biomass, i.e. there is a linear relationship between TAC and stock biomass index. The escapement biomass is therefore increased in proportion to stock size which should ensure a high probability of achieving the minimum amount of biomass left to spawn, which is a key element of sustainable harvest strategies for shrimp fisheries. As the target Fproxy is set at a precautionary level based on historical observed values, setting TACs based on the target Fproxy should over time move the stock towards a level which could be considered consistent with MSY. There are additional HCRs relating to the capture of small shrimp or bycatch species. If more than 30% of the shrimp catch is under the minimum landing size, the area is closed for a period of two weeks to prevent further capture of		

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		juvenile shrimps. There are also closures of fishing areas if bycatches of small redfish, cod or halibut exceed thresholds. It can be concluded that the HCRs are well-defined and ensure that catches are reduced as Ilim is approached, and that the fishery is closed if the stock drops below Ilim. As Ilim (Blim) is considered to be above the PRI, the closure of the fishery when the stock drops below Blim provides evidence that the exploitation rate is reduced to zero as the PRI is approached. At present there is no estimate of Bmsy, and although Bmsy may vary with the level of predation on the shrimp stock, fishing at the target Fproxy should over time increase the stock biomass towards a stock level consistent with MSY. The SG80 is met therefore. As there is no clear understanding of the relationship between the target Fproxy and the biomass (Bmsy) or fishing mortality (Fmsy) at MSY, and the ecological role of the stock is not taken into account, the SG100 is not met.		
b	HCRs robustness to uncertainty			
	Guide post		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
	Met?		Y	N
	Justification	The main uncertainties relating to the triggering of the HCRs are variable recruitment in *P. borealis* due to environmental influences and variable levels of predation, and the need to have accurate catch data in order to obtain robust calculations of the annual TAC. Stock biomass estimates are provided through annual stock surveys so any variation in recruitment to the fishable stock is intrinsically taken into account in the setting of the annual TAC. In addition there is a rigorous monitoring programme which ensures that accurate landings data are recorded through official weigh-masters under the direction of the Directorate of Fisheries, in collaboration with the Coast Guard who undertake weighing of 100% of landings. The annual TAC is based upon the annual stock biomass estimate multiplied by the target Fproxy which is defined as catch/survey biomass. If there is significant uncertainty in estimates of stock biomass through for example environmental factors or variations in catchability, then a precautionary buffer is applied to the TAC. Both the limit reference point, Ilim, a proxy for Blim and the target Fproxy are set at precautionary levels. SG80 is met therefore. Whilst the shrimp fishery has been split into 7 UoCs, the HCRs do not explicitly take into account any variations in spatial distribution of shrimps within fjords and the role of shrimps as a prey species for cod, haddock and other fish predators is not explicitly considered within the HCRs. It cannot be concluded that a wide range of uncertainties are taken into account in the HCRs, and SG		

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		100 is not met therefore.		
c	HCRs evaluation			
	Guide post	There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	Y	Y	Y
	Justification	Exploitation levels in the fishery are controlled through setting the TAC at an appropriate level based upon estimates of stock biomass from the annual stock surveys. If the stock biomass falls below the limit reference point, Ilim, a proxy for Blim, then the exploitation rate must be reduced to zero under the HCR. Closure of fishing areas is an effective method for reducing exploitation immediately, and there is evidence that fisheries have been closed when the stock falls below Ilim. The time trend of values for Fproxy provide evidence that the exploitation rates continue to be kept at the level required by the HCRs. There are also robust mechanisms in place which successfully ensure that the TACs are not regularly exceeded. There is clear evidence of successful implementation of the additional HCRs under which areas are closed if more than 30% of the shrimp catch is under the minimum landing size, or if bycatches of small redfish, cod or halibut exceed thresholds. Generally areas are closed to fishing within 3 hours following the observation of high catches of juveniles. There is clear evidence that the tools are effective in achieving the exploitation levels required under the HCRs. The SG100 is met therefore.		
References		ICES. 2012. Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. (http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/ADHOC/DLS%20Guidance%20Report%202012.pdf) MFRI, 2016b. Inshore northern shrimp, *Pandalus borealis* – in Arnarfjörður, Ísafjarðardjúp, Skjálfandi, Húnaflói, Öxarfjörður and Skagafjörður. State of Marine Stocks and Advice 2016. Marine and Freshwater Institute, 1 November 2016. MFRI, 2017b. Offshore northern shrimp, *Pandalus borealis*. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 31 July 2017. MFRI, 2017d. Inshore northern shrimp, *Pandalus borealis* – in the Eldey area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 20 June 2017. MFRI, 2017f. Inshore northern shrimp, *Pandalus borealis* – in the Snæfellsnes area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute,		

PI 1.2.2	There are well defined and effective harvest control rules (HCRs) in place
	2 May 2017. MFRI, 2017h. Inshore northern shrimp, *Pandalus borealis* – in the Arnarfjörður area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 16 November 2017. MFRI, 2017j. Inshore northern shrimp, *Pandalus borealis* – in the Ísafjarðardjúp area. State of Marine Stocks and Advice 2017. Marine and Freshwater Institute, 8 March 2018. Regulations in the shrimp fishery implemented to reduce the unwanted catch of juvenile shrimps - https://www.reglugerd.is Summary of current closed areas: http://www.fiskistofa.is/media/aflatolur/regugerdir_fridanir_15022016.jpg Discussion at the site visit with Directorate of Fisheries and Ministry of Industries and Innovation
OVERALL PERFORMANCE INDICATOR SCORE:	**All UoCs 85**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	Guide post	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Y	Y	Y
	Justification	Annual stock surveys are conducted in all areas of the fishery prior to the start of the main fishing season in order to provide an estimate of stock biomass upon which the TAC can be based. (Due to problems with the research vessel, the survey was not conducted in 2017 in UoC 6 and UoC7.) The stock surveys use the same trawls as those used by commercial vessels, although in the offshore area, a sorting grid is not used in the annual surveys. The surveys provide information on the abundance, size distribution, sex and maturity stage of all shrimps caught. Detailed information on abundance, length-weight, condition and stomach contents of the main predators, cod and haddock, are also recorded during the surveys. Data on any benthos caught as bycatch in the surveys are not recorded. Full details of the stock surveys are described by Jónsdóttir *et al.* (2017). Stock structure is well known from the surveys and genetics studies showed that the offshore stock can be considered as a separate stock to the inshore fishery, and genetics studies in other *P. borealis* fisheries where significant variations between fjords has been observed, provides justification for the assumption that there are separate stocks in each of the main fjords in the inshore fishery. Fleet composition is well known in all UoCs as in recent years there have been fewer vessels in the shrimp fishery, and all shrimp vessels are licensed. The completion of catch and fishing effort data on electronic log books by all vessels is mandatory. The skipper must record the start and finish of each day and catch of shrimps must be recorded for each tow, along with weight of bycatch. Log book entries are automatically submitted electronically through the system. All vessels have both VMS and AIS on board. By law, the VMS must send back a positional record (ping) every 10 minutes, but on most vessels there is a ping every 30 seconds, so there is a very detailed description of fishing activity recorded for all vessels.		

PI 1.2.3		Relevant information is collected to support the harvest strategy		
		Size compositions of the shrimp catch are measured through a market sampling programme undertaken on the quayside by MFRI. The Directorate of Fisheries may visit fishing areas regularly and go on board fishing vessels to check for compliance with minimum landing size, but they do not undertake regular monitoring of the size distribution of landings. There is no formal observer programme in the shrimp fishery, but the annual surveys use the same trawl as the commercial vessels and so size distribution and bycatch information on commercial vessels from the surveys will be similar to that recorded on the stock surveys. In addition, there is a prohibition on discarding and therefore the benefits of an observer programme would be limited. Official weigh-masters under the direction of the Directorate of Fisheries, in collaboration with the Coast Guard, undertake weighing of 100% of landings, and sales notes are completed by the buyers. MFRI undertakes quarterly observations of temperature, salinity, carbon dioxide and other indicators such as trace elements at a number of fixed stations on the Icelandic shelf in order to monitor climatic variations. Observation of levels of nutrients, primary production of phytoplankton and abundance and species of zooplankton are also taken on a regular basis. Continuous monitoring of the inflow of Atlantic water into the area north of Iceland is also carried out by MFRI using moored current meters. Mapping of fishing grounds in relation to benthic communities and habitat is also undertaken by MFRI. A wide range of environmental monitoring is therefore undertaken in addition to collection of information on stock structure, stock productivity, fleet composition, stock abundance and UoA removals. SG 100 is met.		
b	Monitoring			
	Guide post	Stock abundance and UoA removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Y	Y	N
	Justification	Stock abundance is monitored annually in all UoCs (and biannually in UoC5) through the fishery-independent stock surveys, and these estimates are used along with the target Fproxy to set the annual TAC as determined under the harvest control rule. CPUE from commercial vessels provide an alternative index of stock abundance. UoA removals are monitored through mandatory electronic log books on all vessels, accurate recording of landings through official weigh-masters under the direction of the Directorate of Fisheries, in collaboration with the Coast Guard who undertake weighing of 100% of landings, and through sales notes. Cross-checking of these three sources of data on removals revealed no		

PI 1.2.3		Relevant information is collected to support the harvest strategy		
		compliance problems, which along with 100% coverage on log books and landings declarations provides confidence that data on removals are accurate. SG 80 is met. The stock surveys do not provide confidence intervals around their estimates of stock biomass and therefore as presented in the MFRI stock assessment reports, it is not clear that there is a good understanding of the inherent uncertainties in the data and consequently the robustness of the assessment and management to that uncertainty. The SG100 is not met therefore. It is recommended that stock biomass estimates from the stock surveys are presented with confidence intervals around those estimates.		
c	Comprehensiveness of information			
	Guide post		There is good information on all other fishery removals from the stock.	
	Met?		Y	
	Justification	Mandatory catch returns ensure that landings from all components of the shrimp fleet in both the offshore and inshore fisheries are recorded. Mesh size regulations, the use of sorting grids and the prohibition on discarding ensures that all removals in the shrimp fishery are recorded. There are no other fisheries targeting shrimp using other gears and because of the small mesh size used for catching shrimps, there are no fisheries targeting other species which retain shrimp as bycatch or discard shrimp. The SG80 is met.		
References		Jónsdóttir, O.D.B., Imsland, A.K. and Nævdal, G. 1998. Population genetic studies of northern shrimp, *Pandalus borealis*, in Icelandic waters and the Denmark Strait. Can. J. Fish. Aquat. Sci. 55: 770-780. Jónsdóttir, I.G., Bragason, G.S., Brynjólfsson, S.H., Guðlaugsdóttir, A.K., Skúladóttir, U. 2017. Northern shrimp research in Icelandic waters, 1988-2015. Marine and Freshwater Research Institute, Reykjavík, Iceland. HV 2017-007. Knutsen, H., Jorde, P. E., Blanco Gonzalez, E., Eigaard, O. R., Pereyra, Ricardo T., Sannæs, H., Dahl, M., Andre´, C., and Søvik, G. Does population genetic structure support present management regulations of the northern shrimp (*Pandalus borealis*) in Skagerrak and the North Sea? – ICES Journal of Marine Science, doi: 10.1093/icesjms/fsu204. Martinez, I., Aschan, M., Skerjdal, T. and Aljanabi, S.M. 2006. The genetic structure of *Pandalus borealis* in the Northeast Atlantic determined by RAPD analysis. ICES Journal of Marine Science, 63: 840-850 MFRI website: https://www.hafogvatn.is/en/research/oceanograpy		

OVERALL PERFORMANCE INDICATOR SCORE:	**All UoCs 90**
CONDITION NUMBER (if relevant):	**N/A**

PI 1.2.3	Relevant information is collected to support the harvest strategy
Recommendation	**1**

Evaluation Table for PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration			
	Guide post		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?		Y	N
	Justification	In the absence of an analytical stock assessment model, assessment of the offshore and inshore stocks is based primarily on the results of annual stock surveys from which annual TACs are calculated. The surveys provide an estimate of stock biomass before the start of the main season permitting an evaluation of stock status against the limit reference point, Ilim, a proxy for Blim. At present there is no upper or target biomass reference point defined for the shrimp stocks. The advice for the shrimp fisheries is based upon the application of the ICES framework for category 3 stocks for which analytical assessment is not possible but trends in biomass indicators are assumed to reflect changes in stock dynamics. The TAC advice is based upon multiplying the target Fproxy by the most recent biomass index value under the assumption that discarding is negligible. The target Fproxy (catch/survey biomass) is defined for each fishing area and is generally based upon the mean catch/survey biomass for a reference period when exploitation rates were considered to be low. The annual stock survey also provides information on size distribution of the shrimp stock and other biological information such as maturity-at-size, and abundance, length-weight, condition and stomach contents of the main predators, cod and haddock. The stock assessment also includes an alternative index of stock abundance from commercial fisheries data, catch per unit effort (CPUE). The assessment is therefore appropriate for the stock, and the estimate of stock biomass from annual stock surveys and the calculation of Fproxy permit an evaluation of stock status against the reference points and are therefore appropriate for the harvest control rule. The SG80 is met. There is ongoing research within MFRI to use all the available information on shrimp biology to develop an analytical stock assessment model to assess whether the values of Fproxy used in each fishery are appropriate and to develop an additional upper or target reference point, which can be considered to be consistent with Bmsy, such as MSYBtrigger (as used by ICES in the MSY framework) or Bpa or MSYBescapement. In addition, predation is considered to be a major driver of stock dynamics in *P. borealis*, and therefore the natural mortality rate (M) of shrimps may vary between years and consequently Bmsy may vary with time. Although detailed information on abundance, length-weight, condition and stomach contents of the main predators, cod and haddock, are recorded during the surveys, predation is not explicitly incorporated into the stock assessment approach used in Icelandic waters. SG 100 is not met therefore.		

PI 1.2.4		There is an adequate assessment of the stock status		
		Temperature may also be an important factor driving Pandalus stock dynamics, and the assessment team recommends that a time series of temperature or ocean climate index should be included in the stock assessment reports.		
b	Assessment approach			
	Guide post	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	Y (UoCs 1-6) N (UoC 7)	Y (UoCs 1-6) N (UoC 7)	
	Justification	UoCs 1-6. Annual stock surveys provide an estimate of stock biomass relative to the limit reference point, Ilim, a proxy for Blim, which has been set at a precautionary level considered to be above the point of recruitment impairment (PRI). In line with the approach taken by NAFO, Ilim is defined as 20% or 12% of the average of the three highest values of the biomass index (I) observed for the stock depending on the fishing area. Whilst there is currently no biomass target reference point for any of the UoCs, the temporal variation in predation levels observed in the fishery suggests that Bmsy may vary over time. It is appropriate therefore that the assessment provides an estimate of Fproxy for each fishing area defined as the catch/survey biomass, which is evaluated in relation to the target Fproxy, the mean catch/survey biomass for a reference period when exploitation rates were considered to be low. As the target Fproxy is set at a precautionary level, setting TACs based on the target Fproxy should over time move the stock towards a level which could be considered consistent with MSY. For UoC6, there is no formally agreed target Fproxy, but a TAC is set based upon a value of Fproxy that is considered to be highly unlikely to have a deleterious effect on the stock. The SG80 is met therefore. UoC7. There are currently no reference points (Ilim, target Fproxy or biomass target reference point) set for UoC7 and so the SG60 is not met.		
c	Uncertainty in the assessment			
	Guide post	The assessment **identifies major sources** of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
	Met?	Y	Y	N
	Justification	There is some uncertainty surrounding the stock structure in the inshore fishery, but based upon the findings of genetics studies in other *P. borealis* fisheries where significant variations between fjords has been observed, the assessment assumes that there are separate stocks in each of the main fjords. The main uncertainty driving the dynamics of the *P. borealis* stock is variable recruitment		

PI 1.2.4		There is an adequate assessment of the stock status		
		due to environmental influences and variable levels of predation. Stock biomass estimates are provided through annual stock surveys so any variation in recruitment to the fishable stock is intrinsically taken into account in the estimate of stock biomass and the subsequent setting of the annual TAC. Accurate catch data are required to obtain robust estimates of Fproxy and there is a rigorous monitoring programme which ensures that accurate landings data are recorded through official weigh-masters who undertake weighing of 100% of landings under the direction of the Directorate of Fisheries, in collaboration with the Coast Guard. SG 80 is met, but the stock assessment does not evaluate stock status relative to reference points in a probabilistic way and therefore SG100 is not met.		
d	Evaluation of assessment			
	Guide post			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			N
	Justification	The assessment has not been fully tested or shown to be robust. The relationship between the target Fproxy used to set the TAC and Fmsy (the value of F that would move the stock to MSY) is not clearly understood. The detailed information collected from the annual stock surveys is not fully utilised and although a preliminary study by Abel and Yanez (2000) compared two models, an ADAPT model, and an age-structured production model for the stock assessment in Icelandic offshore waters in the period 1988-2000, such approaches have not been rigorously explored. There is ongoing research within MFRI to develop an analytical stock assessment model to assess whether the values of Fproxy used in each fishery are appropriate and to develop an additional upper or target reference point, which can be considered to be consistent with Bmsy, such as MSYBtrigger (as used by ICES in the MSY framework) or Bpa or MSYBescapement. In addition, predation is considered to be major driver of stock dynamics in *P. borealis*, yet predation is not explicitly incorporated into the stock assessment approach used in Icelandic waters. In other *P. borealis* fisheries e.g. West Greenland, the model explicitly includes cod predation and the addition of this component provided a better fit than alternative models. Alternative assessment approaches have not therefore been rigorously explored and SG100 is not met.		
e	Peer review of assessment			
	Guide post		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.
	Met?		Y	N

PI 1.2.4		There is an adequate assessment of the stock status
	Justification	The annual stock assessments of all fishing areas are published by MFRI. The assessments are peer-reviewed internally within MFRI, although MFRI is a small institute with a limited number of scientists available to review the assessments. The assessments and the advice emanating from those assessments are reviewed by stakeholders in conjunction with the Ministry, before the Ministry makes the final decision on the TAC for the forthcoming year. The SG80 is met therefore. To date, there has been no external peer review of the shrimp stock assessments (cf. the formal external peer review of MFRI cod stock assessments in 2000 carried out by both European and North American scientists). The assessments of the Icelandic shrimp fisheries within Icelandic waters are not considered by the NAFO/ICES Pandalus Assessment Group (NIPAG) which meets annually to undertake stock assessments of other Pandalus stocks. It cannot be concluded therefore that the assessments are externally peer-reviewed. The SG100 is not met therefore. The assessment team recommends that MFRI arranges for regular external peer reviews of the assessments be undertaken.
References		ICES. 2012. Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. (http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/ADHOC/DLS%20Guidance%20Report%202012.pdf) Abel, A. and Yanez, G. 2018. A comparison of different assessment models for northern shrimp, Pandalus borealis, in Icelandic waters. Intertek Moody Marine 2012. MSC Certification Report for West Greenland Cold Water Prawn Trawl Fishery. Jónsdóttir, I.G., Bragason, G.S., Brynjólfsson, S.H., Guðlaugsdóttir, A.K., Skúladóttir, U. 2017. Northern shrimp research in Icelandic waters, 1988-2015. Marine and Freshwater Research Institute, Reykjavík, Iceland. HV 2017-007. Knutsen, H., Jorde, P. E., Blanco Gonzalez, E., Eigaard, O. R., Pereyra, Ricardo T., Sannæs, H., Dahl, M., Andre´, C., and Søvik, G. Does population genetic structure support present management regulations of the northern shrimp (*Pandalus borealis*) in Skagerrak and the North Sea? – ICES Journal of Marine Science, doi: 10.1093/icesjms/fsu204. Martinez, I., Aschan, M., Skerjdal, T. and Aljanabi, S.M. 2006. The genetic structure of *Pandalus borealis* in the Northeast Atlantic determined by RAPD analysis. ICES Journal of Marine Science, 63: 840-850. MFRI. 2016a. Assessment of northern shrimp, *Pandalus borealis*, in Arnarfjörður, Ísafjarðardjúp, Skjálfandi, Húnaflói, Öxarfjörður and Skagafjörður. Marine and Freshwater Institute, 1 November 2016. MFRI. 2017a. Assessment of offshore northern shrimp, *Pandalus borealis*. Marine and Freshwater Institute, 31 July 2017. MFRI. 2017c. Assessment of northern shrimp, *Pandalus borealis*, in the Eldey area. Marine and Freshwater Institute, 20 June 2017. MFRI. 2017e. Assessment of northern shrimp, *Pandalus borealis*, in the Snæfellsnes area. Marine and Freshwater Institute, 2 May 2017.

PI 1.2.4	There is an adequate assessment of the stock status
	MFRI. 2017g. Assessment of northern shrimp, *Pandalus borealis*, in the Arnarfjörður area. Marine and Freshwater Institute, 16 November 2017. MFRI. 2017i. Assessment of northern shrimp, *Pandalus borealis*, in the Ísafjarðardjúp area. Marine and Freshwater Institute, 9 March 2018.
OVERALL PERFORMANCE INDICATOR SCORE:	**UoCs1-6 80 UoC 7 <60**
CONDITION NUMBER (if relevant):	**2 (only for UoC 7). This condition is not binding as UoC 7 fails to meet SG60 requirements.**
Recommendation	**2 and 3**

Principle 2

Evaluation Table for PI 2.1.1 – Primary species outcome

PI 2.1.1		The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guidepost	Main primary species are **likely** to be above the PRI OR If the species is below the PRI, the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are **highly likely** to be above the PRI OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above the PRI **and are** fluctuating around a level consistent with MSY.
	UoA 1			
	UoA 2-7	N/A	N/A	N/A
	Justification	As regards UoA 1, this is, offshore shrimp fishery, using a tunnel sac to retain other species, main primary species to consider are cod and Greenland halibut. Cod accounts for a 20% of the landings by UoA 1 (this is, 1440 tons), while Greenland halibut accounts for a 10% of those landings (this is, 735 tons). SG60 SG80 and SG100 are met for the main primary species in UoA 1 as, according to MFRI 2017 advice on each of these stocks: • the estimated SSB of cod is above B MSY, at its highest rate for the past 40 years period. The harvest rate has declined in the past years and is expected that the cod stock will increase in 2018 and 2019. The cod stock is subject to a management plan. According to it, catches in the 2017/2018 fishing year should not exceed 257572 tonnes. • The Greenland halibut stock is currently above MSY Btrigger, however it is expected that the stock will decline in following years. Fishing mortality has decreased in recent year and is estimated to be relatively close to FMSY. The stock is subject to a management plan which was agreed between Greenland and Iceland. According to it, Icelandic catches in the 2017/2018 fishing year should be no more than 24000 tonnes.		

Scoring	SG60	SG80	SG100

PI 2.1.1		The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.

element			
Cod	Y	Y	Y
Greenland halibut	Y	Y	Y

As regards UoA 2 to UoA 7 (the inshore prawn fishery which takes place in the different fjords), according to landing records, MFRI and the Directorate of Fisheries, the inshore prawn fishery has a very clean catch composition where there are no other species to consider, neither for primary nor secondary PI. SIa would be N/A and by default SG100 is met.

b	Minor primary species stock status			
	Guidepost			Minor primary species are highly likely to be above the PRI OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species
	UoA 1			
	UoA 2-7			N/A
	Justification	As regards UoA 1, minor primary species present in the catch are beaked redfish, golden redfish, greater silver smelt, haddock, saithe, witch, European plaice, ling, Atlantic wolfish, blue ling, anglerfish, lemon sole and tusk. None of these species comprise more than 1.1% each of the total catch, and all together add for less than 5% of the total catch by UoA 1, adding a total of 183 tons of minor primary species landed by UoA 1. MFRI provides scientific advice for all of them and the Directorate of Fisheries establishes annual quotas for each of them. Regarding the different minor primary species stocks, **golden redfish, haddock, saithe, ling** and **tusk** stocks are above B trigger. SG 100 is met for these stocks. There are no defined biomass reference points for other minor primary species in UoA 1. MFRI advice reads as follows for each one of these stocks: • For **beaked redfish** the IS-SMH biomass index declined from 2001–2003 and has since been low. Since 2007, survey estimates have consistently shown very low estimates for juveniles. Catches in the 2017/2018 fishing year should be no more than 11786 tons. Landings by UoA 1 in the 2016 calendar year were 77 tons (1.1% of UoA 1 catch composition). Landings of beaked redfish by the whole Icelandic fleet for the same calendar year (2016) were 2830 tons. The team considers that with the given level of landings by UoA 1, the UoA is not hindering the		

PI 2.1.1		The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.
		recovery and rebuilding of the stock. SG100 is met. • For **greater silver smelt** SSB shows a positive trend and catches in the 2017/2018 fishing year should be no more than 9310 tons. Landings by UoA 1 in the 2016 calendar year were 13 tons (0.18% of UoA 1 catch composition). Landings of greater silver smelt by the whole Icelandic fleet for the same calendar year (2016) were 5991 tons. The team considers that with the given level of landings by UoA 1, the UoA is not hindering the recovery and rebuilding of the stock. SG100 is met. • For **witch** the IS-SMB biomass index has been high since 2004 and catches in the 2017/2018 fishing year should be no more than 1116 tons. Landings by UoA 1 in the 2016 calendar year were 2 tons (0.03% of UoA 1 catch composition). Landings of witch by the whole Icelandic fleet for the same calendar year (2016) were 924 tons. The team considers that with the given level of landings by UoA 1, the UoA is not hindering the recovery and rebuilding of the stock. SG100 is met. • For **plaice**, the harvestable biomass has increased since 2000 and has not been larger in the assessment period 1991–2017. Fishing mortality remains at levels consistent with FMSY. Catches in the 2017/2018 fishing year should be less than 7103 tons. Landings by UoA 1 in the 2016 calendar year was 1 ton (0.02% of UoA 1 catch composition). Landings of plaice by the whole Icelandic fleet for the same calendar year (2016) were 7448 tons. The team considers that with the given level of landings by UoA 1, the UoA is not hindering the recovery and rebuilding of the stock. SG100 is met. • For **Atlantic wolfish**, fishing mortality has increased since 2014 and is now at FMSY. Harvestable biomass has declined since 2006 but is above average compared to the years from 1980. Catches in the 2017/2018 fishing year should be no more than 8540 tons. Landings by UoA 1 in the 2016 calendar year were 0.5 tons (0.01% of UoA 1 catch composition). Landings of Atlantic wolfish by the whole Icelandic fleet for the same calendar year were 8659 tons. The team considers that with the given level of landings by UoA 1, the UoA is not hindering the recovery and rebuilding of the stock. SG100 is met. • For **blue ling**, the biomass index peaked in 2009 but has declined since then. However, the biomass index is still considered above possible biomass reference points. Fproxy has been below the target value for the last three years. Catches in the 2017/2018 fishing year should be no more than 1956 tons. Landings by UoA 1 in the 2016 calendar year were 0.5 tons (0.1% of UoA 1 catch composition). Landings of blue ling by the whole Icelandic fleet for the same calendar year (2016) were 924 tons. The team considers that with the given level of landings by UoA 1, the UoA is not hindering the recovery and rebuilding of the stock. SG100 is met. • For **anglerfish**, the biomass index was high in 2005–2011 compared to previous years but has since then decreased substantially. Juvenile indices show strong recruitment for year classes 1998–2007, but poor recruitment before and after this period. Fproxy was stable when the stock peaked but has decreased in recent years and is now close to target. Catches in the 2017/2018 fishing year should be no more than

PI 2.1.1	The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.

853 tons. Landings by UoA 1 in the 2016 calendar year were 0.3 tons (less than 0.01% of UoA 1 catch composition). Landings of anglerfish by the whole Icelandic fleet for the same calendar year (2016) were 894 tons. The team considers that with the given level of landings by UoA 1, the UoA is not hindering the recovery and rebuilding of the stock. SG100 is met.

- For **lemon sole**, the IS-SMB biomass index has been relatively high but fluctuating since 2003, in particular when compared to the period 1992–2002. Estimated fishing mortality has been variable in recent years. Catches in the 2017/2018 fishing year should not exceed 1304 tons. Landings by UoA 1 in the 2016 calendar year were 0.02 tons (less than 0.01% of UoA 1 catch composition). Landings of lemon sole by the whole Icelandic fleet (2016) were 1735 tons. The team considers that with the given level of landings by UoA 1, the UoA is not hindering the recovery and rebuilding of the stock. SG100 is met.

Scoring element	SG100
Golden redfish	Y
Haddock	Y
Saithe	Y
Ling	Y
Tusk	Y
Beaked redfish	Y
Greater silver smelt	Y
Witch	Y
Plaice	Y
Atlantic wolfish	Y
Blue ling	Y
Anglerfish	Y
Lemon sole	Y

As regards UoA 2 to UoA 7, there are no minor primary species to consider by the different UoAs. Sib is N/A and SG100 is met by default.

References	MFRI advice for cod, Greenland halibut, beaked redfish, golden redfish, greater silver smelt, haddock, saithe, witch, European plaice, ling, Atlantic wolfish, blue ling, anglerfish, lemon sole and tusk. https://www.hafogvatn.is/en/harvesting-

PI 2.1.1	The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.
	advice Landing records. http://www.fiskistofa.is/english/quotas-and-catches/catches-in-individual-species/

OVERALL PERFORMANCE INDICATOR SCORE UoA 1

Scoring element	SG60	SG80	SG100
Cod (*Gadus morhua*)	Y	Y	Y
Greenland halibut (*Reinhardtius hippoglossoides)*	Y	Y	Y
Golden redfish (*Sebastes norvegicus*)	N/A	N/A	Y
Haddock (*Melanogrammus aeglefinus)*	N/A	N/A	Y
Saithe (*Pollachius virens)*	N/A	N/A	Y
Ling (*Molva molva)*	N/A	N/A	Y
Tusk (*Brosme brosme*)	N/A	N/A	Y
Beaked redfish (*Sebastes mentella)*	N/A	N/A	Y
Greater silver smelt (*Argentina silus)*	N/A	N/A	Y
Witch (*Glyptocephalus cynoglosus)*	N/A	N/A	Y
Plaice (*Pleuronectes platessa)*	N/A	N/A	Y
Atlantic wolfish (*Anarhichas lupus)*	N/A	N/A	Y
Blue ling (*Molva dypterygia)*	N/A	N/A	Y
Anglerfish (*Lophius piscatorius)*	N/A	N/A	Y
Lemon sole (*Microstomus kitt)*	N/A	N/A	Y

100

OVERALL PERFORMANCE INDICATOR SCORE UoA 2-7	**100**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 2.1.2 – Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to above the point where recruitment would be impaired.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the point where recruitment would be impaired.	There is a **strategy** in place for the UoA for managing main and minor primary species.
	UoA 1	Y	Y	Y
	UoA 2-7	Y	Y	Y
	Justification	The management of fisheries in Iceland is the responsibility of the Minister of Fisheries and Agriculture and is based on law. Regulations are issued annually and can differ in different years. Both MFRI and ICES issue scientific advice on fisheries and harvesting of fish stocks. The enforcement of laws and regulations falls under the responsibility of the Directorate of Fisheries and the Coast Guard. As mentioned in PI 2.1.1, main primary species for UoA 1 are cod and Greenland halibut. There are no primary species in the catch composition of UoA 2- UoA 7. The Ministry of Fisheries webpage explicitly mentions cod (and also saithe and haddock) in the description of the Icelandic fisheries management strategy. Its goal is to maintain the exploitation rate at levels which are consistent with the precautionary approach that generates MSY (maximum sustainable yield) in the long term. For achieving this, the Ministry relies on MFRI advice on order to set quotas for the different species amongst the different fleets. These quotas shall be consistent with the national TAC. All primary species in the UoA's catch composition are subject to MFRI advice with an adjusted quota. As regards minor species on UoA 1, the strategy relies on more general provisions such as gear and mesh restrictions, landing obligation, monitoring of the catch in the landing points, protection of spawning areas and temporary closed areas when a high number of juvenile fish is detected in the catch. SG60, SG80 and SG100 is met for UoA1 as the team considers that the different measures in place, which are based in MFRI advice, and are directed to manage most species in the catch composition of the different Icelandic fisheries (and definitively all primary species in the UoAs) act as a cohesive strategy to manage all primary species.		

PI 2.1.2		**There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.**		
		As regards UoAs 2 – 7, these fisheries are very localized inside the different fjords. The fishing strategy, which ensures that no other species apart from the targeted prawns are taken by the fishing gear, serves to support that SG60, SG80 and SG100 are met. Moreover, as mentioned above, most fish species (including prawns in the different fjords) are effectively managed by the Directorate of Fisheries.		
b	Management strategy evaluation			
	Guidepost	The measures are considered **likely** to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some **objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	UoA 1	Y	Y	N
	UoA 2-7	Y	Y	Y
	Justification	There is reliable information both on the landings and on the stock status state of all main primary species (this is, cod and Greenland halibut for UoA 1. There are no primary species to consider in UoAs 2 to 7), as they are regularly monitored by MFRI which issues a fishing advice for each of them. The monitoring of the different species and the advice given serve to give confidence to the fishing strategy, as the advice also provides estimates of future behaviour of the different stocks. Moreover, MFRI advice also provides guidelines on possible management measures to implement for the different species when needed. The team considers that there is some objective basis for confidence that the strategy will work (and, moreover, considers that this strategy is effectively working for main primary species cod and haddock). SG60 and SG80 are met for all UoAs. As regards testing that supports with a high degree of confidence that the strategy is working for all species involved, the fact that the stock of certain fish species (such as beaked redfish, Atlantic wolfish and anglerfish) is not at the targeted BMSY levels, limits the confidence that the strategy will work for all primary species. SG100 is not met for UoA 1. There are no primary species to consider for UoAs 2 -7. This lack of interactions with other species apart from the targeted prawns serves as testing to support with a high degree of certainty that the strategy to manage (non-existant) primary species in these UoAs is working effectively. SG100 is met for UoAs 2-7.		
c	Management strategy implementation			
	Guidepost		There is **some evidence** that the measures/partial strategy is being **implemented**	There is clear evidence that the partial strategy/strategy is being implemented

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
			successfully.	successfully and is achieving its overall objective as set out in scoring issue (a).
	UoA 1		Y	Y
	UoA 2-7		Y	Y
	Justification	The team considers that the landing obligation and landing sampling system (with registered operators sampling the catch in the different registered ports), along with both temporary and permanent area closures, and the allocation of quotas per vessel or fleet, serve as an evidence that the strategy for managing primary fish species is fully implemented in Icelandic fisheries. Sampling information can serve to implement fishing restrictions should these be considered needed. The low (or nil) proportion of non-targeted species in the catch composition serves to support that the strategy is achieving its overall objective. SG80 and SG100 are met for all UoAs.		
d	Shark finning			
	Guidepost	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
	All UoAs	Not relevant	Not relevant	Not relevant
	Justification	No primary species are sharks. SId is considered not relevant for all UoAs.		
e	Review of alternative measures			
	Guidepost	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	UoA 1	N/A	N/A	N/A
	UoA 2-7	N/A	N/A	N/A
	Justification	As regards UoA 1, fishing vessels carry a tunnel sac to collect fish species. While most of the catches are the targeted shrimp (65% of the catches), cod and		

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.
		Greenland halibut account for a 20% and a 10% each of the total catch by the UoA. Both species are valuable and therefore "wanted". As regards other primary species in the catch composition, these are beaked redfish, golden redfish, greater silver smelt, haddock, saithe, witch, European plaice, ling, Atlantic wolfish, blue ling, anglerfish, lemon sole and tusk. All these species go to the market auction and there is a (higher or lower) commercial value for all of them. None of these species comprise more than 1.1% each of the total catch, and all together add for less than 5% of the total catch by UoA 1, adding a total of 183 tones of minor primary species landed by UoA 1. The team considers that the volume of unwanted primary species in UoA 1 is negligible and therefore considers SIe as N/A. As regards UoA 2-7, there are no main primary species to consider and therefore SIe is N/A.
References		http://www.fisheries.is/main-species/cod/management_plan/ Act 57/1996. Amended by Act 144/2008. Act concerning the treatment of commercial marine stocks. MFRI advice for cod, Greenland halibut, beaked redfish, golden redfish, greater silver smelt, haddock, saithe, witch, European plaice, ling, Atlantic wolfish, blue ling, anglerfish, lemon sole and tusk. https://www.hafogvatn.is/en/harvesting-advice Landing records. http://www.fiskistofa.is/english/quotas-and-catches/catches-in-individual-species/
OVERALL PERFORMANCE INDICATOR SCORE: UoA 1		**95**
OVERALL PERFORMANCE INDICATOR SCORE: UoA 2-7		**100**
CONDITION NUMBER (if relevant):		**N/A**

Evaluation Table for PI 2.1.3 – Primary species information

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main primary species			
	Guidepost	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Qualitative information is adeqaute to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptiblity attributes for main primary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary species with respect to status.
	UoA 1	Y	Y	Y
	UoA 2-7	Y	Y	Y
	Justification	Main primary species for UoA 1 are cod and Greenland halibut. The implementation in Iceland of landing obligation in 1973 serves to provide verifiable quantitative information on the impact of Icelandic vessels on the different species. MFRI conducts two annual demersal surveys in order to sample catch composition (size and age) of commercial catches. Data collected serves to support MFRI advice of fish catches. The cod and Greenland halibut stocks are evaluated on a yearly basis by MFRI, which gives fishing advice and trends of biomass and harvest in the past and also estimations of the future development of the stocks. Reference points are defined for both cod and Greenland halibut. The good level of information as regards main primary species serves to support that SG60, SG80 and SG100 are met by UoA 1. There are no main primary species for UoA 2-7. SG100 is met by default.		
b	Information adequacy for assessment of impact on minor primary species			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
	UoA 1			Y
	UoA 2-7			Y
	Justification	The landing obligation provides verifiable quantitative information on the impacts the fishery may have both on main and minor primary species. Besides, all minor primary species in UoA 1 (beaked redfish, golden redfish, greater silver smelt, haddock, saithe, witch, European plaice, ling, Atlantic wolfish, blue ling, anglerfish, lemon sole and tusk) are subject to MFRI annual advice on stock status. There are no minor primary species to consider by UoAs 2-7. SG100 is met by all UoAs.		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** Primary species.	Information is adequate to support a **strategy** to manage **all** primary species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.
	UoA 1	Y	Y	Y
	UoA 2-7	Y	Y	Y
	Justification	Main primary species for UoA 1 are cod and Greenland halibut. Minor primary species in UoA 1 are beaked redfish, golden redfish, greater silver smelt, haddock, saithe, witch, European plaice, ling, Atlantic wolfish, blue ling, anglerfish, lemon sole and tusk. There are no main nor minor primary species for UoAs 2-7. Information collected through landing records, landing sampling and research surveys serves to support a strategy to manage all primary species. This is already done through the publication of MFRI fishing advice, the assignation of fishing quotas, and the management and implementation when necessary of fishing closed areas. The evaluation on whether the strategy is achieving its objective can be done by comparing the historical and present results in MFRI advice and landing records. SG60, SG80 and SG100 is me by all UoAs.		
References		MFRI advice for cod, Greenland halibut, beaked redfish, golden redfish, greater silver smelt, haddock, saithe, witch, European plaice, ling, Atlantic wolfish, blue ling, anglerfish, lemon sole and tusk. https://www.hafogvatn.is/en/harvesting-advice http://www.fisheries.is/main-species/codfishes/ http://www.fiskistofa.is/english/quotas-and-catches/total-catch-and-quota-status/ Landing records.		

PI 2.1.3	**Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species**
	http://www.fiskistofa.is/english/quotas-and-catches/catches-in-individual-species/

OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**100**
OVERALL PERFORMANCE INDICATOR SCORE: UoA 2-7	**100**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 2.2.1 – Secondary species outcome

PI 2.2.1		**The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guidepost	Main Secondary species are **likely** to be within biologically based limits. OR If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that also have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are within biologically based limits.
	UoA 1	N/A	N/A	N/A
	UoA 2-7	N/A	N/A	N/A
	Justification	There are no main secondary species to consider for any UoA. SG100 is met by default.		
b	**Minor secondary species stock status**			
	Guidepost			Minor secondary species are highly likely to be above biologically based limits.

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.		
				OR If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	UoA 1			N
	UoA 2-7			N/A
	Justification	As regards UoA 1, minor secondary species to consider are long rough dab, starry ray, spotted wolfish, skate (*Hypotremate spp*.), Greenland shark, shagreen skate, lumpfish, black scabbardfish and whiting. The proportion of all secondary species in the catch of UoA 1 in 2016 did not exceed 2% of the landings by UoA 1. There is scientific advice for some of these minor secondary species (for long rough dab, starry ray, spotted wolfish, black scabbardfish, lump fish and whiting), but there anren't reference points defined for any of them. There are no management measures directed to the management of secondary species. • Long rough dab: According to MFRI advice, the biomass index has decreased since 2003, and has been low for the last nine years. MFRI does not recommend a TAC for the stock. • Starry ray: According to MFRI advice, the survey biomass index (IS-SMB) shows a long term decreasing trend. Since 2013, the biomass index has been stable but at the lowest level in the time series. MFRI does not recommend a TAC for the stock. The species is classified as Vulnerable by IUCN. Landings by the whole Icelandic fleet in 2016 were 1273 tonnes. Landings by UoA 1 in the same year were 23 tonnes, representing a 1.8% of total landings for the species. • Spotted wolfish: According to MFRI advice, the biomass and juvenile indices are at their lowest levels in the time series. Fproxy has been high since 2000. MFRI advices that catches should be no more than 1080 tones for the 2017/2018 fishing year. • Skate (*Hypotremate spp.):* There is no scientific advice for the stock. Landings in Iceland in 2016 were 131937 kg, while landings by UoA 1 were 803 kg in the same year, representing 0.6 % of total landings for the species. • Greenland shark: There is no scientific advice for the stock. The species is classified by IUCN as Near Threatened. Landings in Iceland in 2016 were 25809 kg. Landings by UoA 1 were 301 kg for the same year, representing a 1.2% of total landings for the species. • Shagreen skate: There is no scientific advice for the stock. The species is classified by IUCN as Vulnerable. Landings in Iceland in 2016 were 13014 kg, while landings by UoA 1 in the same year were 9 kg, representing a 0.06% of total landings for the species. • Lumpfish: According to MFRI advice, the female biomass index has increased since 2013 but decreased slightly between 2016 and 2017. The		

PI 2.2.1	The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.
	male biomass index in 2017 has decreased to a historical low. Fproxy has fluctuated greatly during the last thirty years but has been below the target value since 2014. Catches in the 2017/2018 fishing year should not exceed 1854 tons. • Blackscabbard fish: According to ICES advice, the stock abundance has been stable since 2002. Catches in ICES subareas sub-areas 6 and 7 and divisions 5.b and 12.b should not exceed 2802 tonnes. • Whiting: According to MFRI advice, the biomass index has been low since 2012. Fproxy has been high since 2009. MFRI does not recommend a TAC for the stock. Due to the high number of minor secondary species, and following MSC interpretations website advice, the assessment team has decided to evaluate these species as a group for this PI. As shown above, not all minor primary species are above their biologically based limits, as some of them are listed as vulnerable in the IUCN red list. SG100 is not met for UoA 1. There are no minor secondary species to consider for UoAs 2-7. SG100 is met by default.
References	MFRI advice for long rough dab, starry ray, spotted wolfish, black scabbardfish, lump fish and whiting. https://www.hafogvatn.is/en/harvesting-advice ICES advice for black scabbardfish. http://ices.dk/sites/pub/Publication%20Reports/Advice/2016/2016/bsf-nea.pdf IUCN red list.

OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**90**
OVERALL PERFORMANCE INDICATOR SCORE: UoA 2-7	**100**
CONDITION NUMBER (if relevant):	**N/A**
Recommendation	**4**

Evaluation Table for PI 2.2.2 – Secondary species management strategy

PI 2.2.2		**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Management strategy in place**			
	Guidepost	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
	UoA 1	Y	Y	N
	UoAs 2-7	Y	Y	Y
	Justification	The management of fisheries in Iceland is the responsibility of the Minister of Fisheries and Agriculture and is based on law. Regulations are issued annually can differ in different years. Both MFRI and ICES issue scientific advice on fisheries and harvesting of fish stocks. The enforcement of laws and regulations falls under the responsibility of the Directorate of Fisheries and the Coast Guard. The avoidance of unwanted catch during fishing operations could also serve as a partial management strategy itself, as secondary species only represent a 2% of the catch by UoA 1 and there are no secondary species in the catch of UoAs 2-7. There are general measures in place in order to protect juvenile fish, such as gear and mesh restrictions, landing obligation, landing sampling and the establishment of both real time and permanent area closures. The team considers these measures as a partial strategy for managing the catch, as all UoAs have proven to be very selective (with 95% of the catch being the targeted prawns, cod and Greenland halibut in UoA 1, and 100% being the targeted prawn in UoAs 2-7). SG60 and SG80 are met for all UoAs. However, secondary species in UoA 1 are not specifically managed. SG100 is not met for UoA 1. The lack of secondary species in the UoAs 2-7 serves to justify that these UoAs achieve SG100, as the fishing strategy has proven to be effective in avoiding the catch of secondary species. SG100 is met by UoAs 2-7.		
b	Management strategy evaluation			
	Guidepost	The measures are considered **likely** to	There is **some objective basis for confidence**	**Testing** supports **high confidence** that the

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
		work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	partial strategy/strategy will work, based on information directly about the UoA and/or species involved.
	UoA 1	Y	Y	N
	UoA 2-7	Y	Y	Y
	Justification	Secondary species represent 2% of the landings by UoA 1. There are no secondary species to consider for UoA 2-7. There is reliable information on the landings of all secondary species, and scientific advice for some of them. The monitoring of the different species and the advice given serve to give confidence to the fishing strategy, as any drop of the stock will easily be noticed, and the advice would result in lower quotas or area closures. The team considers that there is some objective basis for confidence that the strategy will work. SG60 and SG80 are met for all UoAs. Both the lack of testing of the strategy and the vulnerable situation of certain secondary species prevent UoA 1 from achieving SG100. The fact that there are no secondary species to consider for UoA 2-7 serves as testing that the strategy of avoiding unwanted catch is effectively working for these UoAs. SG100 is met for UoAs 2-7.		
c	Management strategy implementation			
	Guidepost		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	UoA 1		Y	N
	UoA 2-7		Y	Y
	Justification	The team considers that the landing obligation and landing sampling system, along with both temporary and permanent area closures, and the allocation of quotas per vessel or fleet, serve as an evidence that the strategy is fully implemented. Sampling information can serve to implement fishing restrictions should these be considered needed. The poor status of several minor secondary species (starry ray, Greenland shark and shagreen ray) prevent UoA 1 from achieving SG100, as UoA 1 has an impact (although low) on affected stocks. The lack of secondary species in the catch composition of UoAs 2-7 serve as an		

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
		evidence that the fishing strategy is achieving its objective of avoiding the catch of non-targeted species. SG100 us met for UoAs 2-7.		
d	Shark finning			
	Guidepost	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.
	UoA 1	Y	Y	Y
	UoA 2-7	Not relevant	Not relevant	Not relevant
	Justification	The only interactions of UoA 1 with shark species were 301 kg of Greenland shark which landed by UoA1 in 2016. Landings of Greenland sharks by all Icelandic vessels in the same calendar year were 25809 kg. Therefore, landings of Greenland shark by UoA 1 represent 1.2% of total landings of Greenland shark in Iceland. Besides, landings of Greenland shark represent less than 0.01% of the landings by UoA 1. Shark meat is appreciated in Iceland, and shark finning is not considered an issue in the country. This is confirmed by the Directorate of Fisheries. SG60, SG80 and SG100 is met for UoA 1. There were no interactions with sharks by UoA 2 to 7. SId is not relevant for UoA 2-7.		
e	Review of alternative measures to minimise mortality of unwanted catch			
	Justification	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	UoA 1	N/A	N/A	N/A
	UoA 2-7	N/A	N/A	N/A
	Guidepost	As regards UoA 1, secondary species comprise less than 2% of the UoA catch. The team considers this volume as negligible and therefore considers SIe as N/A. As regards UoA 2-7, there are no secondary species to consider and therefore SIe is N/A.		
References		Act 57/1996. Amended by Act 144/2008. Act concerning the treatment of		

PI 2.2.2	**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.**
	commercial marine stocks http://www.iucnredlist.org/ MFRI advice on fish stocks http://www.fisheries.is/management/fisheries-management/

OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**85**
OVERALL PERFORMANCE INDICATOR SCORE: UoA 2-7	**100**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guidepost	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and **adequate to assess** the impact of the UoA on main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and **adequate to assess with a high degree of certainty** the impact of the UoA on main secondary species with respect to status.
	UoA 1	Y	Y	Y
	UoA 2-7	Y	Y	Y
	Justification	There are no main secondary species to consider for any UoA. SG100 is met by all UoAs.		
b	**Information adequacy for assessment of impacts on minor secondary species**			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	UoA 1			Y
	UoA 2-7			Y
	Justification	The landing obligation provides verifiable quantitative information on the impacts the fishery may have both on minor secondary species. Besides, some secondary species are subtect to MFRI advice which serves to estimate the impact of the UoA on these species with respect to status. There are no secondary species to consider by UoAs 2-7. SG100 is met by all UoAs.		

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species, and **evaluate** with a **high degree of certainty** whether the strategy is **achieving its objective**.
	UoA 1	Y	Y	N
	UoA 2-7	Y	Y	Y
	Justification	There are no main secondary species to consider for any UoA. Information collected through landing records, landing sampling and research surveys serves to support a partial strategy to manage secondary species. This is done through the publication of MFRI fishing advice, the assignation of fishing quotas, and the management and implementation when necessary of fishing closed areas. SG60 and SG80 are met by all UoAs. However, as for UoA 1, not all minor secondary species are subject to these management measures. Therefore, SG100 is not met by UoA 1. As regards UoAs 2-7, the lack of secondary species to consider serves to support SG100, as the fact that all the catch is the targeted prawn serves to support with a high degree of certainty that the strategy to avoid the catch of non-targeted species is achieving its objective. SG100 is met by UoAs 2-7.		
References		MFRI advice for long rough dab, starry ray, spotted wolfish, lump fish and whiting. https://www.hafogvatn.is/en/harvesting-advice ICES advice for black scabbardfish. http://ices.dk/sites/pub/Publication%20Reports/Advice/2016/2016/bsf-nea.pdf IUCN red list. Landing records. http://www.fiskistofa.is/english/quotas-and-catches/catches-in-individual-species/		

OVERALL PERFORMANCE INDICATOR SCORE UoA 1	**95**
OVERALL PERFORMANCE INDICATOR SCORE UoA 2-7	**100**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guidepost	Where national and/or international requirements set limits for ETP species, the effects of the UoA on the population/stock are known and **likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, the **combined effects of the MSC UoAs** on the population/stock are known and **highly likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a **high degree of certainty** that the **combined effects of the MSC UoAs** are within these limits.
	UoA 1	Y	Y	N
	UoA 2-7	Y	Y	N
	Justification	According to MSC definition of ETP species, the following species should be considered in this PI, as they are both protected and present in Icelandic waters: - Halibut (*Hippoglossus hippoglossus*): Regulation 1164/2011 - Spurdog (*Squalus acanthias*): Regulation 456/2017 - Portbeagle (*Lamna nasus*): Regulation 456/2017 - Basking shark (*Cetorhinus maximus*): Regulation 456/2017 - Blue whale (*Balaenoptera musculus*): CITES Appendix 1 - Bowhead whale (*Balaena mysticetus*): CITES Appendix 1 - Gray whale (*Eschrichtius robustus*): CITES Appendix 1 - Humpback whale (*Megaptera novaeangliae):* CITES Appendix 1 - North Atlantic right whale (*Eubalaena glacialis*): CITES Appendix 1 - Northern bottlenose whale (*Hyperoodon ampullatus*): CITES Appendix 1 - Atlantic puffin (*Fratercula arctica*): IUCN Vulnerable - Leach's Storm-petrel (*Hydrobates leucorhous):* IUCN Vulnerable Of all the mentioned species, halibut is the only one that appears in landing records of UoA 1. There are no landings by UoAs 2-7. Regulation 1164/2011 sets that catches of halibut should be kept at the minimum possible level but does not set a zero limit. Among other measures, the regulation establishes that the benefits of the sell of landed halibut will be invested in research projects, limiting by this way the possible profit of catching this species. There is no observer programme in Iceland, but a comprehensive follow up of the different fisheries by the Coast Guard and the Directorate of Fisheries. Also, the MFRI conducts two annual research trips which simulate the fishing conditions of commercial fishing vessels. As regards possible interactions of marine mammals and bird species with the UoAs, direct information both from MFRI and the fishermen report no expected interactions of the fishery with bird species. Landing records show that 465 kg of halibut were landed by UoA 1 during 2016. In the same year, landings of halibut by all Icelandic vessels was 123 tons. Landings by UoA 1 represent a 0.4% of all halibut landings in Iceland and 0.01% of the catch by UoA 1 in 2016. According to MFRI advice, 80% of the landings are reported to be by the bottom trawl fleet. According to these data, the team considers that it is highly likely that the		

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
		combined effects of the MSC UoAs on the stock are within national limits (for halibut and the ETP sharks) and international limits (for all other ETP species). The different MSC UoAs would refer to all ISF fisheries in Icelandic waters. In any case, annual landings and status of halibut is monitored by MFRI which provides an updated annual advice on the stock status. National limits for halibut include the end of any directed fishing of halibut, the mandatory landing of any halibut in the catch, and the use of the money obtained at the auction house when selling halibut for MFRI research projects. Therefore, the catch of halibut is not penalized itself but hasn't got any economic compensation for the fishermen. The tight control on landings by all fishing fleets in Iceland, along with research undertaken in the halibut stock and the positive trend in the SSB of the stock (and also in the landings) serves to support that SG60 and SG80 are met by all UoAs. The increased number of halibut landings since the implementation of the ban in 2012 (raising from 35 tons in 2012 to 123 tons in 2016), and the knowledge that at least 80% of those landings are reported to be taken by the bottom trawl fleet, makes it difficult to determine if MSC certified Icelandic trawl vessels are trying to avoid that catch or not. Landings of halibut in Iceland in 2010 and 2011 (when there was a directed fishery targeting halibut) were 500 tons per year. The team considers that there isn't a high degree of certainty that the combined effects of all Icelandic MSC UoAs are within these limits. SG100 is not met by any UoA. However, it is also reasonable to think that the increasing in landings is due to an improvement in stock status, as shown in MFRI advice on halibut.		
b	Direct effects			
	Guidepost	Known direct effects of the UoA are likely to not **hinder recovery** of ETP species.	Known direct effects of the UoA are **highly likely** to not **hinder recovery** of ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species.
	UoA 1	Y	Y	Y
	UoA 2-7	Y	Y	Y
	Justification	Landing obligation would require vessels to land any dead animal, regardless it being ETP species or not. Landing records show about 0.5 tons of halibut landed per year by UoA 1, which accounts for less than 0.4% of global landings in the country (123 tons in 2016) and for only 0.01% of the UoA catch. There aren't any other interactions with ETP species by any UoA. Interviews with different stakeholders (fishermen, the Coast Guard and MFRI) all concluded that fatal interactions with birds or marine mammals would only occur very rarely, which is in concordance with records at landing records and auction points. The team considers that with the given levels of interactions by UoA 1, it is highly likely that the UoA is not hindering the recovery of the halibut stock. SG60 and SG80 are met. The low level of landings by UoA 1 provides a high degree of confidence that the UoA won't have significant detrimental effects on the halibut stock. SG100 is met by UoA 1. There were no catches of halibut (or of any other EP species) by UoAs 2-7. Therefore, there is a high degree of certainty that there are no significant detrimental effects on ETP species. SG60, Sg80 and SG100 are met by UoAs 2-7.		
c	Indirect effects			
	Guidepo		Indirect effects have	There is a high degree of

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
	st		been considered and are thought to be **highly likely** to not create unacceptable impacts.	confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	UoA 1		Y	N
	UoA 2-7		Y	N
	Justification	Possible indirect effects could arise from trophic disturbances caused by the removal of prawn biomass. It is not expected that the removal of prawn biomass (which is very localised inside the fjords for UoAs 2-7 and in waters North of Iceland for UoA 1, while halibut distributes in waters Southwestern of Iceland) would affect halibut stock status, as there is no real overlap in the distribution of both stocks. As regards all other ETP species present in the area (sharks, marine mammals and birds mentioned in SIa), there could be indirect effects due to noise disruptions or injuries made by the net. The team considers that it is highly likely that the different UoAs do not create unacceptable impacts on ETP stocks. SG80 is met by all UoAs. However, it is not possible to assert with a high degree of confidence that there are no indirect effects on ETP species. SG100 is not met by any UoA.		
References		Icelandic Regulation 1164/2011. Icelandic Regulation 456/2017, prohibiting direct fishing for spurdogs (*Squalus acanthias*), portbeagle (*Lamna nasus*) and basking shark (*Cetorhinus maximus).* MFRI Advice for halibut 2017 Fiskistofa: landings of halibut in 2016		

OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**85**
OVERALL PERFORMANCE INDICATOR SCORE: UoA 2-7	**85**
CONDITION NUMBER (if relevant):	**N/A**
Recommendation	**4**

Evaluation Table for PI 2.3.2 – ETP species management strategy

PI 2.3.2		The UoA has in place precautionary management strategies designed to: • **meet national and international requirements;** • **ensure the UoA does not hinder recovery of ETP species.** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place (national and international requirements)			
	Guidepost	There are **measures** in place that minimise the UoA-related mortality of ETP species, and are expected to be **highly likely to achieve** national and international requirements for the protection of ETP species.	There is a **strategy** in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be **highly likely to achieve** national and international requirements for the protection of ETP species.	There is a **comprehensive strategy** in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to **achieve above** national and international requirements for the protection of ETP species.
	UoA 1	Y	Y	N
	UoA 2-7	Y	Y	N
	Justification	In December 2011, Iceland ordain Regulation 1164/2011 banning directed fishing for halibut in the Icelandic EEZ. This regulation entered into force in January 2012 and established measures to manage halibut individuals in the event of catch, such as the obligation to release any animal if it is viable, the establishment of a special fee for illegal catches, the collection of the value of halibut at auction places for marine research, the obligation to record halibut catches on the logbook, and the establishment of penalties in case of violation of the regulation. The fulfillment of these measures is enforced by the Coast Guard. The Directorate of Fisheries report no infractions regarding illegal catching of halibut. All these measures, already in place, are considered as a strategy to manage the impact of all Icelandic fisheries in the stock of halibut. Information from MFRI advice on halibut supports a small but noticeable recovery in the stock of halibut since the implementation of Regulation 1164/2011 in 2012. In May 2017, Iceland ordain Regulation 456/2017 banning directed fishing for spurdogs, portbeagles and basking sharks. If there is an incidental catch of these species, they shall be released if viable. If the recovery of these individuals is not viable, the catch shall be landed. The benefits of the sale of these illegal catches will be used for research purpouses and won't provide any economic benefit nor detriment to the vessel which brought it. The fulfillment of this measure is enforced by the Coast Guard. To the team's knowledge, there have been no infractions so far. As regards interactions with any other ETP species mentioned in PI2.3.1.a, these interactions are regulated by Regulation 557/2007 which establishes that such		

PI 2.3.2		The UoA has in place precautionary management strategies designed to: • **meet national and international requirements;** • **ensure the UoA does not hinder recovery of ETP species.** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
		interactions must be recorded in logbooks, so that fatal interactions or catch of birds or other endangered species must be reported to the Directorate of Fisheries. Marine mammals are regulated by the Fisheries Management Act and Nature Conservation Act. no. 47/1971. Further, in Iceland, whaling is controlled by the International Whaling Commission (IWC) and the North-Atlantic Marine Mammal Commission (NAMMCO). Every 7 seven years there is an update on the number of estimated mammals in Icelandic waters, which is issued after specific monitoring of these species. Besides, fishermen would prevent fatal interactions by letting marine mammals feed before they pump or haul the catch on board. Interviews with different stakeholders (fishermen, the Coast Guard and the MFRI) all concluded that interactions with birds or marine mammals only occur very rarely. All UoAs achieve SG60 and SG80, as the UoAs are not hindering the recovery of these species, but the strategy is not considered to be comprehensive as it would benefit from records obtained through on going monitoring of non-fatal interactions, such as records of areas and quantities of released halibut or ETP sharks or sightings of protected birds and whales.		
b	Management strategy in place (alternative)			
	Guidepost	There are **measures** in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **strategy** in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **comprehensive strategy** in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species
	All UoAs	Not relevant	Not relevant	Not relevant
	Justification	SIb is not relevant as SIa has been scored.		
c	Management strategy evaluation			
	Guidepost	The measures are **considered likely** to work, based on **plausible argument** (e.g., general experience, theory or comparison with similar fisheries/species).	There is an **objective basis for confidence** that the measures/strategy will work, based on **information** directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a **quantitative analysis** supports **high confidence** that the strategy will work.
	UoA 1	Y	Y	Y

PI 2.3.2		The UoA has in place precautionary management strategies designed to: • meet national and international requirements; • ensure the UoA does not hinder recovery of ETP species. Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.		
	UoA 2-7	Y	Y	Y
	Justification	The absence of fatal interactions with birds and marine mammals, the comprehensive landing weighting and recording system, the enforcement carried out by the Coast Guard, the information on the fisheries general compliance with regulations, MFRI comments on the low probability of interactions of the fishery with birds and marine mammals to take place, MFRI advice on halibut showing a small but noticeable recovery of halibut stock and recent implementation of Regulation 456/2017 protecting certain sharks species serve together to give confidence that this strategy is working for all ETP species. SG60 and SG80 are met by all UoAs. The quantitative analysis of ETP interactions by the different UoAs, and the direct information from the fishery and species involved serve to support with a high degree of confidence that the strategy will work. SG100 is met by all UoAs.		
d	Management strategy implementation			
	Guidepost		There is some **evidence** that the measures/strategy is being implemented successfully.	There is **clear evidence** that the strategy/comprehensive strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) or (b).
	UoA 1		Y	N
	UoA 2-7		Y	N
	Justification	Regulation 1164/2011 banning halibut fishing effectively entered in force in 2012 and landings of halibut decreased significantly since then. While none of the UoAs had interactions with ETP sharks in the past years, it is expected that global landings of these species in Icelandic waters will decrease in the following years. Landing records by the UoAs show that interactions of the UoA with marine mammals or birds are nil. The Coast Guard enforcement system serves to prevent or control infractions of these regulations (such as Regulation 1164/2011, Regulation 557/2007 and 47/1971). The Directorate of Fisheries confirms no infractions at this regard. The team considers that there is clear evidence that the strategy has been implemented successfully. SG80 is met by all UoAs. The limited interactions by UoA 1 and nil by UoAs 2-7 would serve as clear evidence that the strategy is achieving its objective as set out in scoring issue (a) in relation to halibut and ETP shark stocks. However, the lack of information on updated status of certain ETP species (such as marine mammals) prevent all UoAs from achieving SG100, as data on non-fatal interactions such as halibut or ETP sharks releases and sightings of ETP birds and marine mammals (or injuries		

PI 2.3.2		The UoA has in place precautionary management strategies designed to: • **meet national and international requirements;** • **ensure the UoA does not hinder recovery of ETP species.** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
		of whales) are not yet recorded. SG100 is not met by any UoA.		
e	Review of alternative measures to minimize mortality of ETP species			
	Guidepost	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
	UoA 1	Y	Y	Y
	UoA 2-7	Y	Y	Y
	Justification	Sampling of landings serve to monitor catch composition and provide records of species identification and quantities landed. It also serves as a historical collection of ETP fatal interactions caused by the fishing fleet. Data on the sampling of the landings, which includes UoA related mortality of halibut, are reviewed annually both by management authorities and by MFRI. This has resulted in the implementation of management measures when necessary, such as the establishment of Regulation 1164/2011 banning the fishing of halibut, which was issued once a significant decrease in halibut stock status was noted. Moreover, in 2017 Regulation 456/2017 was implemented protecting certain shark species. All UoAs meet SG100.		
References		Icelandic Regulation 557/2007. Icelandic Regulation 1164/2011. Icelandic regulation 456/2017. MFRI Advice for halibut 2017 Fiskistofa: landings of halibut in 2016. CITES Appendix 1		

OVERALL PERFORMANCE INDICATOR SCORE:	**90**
OVERALL PERFORMANCE INDICATOR SCORE:	**90**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 2.3.3 – ETP species information

PI 2.3.3		Relevant information is collected to support the management of UoA impacts on ETP species, including: • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts			
	Guidepost	Qualitative information is **adequate to estimate** the UoA related mortality on ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Qualitative information is **adequate to estimate productivity and susceptibility** attributes for ETP species.	Some quantitative information is **adequate to assess** the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.	Quantitative information is available to assess with a high degree of certainty the **magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status** of ETP species.
	UoA 1	Y	Y	N
	UoA 2-7	Y	Y	N
	Justification	There is accurate quantitative information on the UoAs related mortality thanks to historical landing records, which shows no fatal interactions with ETP birds, marine mammals or ETP sharks. These records also show no interactions of UoAs 2-7 on halibut, and limited interactions by UoA 1. There is also information on halibut landing trends since the implementation of the ban on fishing halibut. This trend shows that catches have increased from 35 tons per year in 2012 to 123 tons in 2016. The MFRI continues to offer scientific advice on halibut stock status, which shows a slow recovery and advices on the maintenance of Regulation 1164/2011 until the stock is fully recovered. This information is sufficient to determine if the different UoAs are a threat or not to the protection of ETP species. SG60 and SG80 are met by all UoAs. However, the lack of records on released halibuts and ETP sharks (date, location and quantities) and on ETP sightings or on injuries that these species may receive, prevent all UoAs from achieving SG100, as the impacts and		

PI 2.3.3		Relevant information is collected to support the management of UoA impacts on ETP species, including: • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
		consequences to the status of ETP species due to non-fatal interactions cannot be defined with a high degree of certainty. SG100 is not met by any UoA.		
b	Information adequacy for management strategy			
	Guidepost	Information is adequate to support **measures** to manage the impacts on ETP species.	Information is adequate to measure trends and support a **strategy** to manage impacts on ETP species.	Information is adequate to support a **comprehensive strategy** to manage impacts, minimize mortality and injury of ETP species, and evaluate with a **high degree of certainty** whether a strategy is achieving its objectives.
	UoA 1	Y	Y	N
	UoA 2-7	Y	Y	N
	Justification	Collected information is adequate to support a strategy to manage impacts on ETP species. Landing records would record fatal interaction with protected birds and whales if any. There is also a marine mammal monitoring program which monitors the population of these species every 7 years to update information on populations. Seals are also monitored through a monitoring program which estimates the number of individuals in seal colonies in the North part of Iceland. As regards halibut, landings have been recorded from long periods, and records show how landings dropped from 2000 tons per year in the past century to 1000 tons and later to 500 tons, until the banning regulation was enforced. Since then, landings have grown from 35 tons in 2012 to 122 tons in 2016. Similar landing records are available for ETP shark species. All these data on landings, along with MFRI advice on the stock status, which is reviewed every year, serves to measure trends and support a strategy to manage impacts on ETP species, however, the survival rate of released halibuts has not been estimated yet. As regards survival rate for elasmobranchs such as spurdogs, if the return is done quickly, experimental studies demonstrate that there is a high probability of survival (Mandelman and Farrington 2007a). The team considers that a better reporting of non-fatal interactions with all ETP species and research conducted to estimate survival rate of released halibuts would benefit the fishery in order to achieve SG100.		
References		Icelandic Regulation 456/2017. Icelandic Regulation 557/2007 Icelandic Regulation 1164/2011. MFRI Advice for halibut 2017 Fiskistofa: landings of halibut in 2016		

PI 2.3.3	**Relevant information is collected to support the management of UoA impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**
	CITES Appendix 1 Mandelman, J.W., and M.A. Farrington. 2007a. The estimated short-term discard mortality of a trawled elasmobranch, the spiny dogfish (*Squalus acanthias*). Fisheries Research 83 (2007) 238–245.

OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**80**
OVERALL PERFORMANCE INDICATOR SCORE: UoAs 2-7	**80**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 2.4.1 – Habitats outcome

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.		
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guidepost	The UoA is **unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	UoA 1	Y	Y	N
	UoAs 2-7	Y	Y	N
	Justification	As for the offshore shrimp fishery (UoA 1), the UoA fishing grounds are located in offshore waters in waters North of Iceland, at depths up to 300 m. While it could be possible that other fishing vessels took some prawns as bycatch, landing records show that shrimps are not taken by any other bottom trawl fleets in Iceland, and all landings are responsability of the regulated offshore shrimp fishery. However, shrimp could migrate in the future and UoA 1 covers all Icelandic EEZ. While affected areas can range from sandy or muddy bottoms to gravel and cobbled areas, according to the European Marine Observation and Data Network (EMODnet) map, mud is the most abundant underwater habitat within Icelandic EEZ, and shrimps are normally localized in sandy sediments. Fishing grounds for UoAs 2-7 are localized in small areas inside the different fjords, limiting habitat's impacts to very small areas. According to ICES 2017 Ecosystem overview on Icelandic waters, 10% of the 79000 km2 of the Icelandic ecoregion was affected by bottom trawling. This percentage shows a decreasing trend, which is more noticeable on the southern shelf and at typical shrimp trawling grounds on the northern shelf, where UoA 1 takes place. MSC guidance suggests that serious (or irreversible) harm refers to change that fundamentally alters the capacity of the component to maintain its function (e.g. reducing ecosystem services; loss of resilience; regime shift; gross changes in composition of dependent species) or to recover from the impact (within timescales of natural ecological processes – normally one or two decades). Bottom trawling affects benthic habitats through relocation of shallow burrowing infaunal species to the surface of the seafloor, and by resuspension of surface sediment. The fact that bottom trawlers fish once and again over the same areas serves to reduce the area affected by the trawling. Kaiser et al. (2006) concluded that otter trawling produced a significant, negative, short-term effect on soft habitats such as mud and sand, but no detrimental effects were seen in the long term once the fishing stops. Moreover, there was also a longer-term positive effect on the response variables to this impact.		

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.		
		Data on the persistence of trawl marks in different environments are relatively scarce because only immediate physical effects are observed in most studies owing to their relatively short time frames. However, there are some studies of recovery times after otter trawling in soft or sandy bottoms, as described in FAO's link to physical impacts of the fishing gears (http://www.fao.org/docrep/008/y7135e/y7135e06.htm). These observations show that the most noticeable marks are those caused by the doors, and only faint marks are created by other parts of the trawl. Trawl door marks have been shown to be from 1 to 5 cm deep (Brylinski, Gibson and Gordon Jr., 1994), but may reach about 20 cm in certain parts of the tracks (Krost *et al.,* 1990). The penetration depth depends on the weight and performance of the doors (type, angle of attack, speed) and on sediment grain size and hardness, being deeper in mud than in sand (Churchill, 1989; Krost *et al.,* 1990; Tuck *et al.,* 1998). The persistence of marks produced by trawl doors depends on their original depth, the sediment type, the current, wave action and biological activity (Tuck *et al.,* 1998; Fonteyne, 2000; Smith, Papadopoulou and Diliberto, 2000; Humborstad *et al.,*2004). Research undertaken in different soft sediment areas showed that trawl door marks were shown to disappear within less than five months in an area of strong currents as in the Barents Sea (Humborstad *et al.,* 2004). This area could simulate the conditions in UoA 1 fishing grounds. In a sheltered Scottish loch, however, faint marks could still be seen 18 months after the trawling treatment (Tuck *et al.,* 1998), and the same trawl track could be identified for almost five years in a sandy mud area in Kiel Bay that is not exposed to tidal currents (Bernhard, 1989, cited in Krost *et al.,* 1990). These areas could simulate the conditions in UoAs 2-7 fishing grounds. It is noteworthy to remark that fishing areas in UoAs 2-7 are very localized areas within the different fjords. According to this information, the team concludes that it is highly unlikely that the gear will reduce habitat structure and function of commonly encountered habitats (these are sandy and muddy habitats) to the point where there would be serious or irreversible harm as described in MSC FCR v2.0 SA3.13.4 (such that the habitat would be unable to recover at least 80% of its structure and function within 5-20 years if fishing in the habitat were to cease entirely). SG60 and SG80 are met by all UoAs. The lack of such evidence prevents all UoAs from achieving SG100.		
b	VME habitat status			
	Guidepost	The UoA is **unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	UoA 1	Y	N	N

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.		
	UoAs 2-7	Y	Y	N
	Justification	All Icelandic vessels have a VMS on board regardless the vessel's size. This serves the Coast Guard both to locate the vessel should an emergency occur or to verify that vessels do not enter Marine Protected Areas. According to the OSPAR Commission, most common Vulnerable Marine Ecosystems (VME) in Region 1 are: coral gardens, deep-sea sponge aggregations, intertidal mudflats, *Lophelia pertusa* reefs, *Modiolus modiolus* beds, seamounts and *Zostera* beds. Of those, the following can be found in Icelandic waters: cold water hard corals (*Lophelia pertusa*), soft corals (*Gorgonacea & Pennetulacea*) and sponge aggregations (*Geodia spp*.). Other VME such as maerl beds and hydrothermal vents are found in Icelandic coastal waters. To date, only *Lophelia pertusa* cold water coral reefs and hydrothermal chimneys are protected by specific regulation. As regards intertidal mudflats, *Modiolus modiolus* beds, *Zostera* beds and seamounts, there are no interactions between the shrimp fishery and these VME. According to ICES 2017 Ecosystem overview on Icelandic ecoregion, abrasion caused by bottom trawls has been shown to impact fragile three-dimensional biogenic habitats in particular (e.g. sponge aggregations, coral gardens, and coral reefs), with impacts happening mainly in deeper waters (> 200 m). While as part of Icelandic regulation, bottom trawling is generally not allowed within 12 nm from the coast, this is not the case for the shrimp fishery in inshore waters (UoAs 2-7). Fishing takes place in deep waters inside the fjords and close to the shoreline. However, the footprint of the shrimp fishery for UoAs 2-7 is very small as fishing for shrimps takes place in very localised areas inside the fjords. Remote Operated Vehicle surveys, carried out under the auspices of the CoralFISH project (data from 2004), indicated widespread damage to corals on the Icelandic outer continental shelf, but undamaged colonies on the continental slope. The Icelandic National Biodiversity Strategy and Action Plan (Ministry for the Environment, 2008) and the Ministry of Fisheries work for the protection of vulnerable ecosystems and threatened species by regulating closed areas and developing lighting fishing methods. As a result, benthic habitats such as *Lophelia pertusa* cold water corals reefs, most of which are concentrated in the Southern areas of Iceland, at a depth range between 400-800 m benefit from area closures. Enforcement in area closures is carried out by the Coast Guard. Interactions of cold water corals with UoA 1 are not expected as fishing takes place at depths up to 300 m in the northern shelf of the island. Interactions of cold water corals with UoAs 2-7 are not expected as research in the different UoA shows no presence of these species inside the fjords. Cold water corals meet SG80 for all UoAs. Distribution of coral gardens was studied through the BIOICE programme which showed that gorgonian corals and seapens are common in deep waters (with depth ranging from 500-1700m) all around Iceland, and rare at depths shallower than 500 m. To date, there aren't any specific management measures directed to the protection of coral gardens. However, interactions of the different UoAs with		

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.
		these VME are not expected, as there is no overlap between the fishing grounds depth (up to 300 m.) and the depth at which these species are located (in waters deeper than 500m). Besides, research on the different fjords could not found any evidence of the presence of these species in the fjords under assessment. The research on coral gardens is continued by MFRI. Coral gardens meet SG80 for all UoAs. Aggregation of large sponges occur off northern and southern Iceland and around the Reykjanes Ridge (Guijarro et al., 2006). These are found primarily in the depth range of ca. 300-750 m, and habitat forming sponge communities are common at depths of up to 500 m. Deep-sea sponges have similar habitat preferences to cold-water corals, and hence are often found at the same location (OSPAR Commission 2010c). However, while most cold-water coral reefs are located south of Iceland, sponges are distributed all around the island (OSPAR Commission 2010c), including the northern area where the fishery takes place. According to Webster, C. (2016), heavy trawling significantly impacts the sponge communities in the western seas around Iceland, showing a lower diversity of sponge taxa and smaller size of sponges in higher fished sites. Overall abundance, on the other hand, is similar in non-fished and heavily-fished sites, due to the high abundance of certain species like *Quasillina brevis,* which may be successful in these disturbed environments, and when removed from analyses, the impacts of heavy fishing effort are seen to be adverse to the abundance of other sponges. As regards the presence of sponges in the fjords under assessment, while some individuals can be found in the different fjords, these are not encountered in sufficiently high densities to consider them as sponge aggregations. There are no specific measures protecting sponge communities, which benefit from area closures directed to the protection of cold water corals in the southern shelf of Iceland but which are not protected elsewhere. Sponge aggregations meet SG80 in UoAs 2-7, as such aggregation are not reported in the different fjords under assessment. However, sponge aggregations do not meet the requirement of SG80 for UoA1, as there is spatial overlap (In the northern waters of Iceland) and depth overlap (at the 300 m. depth) between the UoA1 fishing grounds and the distribution of these aggregations. The partial protection of sponge aggregations (granted by area closures directed to the protection of cold-water coral reefs and by the high spatial and depth distribution of the sponge aggregations when compared to UoA 1 fishing grounds) serves to justify that SG60 is met for UoA 1. As reported on MFRI website, over the next few years priority will be given to map the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances. Such information will be important in order to predict which species and habitats are being at risk of being damaged by fishing activities and for protection of important marine habitats in the future. It is therefore considered that there is some protection for certain VME habitats, either due to specific measures to protect habitats (such as the 12 nm limit, *Lophelia pertusa* cold water reefs MPA or hydrothermal chimneys MPA in Eyjafjordud) or due to the difficulties of trawling in certain areas. But these measures are not protecting other VME habitats in the region, such as sponge aggregations. Although bottom trawling generally damages both the structure and function of

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.		
		encountered VME habitats, it is expected that the broad range of MPA and associated regulation, together with MFRI research program on benthic habitats, will serve to avoid serious or irreversible harm to VME. The strong enforcement conducted by the Coast Guard through its monitoring system verifies that Marine Protected Areas are not entered by the fleet. This good enforcement system and the high number of protected areas serve to satisfy SG60 for all UoAs. The abundance of VME such as sponge communities in waters north of Iceland, where the offshore shrimp fishery takes place, prevent UoA 1 from achieving SG80, as there isn't a clear separation between the areas where fishing activity takes place and the location of VME such as sponge aggregations which are not yet protected and there isn't any specific management measure directed to the protection of this VME. SG80 and SG100 are not met for UoA 1. As regards UoAs 2-7, in-fjord studies of marine habitats around Iceland are conducted not only by MFRI (see https://www.hafogvatn.is/is/midlun/utgafa) but also by the University of Iceland (http://luvs.hi.is/fjolrit_liffraedistofnunar_1972_2008) and by the Westfjord Nature Research Center (http://www.nave.is/utgefid_efni/). The fjords in general have very soft sediment in the deeper parts along the centre. Harder substrate (sandy, gravelly) is found in the flanks. Corals (*Scleractinia, Gorgonia*), seapens, *Modiolus modiolus* beds, *Zostera* beds or high densities of deep-water sponge aggregations have never been reported in the fjords under assessment, as these species are mainly found in waters deeper than 200 m. The different studies by these institutions cover all inshore UoAs and conclude that there are no VME to consider in the fjords under assessment. SG60 and SG80 are met for Uoas 2-7. SG100 is not met due to the lack of published evidence.		
c	**Minor habitat status**			
	Guidepost			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	UoA 1			N
	UoAs 2-7			N
	Justification	While there is little room for the occurrence of minor habitats in the UoAs 2-7 fishing grounds (due to the small size of these fishing grounds), the team could not find any specific evidence that the gear (of any UoA) is highly unlikely to reduce the structure and function of minor habitats to a point where here would be serious or irreversible harm so this fails to meet SG 100. SG100 is not met by any UoA.		
References		Jennings, S., Dinmore, T.A., Duplisea, D.E., Warr, K.J., Lancaster, J.E., 2001. Trawling disturbance can modify benthic production processes. J. Animal Ecol. 70, 459-475. http://onlinelibrary.wiley.com/doi/10.1046/j.1365-2656.2001.00504.x/pdf		

PI 2.4.1	**The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.**
	Kaiser, M.J., K. R. Clarke, K.R., Hinz, H., Austen, M.C.V., Somerfield, P.J., Karakassis, I. 2006. Global analysis of response and recovery of benthic biota to fishing. Marine Ecology Progress Series. Vol. 311: 1–14, 2006. http://www.fao.org/docrep/008/y7135e/y7135e06.htm CoralFISH project. Ecosystem based management of corals, fish and fisheries, in the deep waters of Europe and beyond. Study areas: Region 2: Iceland. http://www.eu-fp7-coralfish.net. http://www.emodnet.eu/ http://www.hafro.is/undir_eng.php?ID=16&REF=2 OSPAR vulnerable and threatened habitat types. OSPAR Commission (2010c). Background Document for deep sea sponge aggregations. Biodiversity Series. 46 pages. See pages 5 and 12. https://www.ospar.org/documents?d=7234 Webser, C. 2016. University College London. Thesis: Impacts of benthic trawling on sponge community composition around Western Iceland. Marine Ecology Progress Series. August 2016. ICES 2017 Ecosystem overview. Brylinski, Gibson and Gordon Jr., 1994. Krost *et al.,* 1990 Churchill, 1989; Tuck *et al.,* 1998 Fonteyne, 2000; S Webster, C. (2016) Smith, Papadopoulou and Diliberto, 2000; Guijarro et al., 2006. Humborstad *et al.,*2004 https://www.hafogvatn.is/is/midlun/utgafa http://luvs.hi.is/fjolrit_liffraedistofnunar_1972_2008 http://www.nave.is/utgefid_efni/

OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**70**
OVERALL PERFORMANCE INDICATOR SCORE: UoAs 2-7	**80**
CONDITION NUMBER (if relevant): only for UoA 1	**3**
Recommendation	**4**

Evaluation Table for PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are **measures** in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a **partial strategy** in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a **strategy** in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
	UoA 1	Y	N	N
	UoAs 2-7	Y	N	N
	Justification	The 60 score is justified because the necessary measures are in place. These include the following elements: - Iceland has a detailed management strategy for protecting certain areas (permanent, seasonal or temporary closures), in order to protect both fish spawning areas (Fisheries Management Act:116/2006) or vulnerable habitats such as cold-water corals or hydrothermal chimneys (Ministry of Fisheries Act: No. 942/2016; Nature Conservation Act: 44/1999) . - Iceland has ratified different international conventions intended to protect habitats and ecosystems, such as the OSPAR Convention, the CITES Convention and the Convention on Biological Biodiversity. - Iceland is a Contracting Party to the North East Atlantic Fisheries Commission (NEAFC). In 2014 NEAFC adopted Recommendation 19 (amended in 2015) that requires vessels to move 2 nautical miles away from trawl tracks when encountering "the presence of more than 30 kg of live coral and/or 400 kg of live sponge of VME indicators". Icelandic vessels abide by commonly accepted move-on rules when encountering VMEs, however these remain informal. - Vulnerable areas are closed for fishing: There is a comprehensive mapping project in place by MFRI, there is limited size of the fishing grounds, limited possibility of encounters with VME, implemented area closures to protect certain habitat types such as coral reefs but which also protect associated sponge communities, and strong enforcement in place ensuring that vessels do not enter MPA. The 80 and 100 score is not achieved because of the following: - There are no mandatory measures yet in place to protect certain VME such sponge aggregations which overlap with UoA 1 or to protect other VME such as coral gardens (regardless of interactions not being expected by any UoA). - The lack of established and mandatory measures to avoid impacts to these communities (such as mandatory scientifically based (gear,		

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.		
		habitat) specific move on rules in the case of encounters with VME indicator species for all vessels at all UoAs) prevent all UoAs SG80 and SG100.		
b	Management strategy evaluation			
	Guidepost	The measures are **considered likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).	There is some **objective basis for confidence** that the measures/partial strategy will work, based on **information directly about the UoA and/or habitats** involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on **information directly about the UoA and/or habitats** involved.
	UoA 1	Y	Y	N
	UoAs 2-7	Y	Y	N
	Justification	The team considers that there is sufficient information directly about the fishery and habitats involved to consider with an objective basis for confidence that the present measures will work. This is based on the large number of area closures (of which some of them are focused on the protection of juvenile fish but at the same time are preventing damage in the seafloor, while others are focused on the protection of cold water corals which also benefit associated sponge aggregation communities), the limited area where the fishing activity takes place, the strong enforcement system managed by the Coast Guard, which monitors all vessels at real time, the establishment of new protected areas and MFRI studies on benthic habitats both in-fjord (https://www.hafogvatn.is/is/midlun/utgafa) and in off-shore waters. According to MFRI website, over the next few years priority will be given to map the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances. Research on benthic habitats is not only undertaken by MFRI but also by other institutions such as the University of Iceland (http://luvs.hi.is/fjolrit_liffraedistofnunar_1972_2008) and the Westfjord Nature Research Center (http://www.nave.is/utgefid_efni/). The team considers that no testing has been made to support with a high degree of confidence that the partial strategy, as defined right now, is sufficient to manage all impacts on habitats. Besides, there isn't any comprehensive benthic management plan based on full Icelandic EEZ mapping. SG100 is not met by any UoA.		
c	Management strategy implementation			
	Guidepost		There is **some quantitative evidence** that the measures/partial strategy is being implemented successfully.	There is **clear quantitative evidence** that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.		
				issue (a).
	UoA 1		Y	N
	UoAs 2-7		Y	N
	Justification	Coast Guard information confirms that vessels comply with measures related to Marine Protected Areas, and no infringements were reported in the past years. This can be verified as all Icelandic vessels are obliged to carry VMS on board, regardless of the vessel's size. The team considers that this is sufficient to reach SG80 for all UoAs, although it is acknowledged that the partial strategy in place is not yet managing the impact of all MSC UoAs/non-MSC fisheries on habitats, as vulnerable habitats such as coral gardens and sponge aggregations are not yet directly protected. The condition set on 2.4.2.a and 2.4.1.b will help to improve the protection of affected VME. SG80 is met for all UoAs. As there is not clear quantitative evidence that habitats recover after closures or how long do they take to recover, as that would require a historic series of seabed habitats maps, it is not possible to determine if the partial strategy is achieving its objective. SG100 is not reached by any UoA.		
d	**Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs**			
	Guidepost	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	There is **some quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	UoA 1	Y	Y	Y
	UoAs 2-7	Y	Y	Y
	Justification	Conversations with the Coast Guard and infringements statistics serve the team as clear quantitative evidence to ascertain that the UoAs comply with management requirements such as closed areas. SG60 is met by all UoAs. To the team's knowledge, there are no other voluntary protection measures afforded by other MSC/ non MSC fisheries to take into account. SG80 and SG100 are met by all UoAs.		
References		Ystuvíkurstrýtur chimneys. Webster, C. 2016. Nature Conservation Act 44/1999. Fisheries Management Act 116/2006. Stakeholders interview with the Directorate of Fisheries and the Coast Guard.		
OVERALL PERFORMANCE INDICATOR SCORE: UoA 1				**75**

PI 2.4.2	There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.
OVERALL PERFORMANCE INDICATOR SCORE: UoAs 2-7	**75**
CONDITION NUMBER (if relevant): All UoAs.	**4**

Evaluation Table for PI 2.4.3 – Habitats information

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guidepost	The types and distribution of the main habitats are **broadly understood**. OR If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and **vulnerability** of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. OR If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	UoA 1	Y	Y	Y
	UoAs 2-7	Y	Y	Y
	Justification	The Mapping European Seabed Habitats portal (www.searchmesh.net) provides accurate information on the distribution of the different habitats in European waters, including Icelandic EEZ. Vulnerable habitats are identified and mapped by the OSPAR Commission (www.ospar.org). The CoralFISH project works in assessing the interaction between cold water corals, fish and fisheries. The MFRI conducts two annual demersal research trips which have serve to identify areas of vulnerable benthic habitats in Icelandic waters such as cold-water corals, large sponge aggregation areas, or maerl beds in relation to bottom trawl fishing activities. Mandatory VMS on board serves to know the distribution of Icelandic fishing effort. All UoAs achieve the requirements at SG60, SG80 and SG100.		
n	Information adequacy for assessment of impacts			
	Guidepost	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of	The physical impacts of the gear on all habitats have been quantified fully.

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.		
		OR **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	use of the fishing gear. OR **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	
	UoA 1	Y	Y	N
	UoAs 2-7	Y	Y	N
	Justification	All Icelandic vessels carry VMS on board at every moment. Electronic logbooks record when and where the fishing nets are deployed. These mandatory requirements serve to identify marine areas potentially affected by the UoA. The team considers that overlapped information of VMS tracks (of any of the UoAs) with OSPAR and seabed habitat maps would provide reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. There is also sufficient information both on the substratum (see Figure 35), and geomorphology of Icelandic EEZ (see Figure 36). Since 2000, MFRI maps Icelandic EEZ waters with a multi beam echo sounder and plans to conclude this project by 2026. The distribution of VME species present in the area has been mapped by different authors (see **Figure 39** for OSPAR threatened habitats,		

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.		
		Figure 40 for the distribution of *Lophelia pertusa* reefs, Figure 41 for the distribution of soft corals, Figure 42 for the distribution of sponge aggregations and **Figure 43** for the distribution of Zostera beds). The distribution of Marine Protected Areas can be found in Figure 44 and Figure 45). Research conducted by different authors or institutions (such as Webster, C. 2016 thesis on benthic trawling impacts on sponge communities or the MFRI project on Mapping benthic flora and fauna in Icelandic EEZ) allows for the identification of the main impacts that bottom trawling may have on different habitat types. FCR SA3.15.6.d requires that catch and catch rates of VME indicator organisms are known. Information on these interactions are collected by different research programs (BIOICE, NovasArc) by MFRI and other institutions (OSPAR Commission, CoralFISH), however there isn't yet any established recording system by the fleet in order to identify, monitor and manage these encounters. The recording system suggested in Conditions 2 and 3 (PI 2.4.1 and PI 2.4.2) will help to improve the availability of this information. SG60 and SG80 are met by all UoAs. As physical impacts of the fishing gears in the different UoAs has not been fully quantified yet (although there is sufficient information to do so), SG100 is not met by any UoA. A recommendation has been set for the client to facilitate an estimation of the areal footprint of the fishery in relation to the fishing grounds.		
c	Monitoring			
	Guidepost		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in habitat distributions over time are measured.

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.		
	UoA 1		Y	N
	UoAs 2-7		Y	N
	Justification	Information on habitat types on Icelandic fishing grounds is collected by research vessels from the MFRI, which carry on at least two research trips per year (spring and autumn) where all bottom trawl catch composition is analyzed. The MFRI is carrying out at present the project "Mapping benthic flora and fauna in Icelandic EEZ". The first sampling for this project was taken in fall 2016. Besides, the MFRI also creates detailed bathymetrical mapping of Icelandic EEZ seabed using a multibeam echo sounder. SG 80 is met by all UoAs. The lack of historical records difficulty the possibility of measure changes in habitat distribution over time. SG 100 is not met by any UoA.		
References		Natura Directive (http://natura2000.eea.europa.eu/#), OSPAR Commission (https://odims.ospar.org/maps/298) Mapping European Seabed Habitats portal (www.searchmesh.net). Icelandic area closures: click this link (it needs Google Earth installed). http://www.fisheries.is/management/fisheries-management/area-closures/ Marine Research Institution seabed mapping Webster, C. 2016. Impacts of benthic trawling on sponge community composition around Western Iceland. MSc Thesis. University College London (UCL).		

OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**85**
OVERALL PERFORMANCE INDICATOR SCORE: UoAs 2-7	**85**
CONDITION NUMBER (if relevant):	**N/A**
Recommendation	**5**

Evaluation Table for PI 2.5.1 – Ecosystem outcome

PI 2.5.1		**The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Ecosystem status			
	Guidepost	The UoA is **unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	UoA 1	Y	Y	N
	UoAs 2-7	Y	Y	N
	Justification	The shrimp mainly feed on detritus but may also be a scavenger. Shrimp is also important as a food item for many fish species. They are preyed upon by cod, Greenland halibut, haddock, and other fish species. The trophic relationships of prawn with other species are reasonably well known and are described in the Icelandic Atlantis Ecosystem Model (Sturludottir et al, 2016). According to MFRI, the shrimp stocks are environmentally driven and the fishery has limited impact on stock status. The shrimp fishery is subject to different quotas in the different fishing grounds. On an annual basis, MFRI conducts a shrimp survey trip in the different fishing grounds and elaborates a different fish advice for each one of these areas, which takes into account the biomass of the stock, the population trends, and predator needs. Management advice for the fishery is based upon the index of stock biomass from the stock survey and a target Fproxy (catch/biomass) which varies in each one of the fishing areas and which is based on historical relationships between catch and survey indices of the shrimp stocks in the different fishing areas. However, this advice is reduced by a 20% precautionary buffer which takes into account predation needs as well as seasonal changes in spatial distribution or other environmental factors. The allocated fishing quota follows this advice ensuring that the stock is sustainable harvested. When the stock declines in certain areas effort is limited accordingly, leading to annual fishing closures when necessary. As shrimps are a short-lived species, stocks can recover within a few years after a serious decline. Catch composition in all UoAs is very clean. For the offshore fleet (UoA 1), the targeted shrimp comprises 65% of the total catch, however the fishery also targets cod and Greenland halibut (which account for another 30% of the catch) with the use of a tunnel sac. As for the inshore fleet (UoAs 2-7), there aren't any other species to consider in the catch composition, and the whole catch is the targeted shrimp. Fishing in these UoAs takes place in very localised fishing grounds, limiting the localization of the fishing impacts. As the fishery in the different UoAs follows MFRI advice the team considers that it is highly unlikely that the different UoAs disrupt key elements of the ecosystem and function to a point where there would be serious or irreversible harm. SG60and SG80 are met for all UoAs. The lack of evidence prevents the fishery (all UoAs) from achieving SG100.		
References		Sturludottir, E., Desjardins, C.D., Logemann K., Marteinsdottir, G., and Stefansson, G. 2016. ICES CM 2016/F:215: Integrated ecosystem model of Icelandic waters (Icelandic Atlantis Ecosystem Model).		

PI 2.5.1	The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.
	http://www.ices.dk/sites/pub/ASCExtended2016/Shared%20Documents/F%20-%20Integrated%20ecosystems%20assessment%20and%20decision%20support%20to%20advance%20ecosystem-based%20fisheries%20management/ErlaSturludottirICES2016.pdf Landing records MFRI shrimp fishing advice in the different fishing grounds.

OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**80**
OVERALL PERFORMANCE INDICATOR SCORE: UoAs 2-7	**80**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are **measures** in place, if necessary which take into account the **potential impacts** of the fishery on key elements of the ecosystem.	There is a **partial strategy** in place, if necessary, which takes into account **available information and is expected to restrain impacts** of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a **strategy** that consists of a **plan**, in place which contains measures to **address all main impacts of the UoA** on the ecosystem, and at least some of these measures are in place.
	UoA 1	Y	Y	Y
	UoAs 2-7	Y	Y	Y
	Justification	The Icelandic Fisheries Management Act serves as a strategy to address all main impacts of the UoA on the ecosystem. The objective of the Act is to promote conservation and efficient utilization of marine stocks. There are different measures to accomplish this goal: - Establishment of both permanent and temporary fishing closures. These have been designed either to protect fish spawning areas or vulnerable marine ecosystems. - Establishment of closed areas in case of risk depletion for the prawn stocks. - Establishment of TACs and quotas for prawn in the different UoAs and also for most commercial fish species in Iceland. - Landing obligation and official weighting and sampling of the landings. - Enforcement system and mandatory VMS and logbook - Scientific advice for many fish species, including fishing advice for prawn in the different UoAs. - Research on marine species (including an annual trip to study the shrimp development in the different UoAs and 2 annual ecosystem and habitat research trips) and habitats. - Natural mortality is an important element in the stock assessment program. SG60, SG80 and SG100 are granted for all UoAs.		
b	Management strategy evaluation			
	Guidepost	The **measures** are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).	There is **some objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the UoA and/or the ecosystem	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or ecosystem involved

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.		
			involved	
	UoA 1	Y	Y	N
	UoAs 2-7	Y	Y	N
	Justification	The comprehensive collection of information of fishing removals, the research undertaken by MFRI on the status of prawn in the different fishing grounds, together with the evaluation of other fish stocks (which are primary and secondary species for UoA 1), the mapping of benthic areas (both inside the fjords and in offshore waters) and the study of benthic organisms, along with a highly equipped and effective enforcement system, and the immediate answer given to the presence of juveniles in catch composition (which would lead real-time short-time closures) or even annual shrimp closures in certain fishing grounds, along with the already existing protected areas for the protection of spawning fish or vulnerable ecosystems give objective basis for confidence that the strategy will work. SG60 and SG80 are met for all UoAs. The lack of testing on this strategy along with the lack of protection on vulnerable ecosystems such as sponge communities or soft corals prevent the fishery from gaining SG100. SG100 is not met by any UoA.		
c	**Management strategy implementation**			
	Guidepost		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	UoA 1		Y	Y
	UoAs 2-7		Y	Y
	Justification	The Icelandic Fisheries Management Act was agreed in August 2006 and different measures have been implemented since then through different means, such as banning bycatch, the obligation of the use of VMS, regulating closed areas both for the protection of juveniles and for the protection of vulnerable habitats, establishing procedures for the weighing and sampling of landings, promoting marine research, establishing quotas for different marine stocks in accordance with marine research (including different fishing advice and quotas for prawn in the different UoAs), and establishing a strong enforcement system through the Directorate of Fisheries and the Coast Guard that assures the accomplishment of the different measures. Infringements are negligible. The lack of infringements, together with the healthy status of the stocks for which fishing is allowed and the management measures that limit fishing activities for stocks in a poorer situation serve to justify that the management strategy is achieving its objective. The recovery of depleted stocks after the establishment of different management measures (as in the case of Atlantic		

PI 2.5.2	There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.
	halibut) give confidence that the management strategy works effectively. SG80 and SG100 are granted for all UoAs.
References	Icelandic Fisheries Management Act. http://www.hafro.is/undir_eng.php?REF=2

OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**95**
OVERALL PERFORMANCE INDICATOR SCORE: UoAs 2-7	**95**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guidepost	Information is adequate to **identify** the key elements of the ecosystem.	Information is adequate to **broadly understand** the key elements of the ecosystem.	
	UoA 1	Y	Y	
	UoAs 2-7	Y	Y	
	Justification	The Icelandic ecosystem has been studied by different researches (*Astthorssona, O.S., Gislasona, A., and Jonssona S. 2007; Valdimarsson, H., Astthorsson, O. S., and Palsson, J. 2012*) and institutions, such as the Icelandic Marine and Freshwater Research Institute, ICES or the Icelandic Institute of Natural History. Besides, key elements of the ecosystem, such as primary and secondary productivity, and predator-prey relationships, are described in the Icelandic Atlantis Ecosystem Model. Information from these studies is adequate to broadly understand the key elements of the ecosystem in this area. SG60 and SG80 are met by all UoAs.		
b	Investigation of UoA impacts			
	Guidepost	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but **have not been investigated** in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and **some have been investigated in detail**.	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and **have been investigated in detail**.
	UoA 1	Y	Y	N
	UoAs 2-7	Y	Y	Y
	Justification	The model and projects mentioned in SIa serve to describe main impacts and interactions between the UoAs and the different ecosystem elements, such as fishery biomass removal, trophic interactions and prey relationships or impacts on the seabed. Besides, landing records and MFRI research on the shrimp fishery show that interactions of the prawn fishery and non-targeted species (being these bycatch species or ETP species) are minimal. The team agrees that main impacts and some interactions have been investigated in detail, therefore SG60 and SG80 are granted for all UoAs. As for the offshore shrimp fishery, the team considers that the limited information on the stock status of certain vulnerable secondary species, along with the impacts that the fishery may cause in non-protected vulnerable		

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
		habitats, prevents UoA 1 from achieving SG100. However, the lack of any other species in the catch composition of the inshore shrimp fishery, together with the localization of the fishing activity in very limited areas inside the different fjords, are sufficient to grant SG100 for UoAs 2-7.		
c	Understanding of component functions			
	Guidepost		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are **known**.	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are **understood**.
	UoA 1		Y	Y
	UoAs 2-7		Y	Y
	Justification	Impacts of the fishery on target, primary, secondary or ETP species are fully quantified and monitored. The Icelandic Atlantis Ecosystem Model provides sufficient knowledge on the trophic relationships of shrimps and other species in the ecosystem. Moreover, since 1988 MFRI conducts an annual shrimp research trip to monitor shrimp populations in the different fishing grounds, plus two research trips per year to study fishing impacts on ecosystem elements and habitats. While there is room for improvement in the collection of information of affected benthic species by the UoAs vessels, information on expected impacts on habitat types can be obtained from VMS tracks, mandatory in all Icelandic vessels. The main functions, role and importance of the different habitats and related benthic species present in the area are also studied by different habitat research programs, as described in the background section. The team agrees that there is a good understanding of the functions of the different elements in the ecosystem. SG80 and SG100 are met by all UoAs.		
d	Information relevance			
	Guidepost		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
	UoA 1		Y	N
	UoAs 2-7		Y	Y
	Justification	Available information gathered by management measures (VMS tracks, landing records and sampling) and by research institutions (MFRI fishing advice, MFRI		

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
		research trips on shrimp but also ecosystem surveys, and Atlantis ecosystem modelling), serve to identify and describe the main consequences that the different UoAs have on the ecosystem. SG80 is met by all UoAs. As for UoA 1, the team considers that the diversity on catch composition (although in low abundance), the limited information on the stock status of certain vulnerable secondary species, and the limited information on the effects that the offshore shrimp fishery may have on benthic habitats limit UoA 1 from achieving SG100. However, as regards UoAs 2-7, the inshore shrimp fishery takes place in very localized areas inside the different fjords. VMS maps and the enforcement system ensure that fishing takes place in the small fishing grounds. This measure heavily limits the impacts that these UoAs may have on habitat types. Besides, the fact that there are no primary, secondary or ETP species in the catch composition serve to facilitate the study of the impacts that these UoAs may have on the different ecosystem components and elements. SG100 is met for UoAs 2-7.		
e	Monitoring			
	Guidepost		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	UoA 1		Y	Y
	UoAs 2-7		Y	Y
	Justification	Detailed information obtained though landing obligation, landing records and sampling, VMS tracks on fishing grounds, MFRI and ICES advice on different fishing stocks, including the shrimp advice in the different fishing grounds, MFRI research trips, both on shrimp status and on ecosystem surveys, information obtained from the Atlantis ecosystem model, sampling on benthic communities and mapping of Icelandic EEZ seabed, Coast Guard enforcement system and monitoring of protected areas, monitoring of marine mammals and bird populations, and studies on climate change impacts (*Astthorssona et al*., 2007), are considered adequate to detect any increase in risk level and to support the development of strategies to manage ecosystem impacts. SG80 and SG100 are granted for all UoAs.		
References		Sturludottir, E., Desjardins, C.D., Logemann K., Marteinsdottir, G., and Stefansson, G. 2016. ICES CM 2016/F:215: Integrated ecosystem model of Icelandic waters (Icelandic Atlantis Ecosystem Model). http://www.ices.dk/sites/pub/ASCExtended2016/Shared%20Documents/F%20-%20Integrated%20ecosystems%20assessment%20and%20decision%20support%20to%20advance%20ecosystem-based%20fisheries%20management/ErlaSturludottirICES2016.pdf Astthorssona, O.S., Gislasona, A., Jonssona, S. 2007. Climate variability and the Icelandic marine ecosystem. Deep-Sea Research II 54 (2007) 2456–2477. ICES 2008. Greenland and Iceland ecosystem overview. ICES Advice 2008, Book		

PI 2.5.3	There is adequate knowledge of the impacts of the UoA on the ecosystem.
	2. Valdimarsson, H., Astthorsson, O. S., Palsson, J. 2012. Hydrographic variability in Icelandic waters. ICES Journal of Marine Science (2012), 69(5), 816 –825. doi:10.1093/icesjms/fss027 The Icelandic Institute of Natural History, Ministry of Environment, 2001. Biological diversity in Iceland
OVERALL PERFORMANCE INDICATOR SCORE: UoA 1	**90**
OVERALL PERFORMANCE INDICATOR SCORE: UoAs 2-7	**100**
CONDITION NUMBER (if relevant):	**N/A**

Principle 3: All UoAs.

Evaluation Table for PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: • **Is capable of delivering sustainability in the UoA(s); and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Compatibility of laws or standards with effective management			
	Guide post	There is an effective national legal system **and a framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	Iceland has a well-established system for fisheries management in place, now codified in the 1990 Fisheries Management Act, amended in 2006. The Act details procedures for the determination of TAC (Art. 3) and allocation of harvest rights, including permits and catch quotas (Art. 4–14). It also lays out the system for individual transferable quotas in some detail (Art. 15), as well as procedures for monitoring, control and surveillance (Art. 16–18) and the application of sanctions (Art. 24–27). Further provisions are provided in a number of other acts, such as the 1997 Act on Fishing in Iceland's Exclusive Fishing Zone and the 1996 Act concerning the Treatment of Commercial Marine Stocks, as well as in regulations at lower levels of the legal hierarchy, issued by the relevant management authorities. Iceland is also signatory to, and has ratified, the major international agreements pertaining to fisheries management, such as the 1982 Law of the Sea Convention and the 1995 Fish Stocks Agreement. Fishing by foreign vessels is regulated by the 1998 Act on Fishing and Processing by Foreign Vessels in Iceland's Exclusive Economic Zone. Icelandic vessels' fishing outside Icelandic the Icelandic EEZ is regulated by the 1996 Act on Fishing outside of Icelandic Jurisdiction. The Ministry of Industries and Innovation – which has two ministers: one for Tourism and Innovation and one for Fisheries and Agriculture – is the policy-making body in Icelandic fisheries management and sets annual TAC based on scientific recommendations from the Marine Research Institute. The Minister of Fisheries and Agriculture, in turn, is responsible for two departments: one on fisheries and aquaculture and one for food and agriculture. The Directorate of Fisheries is the implementing body within the management system, formally subordinate to the Ministry as an agency. It issues fishing licenses, allocates annual vessel quotas and oversees the daily operation of the individual transferable quota system. The Directorate is also responsible for monitoring, control and surveillance, in cooperation with the Coast Guard, which is a civilian law enforcement agency under the Ministry of the Interior (see PI 3.2.3). Through the Fisheries Management Act, other relevant acts and regulations issued by the Ministry and the Directorate, binding procedures for cooperation between the different governmental agencies involved are in place, able to provide management outcomes that are consistent with MSC Principles 1 and 2.		

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: • **Is capable of delivering sustainability in the UoA(s); and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**		
		SG 100 is met.		
b	Resolution of disputes			
	Guide post	The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be effective** in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes that is appropriate to the context of the fishery and has been **tested and proven to be effective**.
	Met?	Y	Y	Y
	Justification	There is an effective, transparent dispute resolution mechanism in place in Iceland, as fishers can take their case to court if they do not accept the rationale behind an infringement accusation by enforcement authorities or the fees levied against them. Verdicts at the lower court levels can be appealed to higher levels. The proceedings of the courts are open to the public and the rulings are easily accessible on the internet. Although rare, there have been examples of fishers taking their case to court, and the system has proven effective in resolving disputes in a timely manner. In practice, however, the vast majority of disputes are resolved within the management system, which incorporates ample formal and informal opportunities for fishers and other stakeholders to interact with the authorities (see PI 3.1.2), e.g. to clear out disagreement and conflict among users and between users and authorities. SG 100 is met.		
c	Respect for rights			
	Guide post	The management system has a mechanism to **generally respect** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **observe** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	Iceland is highly dependent on fisheries, and the rights of traditional users were in the main secured when individual transferable quotas were introduced on the		

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: • Is capable of delivering sustainability in the UoA(s); and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework.
		basis of historical fishing. One of the main objectives of Icelandic fisheries management, in addition to conservation and efficient utilization of marine living resources (see PI 3.1.3), is to ensure stable employment and settlement throughout Iceland. According to the Fisheries Management Act (Art. 10), the Minister of Fisheries each fishing year shall have available harvest rights amounting to up to 12,000 tonnes which he or she may use to offset major economic or social disturbances that may occur in times of sizeable fluctuations in catch quotas, or for regional support to smaller communities that have experienced significant reduction in employment as a result of unexpected cutbacks in quotas. Such additional quotas can be allocated for up to three years at a time. The Act (Art. 6) further grants all citizens the right to fish in Icelandic waters provided the catch is for their own consumption. Overall, distribution of harvest rights is considered to be consistent with the social and cultural context of Icelandic fisheries. SG 100 is met.
References		Act concerning the Treatment of Commercial Marine Stocks No. 57/1996, amended as Act No. 144/2008. Act on Fishing in Iceland's Exclusive Fishing Zone No. 79/1997. Act on Fishing Outside of Icelandic Jurisdiction No. 151/1996. Act on Fisheries Management No. 38/1990, amended as Act No. 116/2006. Act on Fishing and Processing by Foreign Vessels in Iceland's Exclusive Economic Zone No. 28/1998, amended as Act No. 88/2008. Arnason, R. (2005), 'Property rights in fisheries: Iceland's experience with ITQs', *Review of Fish Biology and Fisheries* 15: 243–264. Danielsson, A. (1997), 'Fisheries management in Iceland', *Ocean & Coastal Management* 35: 121–135. Eythórsson, E. (2000), 'A decade of ITQ-management in Icelandic fisheries: consolidation without consensus', *Marine Policy* 24: 483–492. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit.
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		**N/A**

Evaluation Table for PI 3.1.2 – Consultation, roles and responsibilities

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG 60	SG 80	SG 100
a	Roles and responsibilities			
	Guide post	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.
	Met?	Y	Y	Y
	Justification	The functions, roles and responsibilities of all actors in the Icelandic system for fisheries management are explicitly defined in the Fisheries Management Act and supporting legislation and are, according to our interviews during site visit, well understood for all areas of responsibility and interaction. As laid out under SI 3.1.1 a), governance functions are split between the Ministry of Industries and Innovation, the Directorate of Fisheries, the Marine Research Institute and the Coast Guard. Different user groups are well integrated in the management process; see SI 3.1.2 b). SG 100 is met.		
b	Consultation processes			
	Guide post	The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used**.
	Met?	Y	Y	Y

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
	Justification	Iceland has a consensus-based system for fisheries management and long tradition of continuous consultation and close cooperation between government agencies and user-group organizations. As emphasized by all stakeholders interviewed during the site visit, lines of communication are short and much consultation takes place informally, in direct and often spontaneous contact between representatives of user groups and authorities. At a more formal level, all major interest organizations are regularly invited to sit on committees established to review changes in government, and they meet for regular consultations with the Ministry, the Directorate and the Parliament's (Althing) Permanent Committee for Fisheries and Agriculture. These include, but are not restricted to, Iceland Fisheries (which was established in 2014 as the result of a merger between two of the most influential user-groups in Icelandic fisheries: the Federation of Icelandic Fishing Vessel Owners and the Federation of Icelandic Fish Processing Plants) and the Fisheries Association of Iceland (which also incorporates the two latter as well as the Federation of Owners of Small Fishing Vessels, the Icelandic Seamen's Federation and others). Further, local authorities are actively engaged in fisheries management and have easy access to the management system. There are no NGOs that show any interest in fisheries management in Icelandic waters at the moment. Major international NGOs that usually engage actively in discussions about fisheries management, such as Greenpeace and WWF, do not have offices in Iceland. Local NGOs are more concerned with nature protection on land. Consultation processes cover policies and regulatory issues, and also include discussions of the annual scientific recommendations by the Marine Research Institute. Shortly after presenting the recommendations to the Ministry, representatives of the Institute enter into dialogue with the fishing industry regarding the status of the stocks and the nature of the recommendations. The Ministry also consults with the industry before setting the final TACs. Stakeholders report consultation processes to be inclusive and transparent, with management authorities displaying consideration of the information obtained from stakeholders and explaining how it is used or not used, mostly in direct communication via email, telephone or informal personal meetings. SG 100 is met.		
c	Participation			
	Guide post		The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.
	Met?		Y	Y

PI 3.1.2		**The management system has effective consultation processes that are open to interested and affected parties.** **The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**
	Justification	As follows from SI 3.1.2 b), the consultation processes provide ample opportunity for all interested and affected parties to become involved in discussions about fisheries management in Iceland. Authorities invite relevant stakeholders to meetings and seminars and actively seek their opinion on management measures. The level of active encouragement is considered appropriate to the scope and context of the fishery. SG 100 is met.
References		Act on Fisheries Management No. 38/1990, amended as Act No. 116/2006. Arnason, R. (2005), 'Property rights in fisheries: Iceland's experience with ITQs', *Review of Fish Biology and Fisheries* 15: 243–264. Eythórsson, E. (2000), 'A decade of ITQ-management in Icelandic fisheries: consolidation without consensus', *Marine Policy* 24: 483–492. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit. Kokorsch, M., Karlsdóttir, A. and Benediktsson, K. (2015), 'Improving or overturning the ITQ system? Views of stakeholders in Icelandic fisheries', *Maritime Studies* 14:15.
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		**N/A**

Evaluation Table for PI 3.1.3 – Long term objectives

PI 3.1.3		**The management policy has clear long-term objectives to guide decision-making that are consistent with MSC fisheries standard, and incorporates the precautionary approach.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC fisheries standard and the precautionary approach, are **implicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach are **explicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within **and required by** management policy.
	Met?	Y	Y	Y
	Justification	The objectives of Icelandic fisheries management, as stated in the Fisheries Management Act (Art. 1), are to ensure conservation and efficient utilization of marine living resources in the Icelandic EEZ; and, as stated in the Act concerning the Treatment of Commercial Marine Stocks, to encourage sustainable utilization of commercial marine stocks in order to ensure maximum long-term return for the Icelandic nation (Art. 1). The precautionary approach is not mentioned explicitly in either act, but the requirement to protect marine resources and take the best scientific knowledge into account (Fisheries Management Act, Art. 3), among other things, equals the requirements of the precautionary approach, as laid out in the FAO Code of Conduct. Since these principles are codified in formal law, their application is required by management policy. SG 100 is met.		
References		Act concerning the Treatment of Commercial Marine Stocks No. 57/1996, amended as Act No. 144/2008. Act on Fisheries Management No. 38/1990, amended as Act No. 116/2006. FAO Code of Conduct for Responsible Fisheries, 1995.		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				**N/A**

Evaluation Table for PI 3.2.1 Fishery-specific objectives

PI 3.2.1		**The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific management system.	**Short and long-term objectives**, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.	**Well defined and measurable short and long-term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.
	Met?	Y	Y	N
	Justification	Short- and long-term objectives consistent with achieving the outcomes of MSC Principles 1 and 2 are explicit in the Fisheries Management Act and supporting legislation, including the overarching objective to maintain the shrimp stock at sustainable level, to reduce bycatch and negative impact on ETP species and habitats, including protecting vulnerable habitat types by implementing permanent area closures where chimneys or coral reefs have been localized. SG 80 is met. However, these objectives are generally not very well defined or measurable, so SG 100 is not met.		
References		Act on Fisheries Management No. 38/1990, amended as Act No. 116/2006. Act concerning the Treatment of Commercial Marine Stocks No. 57/1996, amended as Act No. 144/2008.		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				**N/A**

Evaluation Table for PI 3.2.2 – Decision-making processes

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery.		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guide post	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Y	Y	
	Justification	Established decision-making procedures in the Icelandic fisheries management system – evolved over several decades and now codified in the Fisheries Management Act and supporting legislation – ensure that strategies are produced and measures taken to achieve the fishery-specific objectives. This applies to the shrimp fisheries as it does to Icelandic fisheries in general; see PIs 3.1.1 and 3.1.2 above. Measures include, among other things, the establishment of TACs on the basis of scientific advice, technical regulation of the fisheries (such as gear regulations) and closure of areas; cf. P1 and P2 above.		
b	Responsiveness of decision-making processes			
	Guide post	Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Y	Y	N
	Justification	According to our interviews during the site visit, the established decision-making procedures at national level in Iceland respond to serious and other important issues identified in research, monitoring, evaluation or by groups with an interest in the fishery. This is ensured through the formal and informal arenas for regular and ad hoc consultations between governmental agencies and the industry. In addition, there is close contact between authorities and scientific research institutions. Both scientists and user-group representatives claim that the relevant government agencies are open to any kind of input at any time. They feel that the authorities' response is transparent and timely and that the ensuing		

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery.		
		policy options take adequate account of their advice. From the authorities' point of view, these consultations contribute to enhanced quality of decision-making and also to the legitimacy of the regulations. SG 80 is met. However, there are instances where stakeholder input has not been acted upon by management authorities, for instance suggestions to introduce a move-on rule in the fishery. Therefore SG 100 is not met.		
c	Use of precautionary approach			
	Guide post		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	Decision-making processes are based on relevant scientific research by the Marine Research Institute, and national legislating requires the use of the precautionary approach, as operationalized in the FAO Code of Conduct for Responsible Fisheries (see PI 3.1.3). Management authorities have consistently followed the scientific advice in their setting of TAC in recent years. SG 80 is met.		
d	Accountability and transparency of management system and decision-making process			
	Guide post	Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's performance and management action is available on request**, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Y	Y	Y
	Justification	The Directorate of Fisheries and the Marine Research Institute produce annual reports that are available to the public on request. In these reports, actions taken or not taken by the relevant authority are accounted for, including those proposed on the basis of information from research, monitoring, evaluation and review activity. This information is also conveyed at the frequent meetings between authorities and all interested stakeholders and, not least, on the		

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery.		
		website of the Directorate of Fisheries. The website contains detailed and updated information on quotas and catches broken down to individual vessels, species and gear, among other things. In the opinion of the assessment team, this counts as formal reporting appropriate to the context of the fishery, as much as letters to stakeholders would have done. SG 100 is met.		
e	Approach to disputes			
	Guide post	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Y	Y	Y
	Justification	The national management authority is not subject to continuing court challenges. When occasionally taken to court by fishing companies, the management authority complies with the judicial decision in a timely manner. The management authority works proactively to avoid legal disputes through the tight cooperation with user-groups at the regulatory level, ensuring as high legitimacy as possible for regulations and other management decisions. Regulatory and enforcement authorities offer advice to the fleet on how to avoid infringements. Only the most serious cases go to prosecution by the police and possible transfer to the court system. SG 100 is met.		
References		Act on Fisheries Management No. 38/1990, amended as Act No. 116/2006. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit. Website of the Directorate of Fisheries (www.fiskistofa.is).		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				**N/A**

Evaluation Table for PI 3.2.3 – Compliance and enforcement

PI 3.2.3		**Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.**		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guide post	Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	Y
	Justification	Monitoring, control and surveillance is taken care of by the Directorate of Fisheries, in collaboration with the Coast Guard, the Marine Research Institute and coastal municipalities. The enforcement system is based on reports from the vessels, physical inspections at sea and weighing in harbour, as well as information exchange with other states' enforcement authorities. The structure and procedures of the enforcement system are codified in the Fisheries Management Act (Art. 17–18), while requirements to the weighing system are laid out in the Act concerning the Treatment of Commercial Marine Stocks (Art. 5–12). Fishing vessels are required to keep an electronic logbook and report catches to the Directorate of Fisheries using an electronic recording and reporting system (ERS). VMS is obligatory for all vessels regardless of size, also inshore. Inspectors from the Directorate may accompany fishing vessels on trips or operate from Coast Guard vessels. The Coast Guard has three offshore patrol vessels, as well as a number of smaller boats, helicopters and a surveillance aircraft. At-sea inspections include control of the logbook, catch and gear. If a certain amount of the catch is found to be below size limit, the inspector can initiate a short-term close (usually two weeks) for the fishery of that particular species, vetted by the Marine Research Institute and confirmed by the Directorate of Fisheries. Inspections are conducted using a risk-based framework aimed at utilizing resources to optimize compliance at any given moment. Most importantly, 100 % of the landed fish is weighed by an authorized 'weighmaster', employed by the municipality and hence independent of both buyer and seller. Landing data are immediately added to the Directorate's catch database, where the reported quantities of fish are deducted from the vessel's quota. The Directorate operates a dynamic and interactive website, where stakeholders at all times can monitor the precise quota status for each species and observe the performance of individual vessels, their catch from each fishing trip and vessel quota status. The fact that the vast majority of catch is exported provides a further control mechanism enabling a mass balance comparison of fish in (i.e. landing		

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.		
		declarations) with fish out (i.e. production or export volumes). Hence, Iceland has in place a comprehensive and transparent system for monitoring, control and surveillance, and there are a number of possibilities for enforcement authorities to physically check whether the data provided by fishers through self-reporting are indeed correct. In addition, VMS data enables control of whether area restrictions are observed, among other things. The system has demonstrated a consistent ability to enforce relevant management measures; see SI 3.2.3 c) on compliance in the fishery. SG 100 is met.		
b	Sanctions			
	Guide post	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.
	Met?	Y	Y	Y
	Justification	The sanctioning system in Icelandic fisheries is codified in the Fisheries Management Act (Art. 24–27) and the Act concerning the Treatment of Commercial Marine Stocks (Art. 13–24). A system for graduated sanctions is applied. For a first-time offence, a warning ('reprimand') is given if the infringement is of a less serious nature (Fisheries Management Act, Art. 24). In the other end of the spectrum, serious or repeated deliberate violations can be liable to imprisonment of up to six years (Art. 25). Fines for first offences shall not exceed ISK 4,000,000,-, depending upon the nature and scope of the violation. Repeated offences shall be fined by a minimum of ISK 400,000 and a maximum of ISK 8,000,000,- (Art. 25). Withdrawal of fishing permit can be applied in a number of situations. As an example (cf. the Act concerning the Treatment of Commercial Marine Stocks, Art. 14), if information of the Directorate of Fisheries suggests that a vessel has caught in excess of its catch quotas for any species, the Directorate must notify this to the vessel operator and master of the vessel concerned, stating in addition that the vessel's commercial fishing permit is suspended on the fourth working day thereafter unless sufficient catch quotas have been transferred to the vessel within that time. If the recipient of the notification is of the opinion that the information of the Directorate of Fisheries concerning the vessel's catch is incorrect and that the vessel has not caught in excess of its catch quotas, he/she must convey such objections to the Directorate of Fisheries within three days. If a permit is suspended for the second time during the same fishing year due to catch exceeding catch quotas, the Directorate of Fisheries shall suspend a vessel's commercial fishing permit for two weeks in addition to the time resulting from the suspension provided for in the first paragraph, for six weeks if it occurs for the third time and for twelve weeks if it occurs more often. As another example (Fisheries Management Act, Art. 17), the Directorate of Fisheries shall suspend the commercial fishing permits of vessels failing to submit catch log books; such suspensions shall remain in force until submissions are received or explanations provided for the reasons for failure to submit. In the first instance of a violation which is liable to suspension of fishing permit,		

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.		
		the suspension shall apply for at least one week and no longer than 12 weeks, depending upon the nature and scope of the violation. In the case of repeated violations, a suspension shall apply for at least four weeks and not longer than one year (Act concerning the Treatment of Commercial Marine Stocks, Art. 15). If a vessel's commercial fishing permit has repeatedly been suspended, as provided for in Articles 14 and 15 of this Act, the Directorate of Fisheries may decide that a fishing inspector shall be stationed aboard the vessel at the expense of the vessel operator for a specific period of up to two months. The vessel operation must then pay all cost arising from the presence of the fishing inspector aboard, including salary cost (Art. 16). If there is suspicion of more serious infringements, the case may be transferred to the Ministry (Art. 18) or to a court (Art. 20). All decisions on the suspension of harvest rights are to be made publicly available (Art. 21). The comprehensive enforcement system (see SI 3.2.3 a)) combined with the high level of compliance (see SI 3.2.3 c)) makes it reasonable to assume that the system provides effective deterrence. The deterrent effect of sanctions is corroborated in interviews at the site visit. SG 100 is met.		
c	Compliance			
	Guide post	Fishers are **generally thought** to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Y	Y	Y
	Justification	According to the Directorate of Fisheries, the Icelandic shrimp fishery is very clean; in recent years, no 'substantial' infringements (affecting the sustainability of the stock) have been detected, only 'technical' infringements such as forgetting to apply for the annual renewal of the fishing license. As follows from SI 3.2.3 a) above, Iceland has a comprehensive system for physical inspection of catches, through observers and spot checks at sea and, not least, 100 % coverage of independent landing checks. In addition to these coercive compliance mechanisms, various forms of norm-, legitimacy- and communication-related mechanisms have also proven to be effective in delivering compliance in fisheries. In Iceland, there is a degree of social control in the small coastal communities from which the fishery takes place ('neighbour watch', as expressed by one of our interviewees at the site visit), and the high level of user-group involvement (see PI 3.1.2 above) may provide regulations with a degree of legitimacy that increases fishermen's inclination to comply with them. The same applies to the relationship between fishermen and enforcement officers, which is reported to be good, not least because the Coast Guard is not only policing the fishing ground; it is also the most important service provider and search and rescue operator at sea. Further, inspectors are reported to		

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.		
		approach the fishermen in a respectful manner and provide guidance on how to avoid infringements, thus taking a more consultative role in addition to their traditional policing role towards the fishing fleet. The MSC Fisheries Standard does not give any specific guidance as to what level of compliance is required to conclude that fishers 'comply with the management system under assessment'. Nor would that be reasonable since the absence of infringements in inspection statistics might as well imply that inspectors are not competent (or willing) enough to detect non-compliance, or that they focus attention on those parts of the fishery where compliance is highest; cf. the note on risk-based control above. Hence, official compliance information can only give an indication, and must be seen in relation to other factors, such as the comprehensiveness of the enforcement system, the legitimacy of the management system as such, assumptions on the reliability of data provided by the enforcement authorities and other anecdotal evidence of compliance. It is the qualitative judgment of the assessment team that the requirement that fishers 'comply with the management system' is met in this fishery – this does not imply that infringements never take place (which is probably not the case in any fishery), but that most rules are generally respected. The requirement that fishers provide information of importance to the effective management of the fishery is definitely met. So the question remains whether fishers are 'generally thought to comply' (required for a 60 score), whether 'some evidence exists' that they comply (required for an 80 score), or whether there is 'a high degree of confidence' that they comply (required for a 100 score). The comprehensiveness of the enforcement system, the reliability and transparency of compliance information and the legitimacy of the management system taken together, makes it reasonable to conclude that there is a high degree of confidence that fishers comply. SG 100 is met.		
d	Systematic non-compliance			
	Guide post		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	According to the Directorate of Fisheries, there is no evidence of systematic non-compliance in the fishery. The assessment team has not come across information indicating that this is not the case.		
References		Act on Fisheries Management No. 38/1990, amended as Act No. 116/2006. Act on the Icelandic Coast Guard No. 58/2006. Act concerning the Treatment of Commercial Marine Stocks No. 57/1996, amended as Act No. 144/2008. Annual report for the Directorate of Fisheries, 2016. Gezelius, S.S. (2012), Regulation and Compliance in the Atlantic Fisheries, Dordrecht: Springer. Hønneland, G. (2013), *Making Fishery Agreements Work*, Cheltenham: Edward		

PI 3.2.3	Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.
	Elgar. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit. Regulation No. 224, 14 March 2006, on Weighing and Recording of Catch. Website of the Icelandic Coast Guard (www.lhg.is). Website of the Directorate of Fisheries (www.fiskistofa.is).
OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	**N/A**

Evaluation Table for PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives. There is effective and timely review of the fishery-specific management system.		
Scoring Issue		SG 60	SG 80	SG 100
a	Evaluation coverage			
	Guide post	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.
	Met?	Y	Y	N
	Justification	The Ministry of Industries and Innovation, the Fisheries Directorate and the Coast Guard report that there is a constant process of internal review and consultation, including of scientific advice, and that there is a patchwork review of technical regulations and enforcement measures. Key aspects of the fisheries management system are continuously reviewed by the Icelandic Parliament, in committee hearings but more often at ad hoc meetings, which reflects that Iceland is a small and fishery-dependent country, with short lines of communication. The National Audit Office is an independent body operating under the auspices of the Parliament, as part of the legislature's monitoring of the executive branch. In addition to traditional financial audits, the office conducts so-called performance reviews, aimed at evaluating the effectiveness of the executive's implementation of parliamentary decisions, including within fisheries management. Hence, key parts of the management system are subject to review, and SG 80 is met. It is a principal challenge to claim that 'all' parts of a fisheries management system are subject to review, but it seems reasonable to expect some sort of a formal and holistic evaluation of the system as such to be in place for SG 100 to be met, which is not the case in the management of the Icelandic shrimp fishery.		
b	Internal and/or external review			
	Guide post	The fishery-specific management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific management system is subject to **regular internal** and **external** review.
	Met?	Y	Y	N
	Justification	The fishery-specific management system is subject to various forms of internal self-evaluation within the Icelandic bodies of governance (see SI 3.2.4 a) above). These take place on a regular basis; hence the requirement for a 100 score is met as far as internal reviews are concerned. The system is also subject to parliamentarian control in hearings and, more		

PI 3.2.4		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives. There is effective and timely review of the fishery-specific management system.
		importantly, through the performance reviews of the National Audit Office. These count as external since they are evaluations of the executive branch of government performed by an independent body on behalf of the legislature. SG 80 is met. In order to achieve a 100 score, the external reviews have to be performed on a regular basis. While the National Audit Office monitors the working of the executive branch on a running basis, different ministries are prioritized at different times. The Office's Performance Audit Division operates according to a three-year priority schedule that is reviewed annually. The schedule defines the sectors and issues to which audits are to be directed during the period. The Ministry of Industry and Innovation is not among the four ministries prioritized in the first three-year period after the Office was reformed in 2016/2017. While it is a principal question how frequently evaluations have to be performed in order to count as 'regular' (as opposed to 'occasional'), it is too early to conclude that external reviews of the fishery-specific management system are performed on a regular basis. SG 100 is not met.
References		Act on the Auditor General and the Auditing of Government Accounts No. 46/2016. Icelandic National Audit Office – Annual Report 2016. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit.
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER (if relevant):		**N/A**

Appendix 1.3 Conditions

Table 42 Condition 1 (All UoCs except UoC 3)

Performance Indicator	**PI 1.1.1: The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing**
Score	UoC 1: 70 UoC 2: 60 UoC 3: 80 UoC 4: 60 UoC 5: 70 UoC 6: <60 UoC 7: <60
Rationale	**PI 1.1.1.a: Stock status relative to recruitment impairment** SG80 SIa requirement: It is highly likely that the stock is above the PRI. <u>UoC 2 Eldey inshore fishery</u>. The total stock biomass dropped below Ilim, a proxy for Blim, in 2017 for the first time, having been above Ilim for the previous four years. However, Ilim is considered to be a precautionary reference point above the point of recruitment impairment (PRI), and the CPUE index in 2016 was around the average observed over the last 25 years. The assessment team concluded that it is likely that the stock is above the point where recruitment would be impaired (PRI). **SG60 is met.** In addition to the decline in the total stock biomass index, the index of juvenile abundance is also very low, so it cannot be concluded that the stock is highly likely to be above the PRI. **SG80 is not met.** <u>UoC 4 Arnarfjörður inshore fishery</u>. The most recent survey showed that the fishable stock biomass index has been declining since 2008, and in 2017 declined below Ilim, a proxy for Blim. Ilim is considered to be a precautionary reference point above the point of recruitment impairment (PRI). The index has been above Ilim in recent years, and the stock has demonstrably recovered from a similar level of stock in 2005 as observed currently. In addition the CPUE index in 2016 was still at a relatively high level, around the average observed over the last 15 years, and so all the evidence suggests that the stock can be considered to be likely to be above the PRI. **The SG60 is met.** Shrimp are now found within a relatively small proportion of the fjord in comparison with earlier years, and so the maintenance of high CPUE may be due to fishing occurring only on high densities of shrimps within the innermost areas of the fjord. It cannot be concluded therefore that the stock is highly likely to be above the PRI. **SG80 is not met.** **<u>UoC 6 Skjálfandi inshore fishery</u>. The total stock index in 2016 (no survey was conducted in 2017) in Skjálfandi was very low (** Figure 18), and although some fishing was permitted in Skjálfandi in fishing year 2015/2016, the index in 2016 was below the Blim, and therefore the fishery was closed. The fishery has been opened only twice since the 1988/89 fishing season. As the stock has been consistently below Ilim, a proxy for Blim, it cannot be concluded that it is likely that the stock is above the PRI. **The SG60 is not met.** **<u>UoC 7 Húnaflói, Öxarfjörður and Skagafjörður inshore fishery.</u> In the most recent stock survey in 2016 (no survey was conducted in 2017), the total stock index in Húnaflói and Skagafjörður was zero, and in Öxarfjörður was very low (** Figure 18). In Öxarfjörður there was a significant stock observed in the 2012

	stock survey, but the stock has since declined to levels lower than anything observed in the current time series from 1990. In Húnaflói and Skagafjörður, there has been no significant stock since the late 1990s. For all three fjords, there are no agreed values for Ilim, but it cannot be concluded that it is likely that the stock is above the PRI. **The SG60 is not met.** **PI 1.1.1b: Stock status in relation to achievement of MSY** SG80 SIb: requirement: The stock is at or fluctuating around a level consistent with MSY. For all UoCs, there is no estimate of Bmsy, and so it is impossible to directly evaluate the status of the stocks in relation to Bmsy. In addition, shrimp stock dynamics are strongly influenced by predation and environmental influences, and therefore Bmsy will not be a constant and may change dependent on the level of predation. However stock status can be evaluated in relation to Ilim, a proxy for Blim, which provides some indication of the current stock biomass index in relation to a level consistent with MSY, and the current Fproxy can be evaluated in relation to the target Fproxy, which represents a low exploitation rate that should over time move the stock towards a level which could be considered consistent with MSY. UoC 1. Offshore fishery. The stock biomass index has been above the Ilim for the last 25-30 years of the fishery. From 1990 to 2003, the stock biomass index was much higher than that observed in the most recent years, but the much higher predation rate now seen in the offshore area may preclude the stock recovering to similar levels unless predation pressure is reduced. Fproxy has fluctuated around the target Fproxy for the last ten years, but in the absence of any quantitative analysis of the relationship between predator abundance and shrimp stock dynamics, the assessment team could not conclude that the stock is fluctuating around a level consistent with MSY. **SG80 is not met**. For UoCs 2, 4, 5, 6 and 7 Eldey, Arnarfjörður, Ísafjarðardjúp, Skjálfandi and Húnaflói, Öxarfjörður and Skagafjörður inshore fisheries, the stock biomass index is just above or below Ilim, and therefore it can be concluded that the stock is not fluctuating around a level consistent with MSY. **The SG80 is not met therefore.**
Condition	By the 4th surveillance audit, evidence should be provided for all UoCs that the stock is at or fluctuating around a level consistent with MSY.
Milestones	Year 1: The client shall provide evidence that there are measures in place to aid the recovery of the stocks towards a level consistent with MSY. Resulting score = no change from original scores Year 2: The client shall provide evidence that all stocks are above the point at which recruitment would be impaired (PRI). Resulting score = 70 for all UoCs Year 3: The client shall provide evidence that all stocks are above the point at which recruitment would be impaired (PRI) and are moving towards a level consistent with MSY. Resulting score = 70 for all UoCs Year 4: The client shall provide evidence for all UoCs that the stock is at or fluctuating around a level consistent with MSY. Resulting score = 80 (requirement met and condition closed)
Client action plan	Year 1: The client shall provide evidence that there are measures in place to aid the recovery of the stocks towards a level consistent with MSY. Resulting score = no change from original scores

	Actions *ISF will communicate with MFRI and emphasise need for measures from the certification point of view. Icelandic law requires the government and its institutions to conserve all marine life for sustainable uses.* *Evidence:* *ISF will provide an overview of interaction between the client group and the authorities, in an effort to maintain the needs for recovery measures.* <u>Year 2</u>: The client shall provide evidence that all stocks are above the point at which recruitment would be impaired (PRI). Resulting score = 70 for all UoCs *Actions* *ISF will continue to emphasise the need for stock status being above recruitment impairment.* *Evidence:* *ISF will present an overview of communication and consultations between the client group and the authorities, in an effort to emphasise needs for healthy stock statuses. The evidence of whether all certified stocks are maintained above PRI will be collected and reported by the MFRI, as part of the institutions legal obligations.* <u>Year 3</u>: The client shall provide evidence that all stocks are above the point at which recruitment would be impaired (PRI) and are moving towards a level consistent with MSY. Resulting score = 70 for all UoCs *Actions:* *ISF will continue to emphasise the need for stock statuses being above recruitment impairment and is, in addition, moving towards a level consistent with MSY.* *Evidence: ISF will present an overview of communication and consultations between the client group and the authorities, in an effort to emphasise needs for healthy stock statuses. The evidence of whether all certified stocks are maintained above PRI and are moving toward a level consistent with MSY, will be collected and reported by the MFRI, as part of the institutions legal obligations.* <u>Year 4</u>: The client shall provide evidence for all UoCs that the stock is at or fluctuating around a level consistent with MSY. Resulting score = 80 (requirement met and condition closed) *Actions:* *ISF will emphasise the need for stable stock statuses and fluctuating around a level consistent with MSY.* *Evidence: ISF will present an overview of communication and consultations between the client group and the authorities, in an effort to emphasise needs for healthy stock statuses from the certification point of view. The evidence of whether all certified stocks are fluctuating around a level consistent with MSY, will be collected and reported by the MFRI, as part of the institutions legal obligations.*
Consultation on condition	The client will need to contact the MFRI or other independent consultants or scientists as well as the Directorate of Fisheries in order to fulfil this condition.

Condition 2 on PI 1.2.4 (which only applies to UoC 7) is not binding as UoC 7 fails to meet the SG60 requirements.

Table 43: Condition 3: applies only to UoA 1

Performance Indicator	**PI 2.4.1: The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.**
Score	70
Rationale	According to the OSPAR Commission, most common Vulnerable Marine Ecosystems (VME) in Region 1 are: coral gardens, deep-sea sponge aggregations, intertidal mudflats, Lophelia pertusa reefs, Modiolus modiolus beds, seamounts and Zostera beds. Of those, the following can be found in Icelandic waters: cold water hard corals (Lophelia pertusa), coral gardens (Gorgonacea & Pennetulacea) and sponge aggregations (Geodia spp.). Of those, the distribution of sponge aggregations overlaps (both spatially and in depth) with UoA 1 fishing grounds north of Iceland, where there are no management measures directed to the protection of this VME. Aggregation of large sponges occur off northern and southern Iceland and around the Reykjanes Ridge (Guijarro et al., 2006). These are found primarily in the depth range of ca. 300-750 m, and habitat forming sponge communities are common at depths of up to 500 m. Deep-sea sponges have similar habitat preferences to cold-water corals, and hence are often found at the same location (OSPAR Commission 2010c). However, while most cold-water coral reefs are located south of Iceland, sponges are distributed all around the island (OSPAR Commission 2010c). According to Webster, C. (2016), heavy trawling significantly impacts the sponge communities in the western seas around Iceland, showing a lower diversity of sponge taxa and smaller size of sponges in higher fished sites. Overall abundance, on the other hand, is similar in non-fished and heavily-fished sites, due to the high abundance of certain species like *Quasillina brevis*, which may be successful in these disturbed environments, and when removed from analyses, the impacts of heavy fishing effort are seen to be adverse to the abundance of other sponges. There are no specific measures protecting sponge communities, which benefit from are closures directed to the protection of cold water corals in the southern shelf of Iceland but which are not protected elsewhere. Sponge aggregations do not meet the requirement of SG80 for UoA1, as there is spatial overlap (in the northern waters of Iceland) and depth overlap (at the 300 m. depth) between the UoA1 fishing grounds and the distribution of these aggregations. The partial protection of sponge aggregations (granted by area closures directed to the protection of cold-water coral reefs and by the high spatial and depth distribution of the sponge aggregations when compared to UoA 1 fishing grounds) serves to justify that SG60 is met for UoA 1. The abundance of VME such as sponge communities in waters north of Iceland, where the offshore shrimp fishery takes place, prevent UoA 1 from achieving SG80, as there isn't a clear separation between the areas where fishing activity takes place and the location of VME such as sponge aggregations which are not yet protected and there isn't any specific management measure directed to the protection of this VME. SG80 and SG100 are not met for UoA 1.
Condition	The SG80 requirements for Sib must be met (for sponge aggregations). By the fourth surveillance audit necessary conservation and management measures for sponge aggregations shall be in place and implemented, such that the shrimp fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. This condition is harmonised with that for ISF golden redfish, ISF saithe and ling, ISF cod and ISF blue whiting fisheries.
Milestones	Year 1: There shall be evidence of the Client's plan to evaluate potential

	damage to deep-sea sponge aggregations appropriate to UoA 1. There shall be evidence of engagement with the Marine and Freshwater Research Institute (MFRI) with the goal of evaluating potential damage to sponge aggregations by offshore shrimp fishing activities. If MFRI is unable to provide support for the implementation of the plan, the fishery shall prepare the plan on the basis of other means (e.g. independent consultants or scientists or other means as appropriate). The plan may include an Environmental Impact Assessment or other similar analysis. Score 75. Year 2: By the end of Year 2 there shall be evidence of ongoing work towards the implementation of the plan; i.e. developing options for conservation and management measures to sponge aggregations , such that the fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. These options may be developed with the support of MFRI, or may be developed within the client group, as appropriate. Options may include closed areas, move on thresholds or other actions as appropriate, but should be sufficient to ensure that there serious and irreversible harm to sponge aggregations is highly unlikely. The client shall provide overlapped maps of VMS recordsfor UoA 1 and sponge aggregations distribution. Score 75. Year 3: Evaluate the options developed in year 2. Consider suggested modifications if needed and finalise and agree on conservation and management measures. By the end of the year a partial strategy for the protection of deep-sea sponge aggregations from trawling shall be agreed upon, either at client group level or at a higher level. Score 75. Year 4: Implement the agreed upon partial strategy. A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period. The client shall provide overlapped maps of VMS records and sponge aggregations distribution, to show avoidance on VME. Score 80.
Client action plan	Year 1: There shall be evidence of the Client's plan to evaluate potential damage to deep-sea sponge aggregations appropriate to UoA 1. There shall be evidence of engagement with the Marine and Freshwater Research Institute (MFRI) with the goal of evaluating potential damage to sponge aggregations by offshore shrimp fishing activities. If MFRI is unable to provide support for the implementation of the plan, the fishery shall prepare the plan on the basis of other means (e.g. independent consultants or scientists or other means as appropriate). The plan may include an Environmental Impact Assessment or other similar analysis. Score 75. *Actions* *ISF has been running a pilot project in close cooperation with fishing companies HB Grandi and Brim hf, and the Icelandic MFRI, to increase and normalise onboard logging of ponges brought on board by fishing gear. ISF will approach MFRI to further research sponge aggregations in shrimp trawling areas to evaluate potential damage to deep-sea sponge aggregations.* *Evidence* *ISF will provide evidence of engagement with MFRI with the goal of evaluating potential damage to vulnerable habitats by shrimp trawling activities. In the unlikely event, MFRI is unable to perform the research, ISF will seek for 3rd party consultant for evaluation purposes.* Year 2: By the end of Year 2 there shall be evidence of ongoing work towards the implementation of the plan; i.e. developing options for conservation and management measures to sponge aggregations, such that the fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. These options may be developed with the support of MFRI, or may be developed within the client group, as appropriate. Options may include closed

	areas, move on thresholds or other actions as appropriate, but should be sufficient to ensure that there serious and irreversible harm to sponge aggregations is highly unlikely. The client shall provide overlapped maps of VMS recordsfor UoA 1 and sponge aggregations distribution. Score 75. *Actions* *ISF will meet with MRI to discuss findings from annual research on sponge incidents. The meeting is intended to review statistics and discuss alternative actions, if needed. ISF will meet with members of the client group to discuss the condition and ask for feedback on current and future actions made by each member to address the condition. The actions will be formalized into a plan, intended for engagement by members of the client group to meet the condition. The purpose is to ensure that bottom trawling is highly unlikely to cause serious or irreversible harm to sponge aggregations.* *Evidence* *If Year 1 conclusions require there to be plan, then at the Year 2 audit, ISF will present an action plan, with evidence that it has been agreed by all participating parties (e.g. a signed agreement, meeting minutes, letters of support etc.).* <u>Year 3</u>: Evaluate the options developed in year 2. Consider suggested modifications if needed and finalise and agree on conservation and management measures. By the end of the year a partial strategy for the protection of deep-sea sponge aggregations from trawling shall be agreed upon, either at client group level or at a higher level. Score 75. *Actions* *ISF will meet with members from the client group to discuss effects of actions taken in year 2 and adjust for improved efficiency, as needed. The goal is to protect deep sea sponge aggregations from impacts of trawling and seek an agreement among the members of the client group for this type of conservation. The actions of Year 3 are contingent on the outcome of findings showing whether and how conservation actions are required. If a plan has been proven necessary and agreed upon in year three, ISF will monitor the implementation of the plan in year 4 in cooperation with the members of the client group.* *Evidence* *If required, the plan is implemented; it is updated as new information is available. At the Year 3 audit, ISF will present the updated plan if necessary, with evidence of implementation (e.g. benthic logbook data, MFRI report or other similar).* <u>Year 4</u>: Implement the agreed upon partial strategy. A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period. The client shall provide overlapped maps of VMS records and sponge aggregations distribution, to show avoidance on VME. Score 80. *Actions* *ISF will meet with members from the client organisation to discuss conservation needs and approach the fisheries authorities regarding a formal conservation and management measures, if they are not in place already. ISF will approach the Ministry of fisheries to underline the need from the viewpoint of sustainability certifications. ISF will further approach MFRI for overlapping analysis of VMS records and sponge aggregations.*

	Evidence *ISF will present the partial strategy, which will be, if formed and implemented, under control of Icelandic fishing authorities. In case the strategy cannot be implemented at a national level, ISF will ask shrimp fisheries to implement a necessary strategy. ISF will present a map of potential overlapping of VMS records and sponge aggregations.*
Consultation on condition	The client will need to contact the MFRI or other independent consultants or scientists as well as the Directorate of Fisheries in order to fulfil this condition.

Table 44: Condition 4: All UoAs.

Performance Indicator	PI 2.4.2: **There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.**
Score	75
Rationale	PI 2.4.2.a Habitats management. SG80 SIa: requirement: There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. Finding: The 60 score is justified because the necessary measures are in place. These include the following elements: - Iceland has a detailed management strategy for protecting certain areas (permanent, seasonal or temporary closures), in order to protect both fish spawning areas (Fisheries Management Act:116/2006) or vulnerable habitats such as cold-water corals or hydrothermal chimneys (Ministry of Fisheries Act: No. 942/2016; Nature Conservation Act: 44/1999). - Iceland has ratified different international conventions intended to protect habitats and ecosystems, such as the OSPAR Convention, the CITES Convention and the Convention on Biological Biodiversity. - Iceland is a Contracting Party to the North East Atlantic Fisheries Commission (NEAFC). In 2014 NEAFC adopted Recommendation 19 (amended in 2015) that requires vessels to move 2 nautical miles away from trawl tracks when encountering "the presence of more than 30 kg of live coral and/or 400 kg of live sponge of VME indicators". Icelandic vessels abide by commonly accepted move-on rules when encountering VMEs, however these remain informal. - Vulnerable areas are closed for fishing: There is a comprehensive mapping project in place by MFRI, there is limited size of the fishing grounds, limited possibility of encounters with VME, implemented area closures to protect certain habitat types such as coral reefs but which also protect associated sponge communities, and strong enforcement in place ensuring that vessels do not enter MPA. The 80 score is not achieved because of the following: - There are no mandatory measures yet in place to protect certain VME such sponge aggregations which overlap with UoA 1 or to protect other VME such as coral gardens (regardless of interactions not being expected by any UoA). - The lack of established and mandatory measures to avoid impacts to these communities (such as mandatory scientifically based (gear, habitat) specific move on rules in the case of encounters with VME indicator species for all vessels at all UoAs) prevent all UoAs SG80 and SG100.

Condition	There must be evidence of the implementation of a partial strategy designed to ensure that the UoAs do not pose a risk of serious or irreversible harm to the different types of encountered habitats, paying special attention to VME, so that the partial strategy is expected to achieve the Habitat Outcome 80 level of performance or above. This condition has been harmonised with the ISF cod and ISF blue whiting trawling fisheries.
Milestones	Year 1: There shall be evidence of the Client's plan to evaluate potential damage to cold water corals reefs, coral gardens and sponge aggregations appropriate to the UoAs. There shall be evidence of engagement with the Marine and Freshwater Research Institute (MFRI) with the goal of evaluating potential damage to all vulnerable habitats by fishing activities. If MFRI is unable to provide support for the implementation of the plan, the fishery shall prepare the plan on the basis of other means (e.g. independent consultants or scientists or other means as appropriate). The plan may include an Environmental Impact Assessment or other similar analysis. Score 75. Year 2: By the end of Year 2 there shall be evidence of ongoing work towards the implementation of the plan; i.e. developing options for conservation and management measures to all vulnerable habitats, such that the fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. These options may be developed with the support of MFRI, or may be developed within the client group, as appropriate. Options **shall include move on rules**, and other actions such as closed areas as appropriate, and should be sufficient to ensure that there serious and irreversible harm to sponges, soft corals and seapens is highly unlikely. Score 75. Year 3: Evaluate the options developed in year 2. Consider suggested modifications, if needed and finalise and agree on conservation and management measures. By the end of the year a partial strategy for the protection of sponge aggregations, cold water corals and coral gardens from trawling shall be agreed upon, either at client group level or at a higher level. Score 75. Year 4: Implement the agreed upon partial strategy. A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period. Score 80.
Client action plan	**CONDITION 3** PI 2.4.2.a Habitats management. SG80 SIa: requirement: There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. Year 1: There shall be evidence of the Client's plan to evaluate potential damage to cold water corals, coral gardens and sponge aggregations appropriate to the UoAs. There shall be evidence of engagement with the Marine and Freshwater Research Institute (MFRI) with the goal of evaluating potential damage to all vulnerable habitats by fishing activities. If MFRI is unable to provide support for the implementation of the plan, the fishery shall prepare the plan on the basis of other means (e.g. independent consultants or scientists or other means as appropriate). The plan may include an Environmental Impact Assessment or other similar analysis. Score 75. *Actions* *Based on work done pilot project with HB Grandi, ISF will meet with MRI and request an engagement by MRI to conserve vulnerable habitats and ask for options and plans to prevent serious or irreversible harm to habitat structures, if necessary. ISF will engage their members to agree upon and implement methods of benthic bycatch monitoring by vessels fishing under the certificate, and if proven necessary, with the aim of reducing impacts to*

	an acceptable level. *Evidence* *At the Year 1 audit, ISF will present evidence from the monitoring efforts, however, it will continue to MFRI who stores and reports on data collected from the fisheries.* *ISF will form a stakeholder panel from shrimp fisheries to disseminate information on progress and to channel tasks regarding the condition to representative stakeholders within or outside of ISF. The panel will convene twice a year during the lifetime of the certificate, or as needed, and be comprised of ISF representatives and from other stakeholders as fitting for each condition.* Year 2: By the end of Year 2 there shall be evidence of ongoing work towards the implementation of the plan; i.e. developing options for conservation and management measures to all vulnerable habitats, such that the fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. These options may be developed with the support of MFRI, or may be developed within the client group, as appropriate. Options **shall include move on rules**, and other actions such as closed areas as appropriate, and should be sufficient to ensure that there serious and irreversible harm to sponges, soft corals and seapens is highly unlikely. Score 75. *Actions* *ISF will meet with MFRI to discuss findings from annual research on all VMEs incidents. The meeting is intended to review statistics and discuss alternative actions, if needed. ISF will meet with members of the client group to discuss the condition and ask for feedback on actions made by each member to address the condition. The actions will be formalized into a plan, intended for engagement by members of the client group to meet the condition. The purpose is to ensure that bottom trawling is highly unlikely to cause serious or irreversible harm to all VMEs.* *Evidence* *The plan, if required, is updated according to the results of ongoing monitoring, and agreed by ISF and all relevant parties. If needed at the Year 2 audit, ISF will present an action plan, with evidence that it has been agreed by all participating parties (e.g. a signed agreement, meeting minutes, letters of support etc.)* Year 3: Evaluate the options developed in year 2. Consider suggested modifications, if needed and finalise and agree on conservation and management measures. By the end of the year a partial strategy for the protection of sponge aggregations, cold water corals and coral gardens from trawling shall be agreed upon, either at client group level or at a higher level. Score 75. *Actions* *ISF will meet with members from the client group to discuss effects of actions taken in year 2 and adjust for improved efficiency, as needed. The goal is to protect deep sea sponge aggregations and other VMEs from impacts of trawling and seek an agreement among the members of the client group for this type of conservation. The actions of Year 3 are contingent on the outcome of findings showing whether and how conservation actions are required. If a plan has been proven necessary and agreed upon in year three, ISF will monitor the implementation of the plan in year 4 in cooperation with the members of the client group.* *Evidence* *If required, the plan is implemented; it is updated as new information is*

	available. At the Year 3 audit, ISF will present the updated plan if necessary, with evidence of implementation (e.g. benthic logbook data, MRI report or other similar). Year 4: Implement the agreed upon partial strategy. A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period. Score 80. *Actions* *ISF panel from shrimp fisheries will convene and meet with MFRI to discuss implementation and progress of the partial strategy, if it will prove necessary for conservation purposes.* *Evidence* *ISF will provide and present a timeline of meetings, actions and reports which are to follow up on the contents of the partial strategy.*
AmConsultation on condition	The client will need to contact the MFRI or other independent consultants or scientists as well as the Directorate of Fisheries in order to fulfil this condition.

Recommendation 1: It is recommended that stock biomass estimates from the stock surveys are presented with confidence intervals around those estimates.

Recommendation 2: It is recommended that annual stock assessment reports should incorporate a temperature or ocean climate index.

Recommendation 3: It is recommended that regular external peer reviews of the stock assessments should be undertaken.

Recommendation 4: Different Principle 2 PI (primary, secondary and ETP species) would benefit from UoA records of non-fatal interactions with halibuts, porbeagles, spurdogs, basking sharks, and ETP marine mammal sightings. Records on benthic species would benefit the score of bottom trawlers in PI related to habitats. These recordings would increase Information PI scorings and would increase the credibility of management strategies.

Recommendation 5: It is recommended that an estimation of the areal footprint of the fishery in relation to the fishing grounds is calculated, in order to facilitate the estimation of the habitat impact of the fishery.

APPENDIX 2 PEER REVIEW REPORTS

Peer Reviewer Information				
Contact Name	*First*	Peer reviewer A	*Last*	

Fishery Assessment Details	
Fishery	ISF Iceland North Shrimp fishery (inshore and offshore)
Peer Review College contact details	
Peer Review Due Date	

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Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**CAB Response**
Justification: In my opinion the review has been carried out in a detailed and accurate manner by acknowledged experts in each of the three main categories of the MSC assessment process. The shrimp fisheries in question are clearly well monitored both by the Icelandic Government and by the fishermen and processors and by using a very prudent precautionary approach the current exploitation is below the potential sustainable production for UoC 1-5. I consequently agree with the judgement that the Northern shrimp (inshore and offshore) fishery (UoCs 1,2,3,4 and 5) be awarded the MSC certification.		Received with thanks.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]	**Yes**	**CAB Response**
Justification: The conditions are appropriately written to achieve the SG80 outcome within the timeframe.		Received with thanks.

If included:

Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]	**Yes**	**CAB Response**
Justification: It is likely that the actions specified in condition 1 will result in further conservation measures and increased communication between the client group and the authorities that could lead to the stock fluctuating around a level consistent with MSY. The client action plan for condition 2 is sufficient to close the condition and requires the client group to ask fisheries to implement a strategy in case it cannot be implemented at a national level. The client action plan for condition 3 is sufficient to close the condition and has been harmonised with other fisheries in the area.		*Received with thanks.*

Performance Indicator Review

Please complete the appropriate table(s) in relation to the CAB's Peer Review Draft Report:

- For reports using one of the default assessment trees (general, salmon or enhanced bivalves), please enter the details on the assessment outcome using Table 1.

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- For reports using the Risk-Based Framework please enter the details on the assessment outcome at

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Table 2.

- For reports assessing enhanced fisheries please enter the further details required at Table 3.

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Table 1 For reports using one of the default assessment trees:

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1	Yes	Yes	Yes	The rationale supports the score.	No further comments needed.
1.1.2	Yes	Yes	N/A	The rationale supports the score.	No further comments needed.
1.2.1	Yes	Yes	N/A	The rationale supports the score	No further comments needed.
1.2.2	Yes	Yes	N/A	The rationale supports the score	No further comments needed.
1.2.3	No	Yes	N/A	There was no survey of UoC 6 & 7 in 2017. Will this recommence in 2018? Scoring of SG a should be modified to reflect this.	As noted in section 3.3.4.2, there was no survey conducted in UoC 6 and UoC 7 in 2017 because of problems with the research vessel, and it is expected that the 2018 survey in these two UoCs will go ahead in autumn 2018 as planned. The rationale has been amended accordingly, but the assessment team considered that the score should not be changed as it is expected that annual surveys will be carried out in UoCs 6 & 7 except in unforseeen circumstances such as occurred in 2017.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.4	Yes	Yes	N/A	The rationale supports the score	No further comments needed.
2.1.1	No	No	N/A	The rationale supports the score however, common and scientific names should be given for each main species. Under SIa for UoA 1 no score is given. Cod and haddock are mentioned in the scoring elements box – it should be cod and Greenland halibut. Also under SIb there are no scores given. Is there a reason some species are underlined here and others not?	Scientific names have been included in the overall score table. No scre is given under Sia for UoA 1 as the UoA is scored using the scoring element approach. The score for each species is given in the rationale text and the score for all species and the UoA is given in the overall score box. The same reasoning applies to Sib. These SI are not scored individually as the element approach has been considered. Thanks, haddock has been replaced for Greenland halibut. Some species were underlined as a guideine for the assessor writing the report. The underlining has now been removed.
2.1.2	Yes	Yes	N/A	The rationale supports the score and it is clear that the quotas and technical measure form the strategy. However, under SIa 'Spawning protected areas' should be reworded and under Sib it is unclear what 'rests confidence' means?	The wording of the 4th paragraph at Sia has been reviewed for clarification. The wording of the 2nd paragraph at Sib has been reviewed for clarification. "Rests confidence" intended to mean that "it limits the confidence".

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.3	Yes	Yes	N/A	The rationale supports the score	No further comments needed.
2.2.1	Yes	Yes	N/A	The rationale supports the score	No further comments needed.
2.2.2	Yes	Yes	N/A	The rationale supports the score.	No further comments needed.
2.2.3	Yes	Yes	N/A	The rationale supports the score	No further comments needed.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.3.1	No	No	N/A	For SIa the limits for the ETP species are not specified, if its zero this should be stated.For SIb the score for UoA 1 should be 80 as the text states that 'it is difficult to assure with a high degree of confidence that there are no significant detrimental effects on halibut population' also more concrete evidence on interactions is needed 'very rarely' is very vague. For SIc further clarification is needed on the text regarding the distribution of halibut – this makes it sound like they shouldn't catch halibut at all.	Additional information has been added to Sia to clarify that the limit set is to minimise the catch, but is not cero as such. For Sib, the text has been reviewed and the mentioned paragraph has been deleted as it refers to all Icelandic trawling vessels, which shall be considered under Sia instead of under Sib. The scoring of Sib remains unchanged at SG100, as it shall only take into account interactions by the UoA (of which UoA 1 caught 465 kg in 2016, a 0.01% of the UoA catch and a =.38% of the catch by all Icelandic vessels). Regarding the "very rarely" posibility of fatal interactions with marine mammals and birds, this relies both on MFRI comments and on landing records.n Additional information has been added to Sic regarding the distribution of the halibut stock. As the Peer reviewer highlights, interactions are not expected (as there is no overlap of the stocks). Information has been added on the ratio of halibut in the catch by UoA1, set at 0.01% of the catch.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.3.2	No	Yes	N/A	The SIa rationale would benefit from more information on the measures to minimise mortality. As SId confirms that ETP interactions are currently not recorded, SIc should be scored as 80 for both UoAs as a 'quantitative analysis' could not take place without this information. The rationale relies on the MFRI comments on low probability of interactions.	Additional information has been added to Sia regarding measures to minimise mortality of elasmobranchians species. Sid has been reviewed to clarify that fatal interactions are recorded but that results show negligible interactions. Is sightings and non-fatal interactions that are not recorded as yet. The rationale of Sic has been reviewed but scoring remains unchanged once this clarification has been made to Sic and Sid. The rationale relies on MFRI comments and on landing records.
2.3.3	Yes	Yes	N/A	The rationale supports the score. It is unclear what is ment by 'sizes different individuals' in SIb?	The wording of Sib has been reviewed for clarification. "Sizes different individuals" intended to mean "estimates the population".

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.4.1	Yes	Yes	Yes	The rationale supports the score. However,in SIa the second sentence needs to be reworded as it is unclear. SIb what is ment by 'coral gardens' is it the soft coral species?	The second sentence at Sia has been reworded seeking clarification. In the context of the text coral gardens refer to "soft coral species", however coral gardens also include other coral species which grow on hard substrate. The assessment team decided to use OSPAR nomenclature to define VME. See https://www.ospar.org/site/assets/files/1487/eng_coral_gardens_2008.pdf and the background information pdf on coral gardens which can be found at https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats Specifically, OSPARdescribes coral gardens as "a relatively dense aggregation extending over at least 25m^2 of colonies or individuals of one or more coral species, such as leather corals (*Alcyonacea*), gorgonians (*Gorgonacea*), sea pens (*Pennatulacea*), black corals (*Antipatharia*), hard corals (*Scleractinia*) and, in some places, stony hydroids (lace or hydrocorals: *Stylasteridae*)".

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.4.2	Yes	Yes	Yes	The rationale supports the score. However, under SIb MFRI studies should also be mentioned.	MFRI studies have now been included under Sib.
2.4.3	Yes	Yes	N/A	The rationale supports the score.	Following a comment by Peer reviewer B a recommendation has been set in 2.4.3, so that, if possible, an estimation of the footprint of the fishery is calculated.
2.5.1	Yes	Yes	N/A	The rationale supports the score	Some information has been added in the second paragraph of Sia following a comment by PR-B
2.5.2	No	No	N/A	Under SIc the measures that make up the strategy are just listed again and no detail is provided on how they are achieving their objective.	A second paragraph has been added to Sic in order to address this comment.
2.5.3	Yes	Yes	N/A	The rationale supports the score however under SIc this is the first time the two research trips per year are mentioned that study fishing impacts on ecosystem elements and habitats. There is no statement in the justificaton that the SG is met.	MFRI research trips are also mentioned under PI 2.4.3 and in the background information for habitats, as these trips cover research on both habitat and ecosystem matters. An additional line has however been added to PI 2.5.2.a. The statement that SG 80 and 100 are met has been added to PI 2.5.3.c.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.1.1	Yes	Yes	N/A	The rationale supports the score	No further comments needed.
3.1.2	Yes	Yes	N/A	The rationale supports the score. More information on how regularly the stakeholders are consulted would benefit the justification.	The regularity varies with the topic, and as follows from the rationale, in a small country like Iceland much interaction takes place in an informal manner and on an ad-hoc basis. No changes have been made to the report.
3.1.3	Yes	Yes	N/A	The rationale supports the score	No further comments needed.
3.2.1	Yes	Yes	N/A	The rationale supports the score	No further comments needed.
3.2.2	Yes	Yes	N/A	The rationale supports the score	No further comments needed.
3.2.3	Yes	Yes	N/A	The rationale supports the score	No further comments needed.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.4	No	Yes	N/A	While it is clear that reviews take place, it is not clear how regularly the internal reviews occur.	As follows from the rationale, there is a constant process of internal review and consultation within the Ministry of Industries and Innovation and the Fisheries Directorate, including of scientific advice, and a patchwork review of technical regulations and enforcement measures. Regulatory measures taken by the Ministry and Directorate are reviewed by the Icelandic Parliament, in committee hearings (which are held at irregular intervals) but more often at ad hoc meetings, which reflects that Iceland is a small and fishery-dependent country, with short lines of communication. No changes have been made to the report.

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Table 2 For reports using the Risk-Based Framework:

Performance Indicator	Does the report clearly explain how the process(es) applied to determine risk using the RBF has led to the stated outcome? Yes/No	Are the RBF risk scores well-referenced? Yes/No	Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response:
1.1.1				
2.1.1				
2.2.1				
2.3.1				
2.4.1				
2.5.1				

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Table 3 For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities? Note: Justification to support your answers is only required where answers given are 'No'.	**Yes/No**	**CAB Response:**
Justification:		

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary) can be added below and on

My review is based on a reading of the Peer Review Draft Report. This is a competent and comprehensive assessment of the Iceland Northern Shrimp fisheries against the MSC Principles and Criteria for Sustainable Fisheries. The report is well presented and provides an authoritative overview of the fishery and the issues that relate to the three MSC principles. I agree with the majority of comments and scoring in the report. Some more information should be added to more fully justify certain scores as indicated.
Received with thanks. Some more information has been added to different PIs and to the background section following comments by both peer reviewers. Besides, Condition numbering has been reviewed after a comment by Peer Reviewer B and there are now 4 conditions to the report, however condition 2 (on PI 1.2.4 for UoC 7) is not binding as UoC 7 fails to meet SG60 for PI 1.2.4.

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Peer Reviewer Information				
Contact Name	*First*	Peer reviewer B	*Last*	

Fishery Assessment Details	
Fishery	Iceland Northern shrimp fishery (inshore and offshore)
Peer Review College contact details	
Peer Review Due Date	

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Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes/No** **Yes**	**CAB Response**
Justification: The evidence presented provides ample justification for the scoring of all PIs and sound support for the team's recommendation (section 1.2, p.7) to certify UoCs 1, 2, 3, 4, and 5.		*Received with thanks.*

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]	**Yes/No** **Yes**	**CAB Response**
Justification: Appendix 1.3, Tables 36-38, provide specific PI and SI wording and the year 1-4 milestones provide clear steps required to close each condition. There are several suggestions provided in general comments at the end of the template aimed at improving readability. In connection with the PI 1.1.1 condition, there should be some attempt to manage expectations with a consideration of the reality that recruitment in these stocks is driven by bottom-up processes and that the conventional notion of MSY really doesn't apply. See also the comment for 1.1.2 below.		In relation to condition 1, the assessment team agrees that careful consideration must be given at surveillance audits to evaluating whether the rebuilding plan has recovered the stock because it is likely that MSY is not truly definable for Pandalus stocks as stock dynamics are driven primarily by temperature and predation.

If included:

Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]	**Yes/No** **Yes**	***CAB Response***
Justification: The CAP portions of Tables 36-38 provide clear steps that ISF should/will take over the 4-year period of the milestones in order to close each condition. While these steps seem quite doable, there is no indication of the extent to which ISF has been consulted/involved in their development.		The Client Action Plan was developed entirely by ISF and was subsequently reviewed by the assessment team to ensure that it was capable of meeting the annual milestones and ultimately closing the condition.

Performance Indicator Review

Please complete the appropriate table(s) in relation to the CAB's Peer Review Draft Report:

- For reports using one of the default assessment trees (general, salmon or enhanced bivalves), please enter the details on the assessment outcome using Table 1.
- For reports using the Risk-Based Framework please enter the details on the assessment outcome at

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Table 2.

- For reports assessing enhanced fisheries please enter the further details required at Table 3.

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Table 1 For reports using one of the default assessment trees:

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1	Yes	Yes	Yes	The scoring is appropriate, however, some consideration of the following points, as covered in more detail in general comments at the end, is in order for section 3.3.4.1 of the report. Re the NAFO approach, given the absence of a B_{MSY} (upper) reference point and the more usual HCR requiring F to be reduced as biomass drops towards B_{lim}, using the 12% instead of 20% as a B_{lim} proxy needs a bit more explaining. Determination/selection of target proxy Fs also needs a bit more explaining.	The approach taken by NAFO to setting limit reference points in data-poor stocks (Blim = 15% of the highest observed biomass), and how this relates to the approach taken in Icelandic Pandalus stocks, has been incorporated in the text for section 3.3.4.1. For UoCs 1, 3, 4 and 5, a precautionary Ilim of 20% of the average of the three highest observed values has been set, but in UoC2 where the highest observed values were much higher than in any other years, Ilim has been set at 12% of the average of the three highest observed values. Fproxy values are considered to be precautionary. They are based on historical time series of catch/biomass ratios when stock levels were high and will therefore differ between UoCs. The Fproxy is set at a lower level than that observed when the stock biomass was high, i.e when the exploitation rate was demonstrated to be sustainable.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.2	Yes	Yes	NA	SI a – A target F proxy of .5, when the stock is marginally above B_{lim} Closure of the fishery is the strongest possible management action. Any rebuilding plan might also consider requiring the stock to increase to double the B_{lim} level or be above B_{lim} for a couple years before reopening. Nevertheless, given that recruitment in these stocks is driven by bottom-up processes, it might be wise, in the context of monitoring progress during surveillance audits, to temper expectations and indicate that there can be no guarantee of recovery to some unidentifiable "MSY" level. However, scoring is appropriate.	SIa. Additional text has been included explaining why the Fproxy values are considered to be precautionary. They are based on historical time series of catch/biomass ratios when stock levels were high and will therefore differ between UoCs. The Fproxy is set at a lower level than that observed when the stock biomass was high, i.e when the exploitation rate was demonstrated to be sustainable. SIb. A comment has been added to the rationale that temperature may be an important factor driving Pandalus stock dynamics, and in the absence of a time series of temperature or ocean climate index and a quantitative analysis of the effect of such an index on Pandalus recruitment, it is difficult to assess how long it will take for the stock to recover. The assessment team agrees with the peer reviewer that in *Pandalus borealis*, it is very difficult to provide a guarantee of recovery to MSY, as it is questionable whether MSY is truly definable for these stocks. Annual surveillance audits will therefore need to show careful consideration of stock trajectories when assessing if the rebuilding plan has been completed.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.1	Yes	Yes	NA	Rationales provide justification for the 85 score.	No further comments.
1.2.2	Yes	Yes	NA	Points raised in PI 1.1.1 are pertinent here as well. SI a, 1st paragraph – While a little more info is provided here re selection of target F proxies, this point needs more in section 3.3.4.3 for each UoC in order to better support the precautionary claim. 3rd paragraph – the exploitation rate is not reduced as the PRI is approached (as per SI wording) rather the actual catch is reduced. This needs a little more rationalization especially in connection with the comment regarding very low spawning escapement when the stock approaches B_{lim}. However, scoring is appropriate.	SIa, 1st paragraph. Additional text has been added to section 3.3 to describe how the values of Fproxy are chosen and why they are considered to be precautionary. They are based on historical time series of catch/biomass ratios when stock levels were high and will therefore differ between UoCs. The Fproxy is set at a lower level than that observed when the stock biomass was high, i.e when the exploitation rate was demonstrated to be sustainable. 3rd paragraph. The reviewer notes that the catch is reduced as Blim is approached, but the exploitation rate remains the same (Fproxy). However Blim is considered to be above the PRI, and as fishery is closed if the stock declines to Blim, there is evidence that the exploitation rate is reduced to zero as the PRI is approached. The rationale has been revised accordingly
1.2.3	Yes	Yes	NA	Rationales provide justification for the 90 score.	No further comments.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.4	Yes	Yes	NA	SI a, 3rd paragraph – Given that temperature is an important component of bottom-up processes controlling recruitment in these stocks, consideration of some ocean climate index should be recommended. The scoring is appropriate.	The assessment team agrees with the peer reviewer's comment and has made an additional recommendation that the stock assessment reports include a temperature or ocean climate index.
2.1.1	Yes	Yes	NA	SI a – Text table has haddock where greenland halibut is intended. Some minor editing comments are included in general comments at the end. The scoring is appropriate.	The reference to haddock has been changed to Greenland halibut as appropiate. Thanks for noting. The minor edits mentioned in the general comments section have been addressed (see section on General comments below).
2.1.2	Yes	Yes	NA	The scoring is appropriate but, see note in general comments below.	The general comments below have been addressed (see section on General comments below).
2.1.3	Yes	Yes	NA	The scoring is appropriate but, see note in general comments below.	The general comments below have been addressed (see section on General comments below).
2.2.1	Yes	Yes	NA	The scoring is appropriate.	No further comments.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.2.2	Yes	Yes	NA	The scoring is appropriate but, see note in general comments below.	The general comments below have been addressed (see section on General comments below).
2.2.3	Yes	Yes	NA	The scoring is appropriate but, see note in general comments below.	The general comments below have been addressed (see section on General comments below).
2.3.1	Yes	Yes	NA	The 2nd paragraph of SI b, dealing with halibut in the bottom trawl fleet, seems to belong in SI a, which deals with all MSC UoAs. Part of the statement is at odds with SG 100 being met for UoA 1. SI b deals only with the UoAs under assessment here. SI c – The word intended in the next to last line seems to be "assert", i.e. ….possible to assert with…. Otherwise, the scoring is appropriate.	The 2nd paragraph of Sib has been deleted, and that information has been added to Sia. The text of Sia, Sib and SIc has been reworded seeking for clarification after comments by both peer reviewers. Scoring remains unchanged.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.3.2	Yes	Yes	NA	The scoring is appropriate but, see note in general comments below.	The general comments below have been addressed (see section on General comments below). Some sentences at Sia, Sic and Sid have been reworded seeking for clarification after a comment from the other peer reviewer. Scoring remains unchanged.
2.3.3	Yes	Yes	NA	The scoring is appropriate but, see note in general comments below.	The general comments below have been addressed (see section on General comments below). A sentence in Sib has been reworded seeking for clarification after a comment by the other peer reviewer.
2.4.1	Yes	Yes	Yes	The scoring is appropriate but, see general comments below.	The general comment has been addressed by reviewing paragraphs 7 and 12 at Sib.
2.4.2	Yes	Yes	Yes	SI b – End of 1st sentence: instead of "present strategy", better to use "measures" in SG 80 wording to be consistent with SI a SG 60 wording. SI c – In 1st line, "accomplish" is intended to be "comply"??	Sib- "Strategy" changed for "measures" under Sib. Sic- "Accomplish" changed for "comply" under Sic. Besides, an additional sentence on MFRI studies has been added to Sib following a comment by PR-A.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.4.3	Yes	Yes	NA	The scoring is appropriate.	A recommendation (Recommendation 5) has been set in 2.4.3 (on the estimation of the footprint of the fishery) as an answer to the comment in the general comment section.
2.5.1	Yes	Yes	NA	SI a – 2nd paraagraph, end of 2nd sentence: accounting for predator needs is not specifically mentioned in the P1 background. Is this part of the 20% reduction to the target F proxy when predator abundance is high? Given its relevance in the context of this PI, a little elaboration is in order. The scoring is appropriate but, see note in general comments below.	Additional information has been added in the second paragraph of Sia, in order to address this comment. The general comment below has been taken into consideration and some infomratin has been added in the background section.
2.5.2	Yes	Yes	NA	Not certain but, shouldn't the score be 90 rather than 95? See note in general comments below.	A second paragraph has been added to Sic following a comment by PR-A. The scoring of 95 has been calculated taking into account FCR v2.0 7.10.5.3.a.ii. Scoring remains unchanged at 95. The general comment below has been taken into consideration and some infomratin has been added in the background section.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.5.3	Yes	Yes	NA	SI c – It is not specifically stated that SGs 80 and 100 are met. The scoring is appropriate but, see note in general comments below.	The statement that SG80 and SG100 are met has been added for Sic. The general comment below has been taken into consideration and some infomratin has been added in the background section.
3.1.1	Yes	Yes	NA	Note the different font in the 1st two paragraphs of SI a. The scoring is appropriate.	The font has been harmonised. Thanks for noticing.
3.1.2	Yes	Yes	NA	The scoring is appropriate.	No further comments.
3.1.3	Yes	Yes	NA	The scoring is appropriate.	No further comments.
3.2.1	Yes	Yes	NA	There is no consideration of fishery-specific objectives in P3 Background sections and the rationale provided is rather brief – a little elaboration seems in order. Nevertheless, the scoring is appropriate.	The team notes that the reviewer agrees with the score and has added some information to the PI table and to the background section.
3.2.2	Yes	Yes	NA	The scoring is appropriate.	No further comments.

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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.3	Yes	Yes	NA	The scoring is appropriate. Note, however, that in Background section 3.5.5, the punctuation at the end of fine amounts in the 5th paragraph needs fixing.	The punctuation at the end of the fine amounts has been fixed. Thanks for noticing.
3.2.4	Yes	Yes	NA	The scoring is appropriate.	No further comments.

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Table 2 For reports using the Risk-Based Framework:

Performance Indicator	Does the report clearly explain how the process(es) applied to determine risk using the RBF has led to the stated outcome? Yes/No	Are the RBF risk scores well-referenced? Yes/No	Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response:
1.1.1				
2.1.1				
2.2.1				
2.3.1				
2.4.1				
2.5.1				

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Table 3 For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities? Note: Justification to support your answers is only required where answers given are 'No'.	**Yes/No**	**CAB Response:**
Justification:		

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary) can be added below and on additional pages

1.2 – p.7, 3rd paragraph: Only 3 conditions, 1st sentence needs fixing – reference to UoC 7 in brackets at end should be deleted. The N/A portion of Table 3 should be deleted, it would be better considered in recommendation 2 – see also Table 34, p.86. The paragraph has been reviewed. For clarifying reasons, the non-binding condition on PI 1.2.4 for UoC 7 remains to highlight that the UoC has been assessed. However, as UoC 7 fails to meet SG60 for PI 1.2.4, this condition (now numbered as condition 2) is not binding. So there are 4 conditions to the assessment, however one of these conditions (Condition 2) is not binding and therefore does not require of a CAP.

3.1.1.2 – p.14: There should be a map to show location of UoC 1. A map with the location of the offshore shrimp fishing grounds (where UoA1 takes place) has been added to this section. The map was already available later in the report but it makes sense to have it also in this section.

3.3.1.2 – p.22: 2nd sentence of 2nd paragraph and 1st of 3rd are at odds – there appears to be no "genetic" evidence re separation of inshore and offshore shrimp in Iceland. Nevertheless, it seems appropriate enough to treat them, as well as the various inshore units, as separate stocks here. The assessment team does not believe that there are conflicting rationales within the 2nd and 3rd paragraphs of this section. Early genetic and morphometric studies demonstrated a difference between offshore and inshore shrimps supporting the split of offshore

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and inshore shrimps as separate stocks. To date there have been no studies on any genetic differences between shrimps from the different Icelandic fjords, but evidence from other studies shows that whilst there appears to be little variation in genetic structure across wide oceanic areas, there appear to be elevated levels of genetic differentiation both between Skagerrak fjords and between northern Norwegian fjords. It seems reasonable to assume therefore that such elevated levels of genetic differentiation may also occur between Icelandic fjords. It is noted that the peer reviewer agrees in any case that it is appropriate to treat the inshore and offshore units as separate stocks.

3.3.4.1 – p.27: Some elaboration of the NAFO approach re defining B_{lim} as 20% or 12% …..should be provided. Additional detail of the NAFO approach for setting limit reference points for data-poor stocks, and how this relates to the approach taken in Icelandic Pandalus stocks, has been incorporated in the text for section 3.3.4.1.

Fig. 7, p.31: B_{lim} is shown in the total stock index panel rather than the fishable index. Ditto Fig. 9, p.32. The peer reviewer's comment is noted. However, this figure has been copied unrevised from the original MFRI stock assessment report, and it is not an error on behalf of the MSC assessment team. Many of the following comments from the peer reviewer highlight errors or suggest improvements to tables and figures in the MFRI assessment documents. Whilst these comments will undoubtedly be of help to the authors of these MFRI documents, it is not for the assessment team to correct any discrepancies within these documents. Despite these numerous discrepancies, the MSC assessment team was able to interpret appropriately all the tables and graphs in the MFRI assessment documents, and there is no requirement to modify the scores for any Performance Indicators.

Fig. 11, p. 34: Grey bands should be defined in caption. This figure is copied directly from the MFRI assessment report, which does not define the grey bands, so it is not clear from the assessment report what these grey areas represent e.g. standard errors or 90/95% confidence intervals.

UoC 6 and UoC 7, p.36: Starting at 4th sentence of text (total stock index), there should be clearer separation of the two UoCs. B_{lim}s should be included in Fig. 16. The text has been revised to more explicitly separate UoC6 and UoC7. In relation to including Blim on Figure 6, this is an original Figure from the MFRI stock assessment report. Please see previous comments.

UoC 1, p.37 – some elaboration on choice of the 2010-2015 reference period for F_{proxy} should be included. Additional text has been included to elaborate on why the F_{proxy} is considered precautionary.

Fig. 17, p.38 – Caption should include reference to B_{lim} and indicate exploitation rate in 3rd panel with F_{proxy} shown in the horizontal line. In Table 13, it is inappropriate(?)/confusing to refer to the observed exploitation rates as F_{proxy}. In MSC context, the word proxy applies to

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reference points. Information on the horizontal lines on the graphs has been added to the caption on the Figure. The assessment team agrees with the peer reviewer that reference to observed exploitation rates as F_{proxy} can appear confusing in the context of an MSC assessment. However, this is the nomenclature used in the MFRI assessments and it is clear from all the stock assessment reports that F_{proxy} refers to the observed exploitation rate and that the reference point is a target F_{proxy}. Scientific institutes are not required to use nomenclature equivalent to that of the MSC. It is the assessment team's job to interpret the stock assessments within the framework of the MSC CR, which is what has been undertaken in this MSC assessment report.

Fig. 18, p.38 – Legend in the figure needs to be defined in caption. Legend has been added to the caption.

3.3.4.2 and 3.3.4.3 – there are several inconsistencies under these headings. Numerical values are provided for the B_{lim}s for UoCs 1 and 6 but not the % values. For UoC 2, it seems a bit odd to have a low B_{lim} (12%) and a high target F (.5). The target F proxy for UoAs 2, 3 and 5 (.5) are based on a relationship between catch and survey indices – this needs a little elaboration. Similarly with the choice of the 1988 to 2004 period for UoC 4. Revisions have made to the text in the relevant sections to remove any inconsistencies. B_{lim} is set at 20% for UoCs 1, 3, 4 and 5, and at 12% for UoC 2. The B_{lim} for UoC6 is a preliminary figure determined by MFRI but is not based upon a percentage of the highest observed stock levels. There is no B_{lim} defined for UoC7. The general principle for setting values of F_{proxy} is to review the time series of observed values of F and set the target F_{proxy} at a level which is significantly lower than the observed value of F when the stock was at a high level, thereby setting F_{proxy} at a precautionary sustainable level. This is the approach used in UoCs 1,2,3 and 5, whereas in UoC4, the F_{proxy} is set at the average observed level of F during a period of high stock biomass, and which was therefore considered to be a sustainable level. There is no F_{proxy} value set for UoCs 6 and 7.

B_{lim} and target F proxy are not shown in some UoC figures – e.g. B_{lim} is not shown in middle panel in Fig. 20 and target F proxy is not shown in right panel of Figs. 21 and 22. As noted above, these are original figures copied directly from MFRI assessment reports, and whilst the peer reviewer's comments are helpful to MFRI, please see above comment in relation to this MSC assessment report.

3.3.1.3 – In the 2nd paragraph, statements are made that "recruitment to the fishery is influenced by temperature, competition and predation" and "predation mortality is thought to be an important factor in stock dynamics". Only predation is considered in any detail. And, in 3.3.4.2 only very limited consideration of predator abundance is included. Even if not utilized in any kind of analytical way, the assessment for each UoA would be well informed by consideration of time series of some temperature index and a predator abundance index. The team might consider making such a recommendation. The assessment team noted briefly in section 3.3.1.3 that temperature, competition and predation are likely to be important factors driving stock dynamics in Pandalus and discussed predation in more detail as this factor is considered in both MFRI and ICES stock assessment reports. It is not a requirement for the MSC assessment team to present detailed text on factors affecting stock dynamics, rather these sections provide a brief background introduction to the fishery under

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assessment. Nevertheless, the assessment team agrees that in addition to predator abundance indices being presented in the assessment reports, it would be instructive to include some form of temperature index in the assessment reports even if it is not used in a quantitative analytical way. A recommendation has been added to PI 1.2.4.

3.3.4.1 – Sentence at end of 3rd paragraph: At any given target F, the minimum amount of biomass left to spawn will be quite small as B_{lim} is approached, compared to the escapement biomass at high stock sizes, especially with B_{lim} based on 12%. This is why PA frameworks generally require lower Fs at the low end of the cautious zone. Some consideration of this point might be useful to include here. This is a good point. Some additional text has been added to note that whilst the TAC is reduced as the stock declines towards Blim, the exploitation rate remains the same, and a more precautionary approach might be to reduce the exploitation rate at stock biomass levels above but close to Blim.

3.4.1 – In Tables 13 and 14, there is use of periods where there should be commas and vice versa. Also, some numbers in text don't include commas where there should be. The punctuation of numbers has been harmonised to the British system.

Figs. 5 and 7 – Captions should include cod and Greenland halibut, respectively. Reference to cod and Greenland halibut have been added to the captions.

Tables and figures are not numbered sequentially from preceding P1 Background sections. Numbering of tables and figures has been reviewed across the report.

Note: There is no summary in P2 Background section 3.4.1 for PIs 2.1.2 (management strategy) or 2.1.3 (information). Ditto for 2.2.2 and 2.2.3. Some information has been added at the beginning of section 3.4.1 to address this comment, both for primary and secondary species management strategy and information.

Note: As above, section 3.4.3 in P2 Background seems to provide little related to PIs 2.3.2 and 2.3.3. The text already provided the relation of measures enforced by Regulation 1164/2011 and 456/2017 on ETP species. An additional sentence on the enforcement of these measures has been added at the beginning of the section. An additional paragraph has also been added at the beginning of the section to address the comment on 2.3.3.

Habitats, p.56 – This should be a main, numbered heading as per the other P2 components. Modified. Habitat section is now numbered as 3.4.4. while the Ecosystem section is numbered 3.4.5.

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Note: Pp. 56 to 67 provide a detailed description of habitat, MPAs, restricted areas, etc, but nothing related to a management strategy for limiting impact of fishing where it is allowed or related to information about its impact. Additional information (5 paragraphs) has been added in order to address this comment, at the beginning of section 3.4.4 (habitats), after the figures showing the location of the different UoAs. Some information may now be repeated.

PI 2.4.1 – In the 7th paragraph of SI b, it is stated that sponge aggregations (depth range of ca. 300-700 m) do not meet SG 80 for UoA 1 as there is spatial (and depth) overlap between fishing grounds (to 300m) and the sponges – the only overlap mentioned is the very slight depth overlap at 300 m – is this the spatial overlap? Given that a condition is raised, is should be made quite explicit that it's the lack of clear separation or buffer zone that is the issue. Paragraph 7 and 12 under Sib have been modified in order to address this comment. However, while MOST of the fishing takes place at depths up to 300m, shrimps can be located at depths ranging from 20-1000 m, and sponges, while MOSTLY located at the 300-700 m depth range, can be found at depths ranging from 0-700 m, so there is room for overlap of the fishing activity and the location of sponge aggregations. Estimated depths for the location of both shrimp and sponges vary depending of the authors.

A simple estimate of the footprint of the fishery (# sets x bottom area covered per set in relation to area of fishing grounds) would be a very useful metric. This could be considered for a recommendation. Recommendation 5 has been set in PI 2.4.3 in order to address this comment.

Note: Section 3.4.4 in P2 Background provides limited information in the context of the full scope of the three PIs. Section 3.4.4 has now be renumbered as section 3.4.5. Additional paragraphs have been added at the end of the section to address this comment.

Appendix 1.3 Conditions

Table 36 Condition 1 – Rationale: Bold individual UoC headings and all statements re SGs being met or not. Add spacing between each UoC. Remove UoC 5 from SI a (SG 80 is met) and UoC 3 from SI b (SG 80 is met). The suggested changes have been made.

Table 37 Condition 2 – Info in rationale re UoCs 2-7 is not needed. Refer also to general comment above re 300 m buffer zone. The rationale of the condition has been reviewed in concordance with the revision of SIb at PI 2.4.1 after the peer reviewer comment above. The information regarding UoAs 2-7 has been removed.

Table 38 Condition 3 – Rationale should omit reference to SG 100. The reference to SG100 has been removed.

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APPENDIX 3 STAKEHOLDER SUBMISSIONS

1. The report shall include:

a. All written submissions made by stakeholders during consultation opportunities listed in FCR 7.15.4.1.
b. All written and a detailed summary of verbal submissions received during site visits regarding issues of concern material to the outcome of the assessment *(Reference FCR 7.15.4.2)*
c. Explicit responses from the team to stakeholder submissions included in line with above requirements *(Reference: FCR 7.15.4.3)*

(REQUIRED FOR FR AND PCR)

2. The report shall include all written submissions made by stakeholders about the public comment draft report in full, together with the explicit responses of the team to points raised in comments on the public comment draft report that identify:

a. Specifically what (if any) changes to scoring, rationales, or conditions have been made.
b. A substantiated justification for not making changes where stakeholders suggest changes but the team makes no change.

- *(Reference: FCR 7.15.5-7.15.6)*

APPENDIX 4 SURVEILLANCE FREQUENCY

1. The report shall include a rationale for any reduction from the default surveillance level following FCR 7.23.4 in Table 45.
2. The report shall include a rationale for any deviations from carrying out the surveillance audit before or after the anniversary date of certification in Table 46
3. The report shall include a completed fishery surveillance program in Table 47.

[To be included in the PCDR and subsequent reports]

Table 45 Surveillance level rationale

Year	Surveillance activity	Number of auditors	Rationale
e.g.3	*e.g.On-site audit*	*e.g. 1 auditor on-site with remote support from 1 auditor*	*e.g. From client action plan it can be deduced that information needed to verify progress towards conditions 1.2.1, 2.2.3 and 3.2.3 can be provided remotely in year 3. Considering that milestones indicate that most conditions will be closed out in year 3, the CAB proposes to have an on-site audit with 1 auditor on-site with remote support – this is to ensure that all information is collected and because the information can be provided remotely.*

Table 46 Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
e.g. 1	*e.g. May 2014*	*e.g. July 2014*	*e.g. Scientific advice to be released in June 2014, proposal to postpone audit to include findings of scientific advice*

Table 47 Fishery Surveillance Program

Surveillance Level	Year 1	Year 2	Year 3	Year 4
e.g. Level 5	*e.g. On-site surveillance audit*	*e.g. On-site surveillance audit*	*e.g. On-site surveillance audit*	*e.g. On-site surveillance audit & re-certification site visit*

APPENDIX 5 OBJECTIONS PROCESS

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)

The report shall include all written decisions arising from an objection.

(Reference: FCR 7.19.1)

APPENDIX 6 VESSEL LIST

Please see list of updated list of client group members at https://fisheries.msc.org/en/fisheries/iceland-northern-shrimp-inshore-and-offshore/@@assessments

APPENDIX 7 CLIENT ACCEPTANCE OF REPORT

About DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.