

Northwest Atlantic Fisheries Organization



**Report of the Fisheries Commission Ad hoc Working Group to
Reflect on the Rules Governing Bycatches, Discards and Selectivity in the
NAFO Regulatory Area**

13-14 July 2015
Dartmouth, Nova Scotia, Canada

NAFO
Dartmouth, Nova Scotia, Canada
2015

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1. Opening

The Fisheries Commission (FC) Chair Sylvie Lapointe (Canada) opened the meeting at 1000 hrs on Monday, 13 July 2015 at the NAFO Headquarters in Dartmouth, Nova Scotia, Canada.

Representatives from Canada, Denmark (in respect of the Faroe Islands and Greenland) (DFG), European Union (EU), Iceland, Japan, Norway, the Russian Federation, and the USA were in attendance. The Scientific Council (SC) is represented by the SC Coordinator. An observer from Ecology Action Centre was also in attendance (Annex 1).

2. Appointment of Rapporteur

Ricardo Federizon (NAFO Secretariat) was appointed Rapporteur.

3. Adoption of Agenda

A new agenda item was inserted after agenda item 4 - *Consideration of the SC advice pertaining to the selectivity of the 3M Cod and 3M Redfish fisheries in the Flemish Cap*. The agenda as revised was adopted (Annex 2).

4. Review of Status of the WG recommendations to FC from the July 2014 Meeting

There were nine recommendations that were adopted by FC in September 2014. This meeting presented the opportunity to address or continue to address the recommendations on behalf of FC. Actions and decisions at this meeting that address the recommendations are reflected in this section.

1. *that FC continue to address this issue by inter alia allowing this WG to continue*

Status: This meeting was in response to the recommendation; however, it was decided not to make further recommendations on the future of this WG. There are no new bycatch issues expected to be addressed in the next year. However, with the development of the strategy on bycatch and discards (see agenda item 6), this WG might be instructed by the FC to meet in the future to evaluate the implementation of the strategy.

2. *that the objective of this WG focus on effective management of bycatch and minimization of discards in the NAFO Regulatory Area, to the extent practicable, by recommending appropriate policy and regulatory changes that recognize the diverse factors influencing and incentivizing and discards in each fishery, the current biological status of affected species, and domestic legislation affecting bycatch and discards*

Status: An action plan would be developed at this meeting (see agenda item 6 and Recommendation 5 in agenda item 7).

3. *that the Fisheries Commission consider amendments to the management measures and approach for managing 3M cod and redfish fisheries that address factors promoting discards*

Status: Concerning 3M cod, the SC advice which pertains to gear selectivity in the cod fishery was considered (see agenda item 5) and a recommendation on selectivity experiments with an aim of minimizing discards through the use of sorting grids was formulated (see Recommendation 1 in agenda item 7). Concerning 3M redfish, a recommendation to amend Article 5.12 was formulated (see Recommendation 4 in agenda item 7).

4. *that the FC tasks STACTIC to support the WG as necessary including the development of standardized language for bycatch and discards throughout the CEM, including clarifying ambiguous or inconsistent terminology*

Status: At its intersessional meeting in May 2015, STACTIC discussed this recommendation and noted that there is no ambiguity or inconsistency in bycatch and discard terminology as used in the CEM for management purposes. With the clarity provided by STACTIC, it was decided that there is no need to re-visit this recommendation.

5. *that the FC include SC on this issue as necessary through this WG. To start with the FC-SC dialogue will give specific consideration to the discussions of this WG*

Status: At its first meeting in 2014, it was determined at the onset that this WG deals with bycatch, discards and selectivity which have significant implications for stock assessments. In this regard, the Scientific Council should be adequately represented at this WG. The Scientific Coordinator has been seconded to participate at the WG meetings. Also, Recommendation 2 in agenda item 7 which pertains to a FC request to SC addresses this recommendation.

6. *that the Secretariat continue to analyze data about bycatch and discards in NAFO fisheries. The analysis in particular should identify areas and fisheries of concern; identify anomalies and trends regarding bycatch and discards; and give priority to species under moratorium or instances where they may be conservation issues*

Status: At the first meeting, the Secretariat presented the preliminary results of the bycatch and discard analysis in the NAFO Regulatory Area using the daily catch reports from the fishing vessels (see Annex 5 of FC Doc. 14/06). The WG reviewed the information and decided that the analysis should continue, and priority should be given to certain stocks (see Recommendation 3 in agenda item 7).

7. *that Contracting Parties continue to share available information on domestic practices and/or policies to address bycatch and discards*

Status: There were two presentations, complementing the information from other Contracting Parties from the previous meeting. Iceland gave a presentation on its domestic practices in fisheries management. It highlighted the Individual Transferable Quota System, which works in the context of a discard ban in order to address bycatch and discard issues (Annex 3). The EU presented a study it commissioned regarding possible measures on bycatch and discards. The measures included input and output controls and fishing gear modifications. It was stressed that these do not constitute any advice per se (Annex 4). The WG appreciated the presentations and noted that there were important elements in the presentations that would be useful for the WG in the development of bycatch and discards strategy for NAFO (see agenda item 6).

8. *that the FC give further consideration to improving bycatch and discard data availability and quality, including options already identified in other NAFO bodies. This would be made available to the Secretariat, SC and the WGs of the FC and SC for the purpose of undertaking bycatch and discard analysis.*

Status: One of the overarching objectives of the Action Plan directly relates to this recommendation (see Recommendation 5 in agenda item 7). The importance of data availability and quality was discussed at this meeting and it was noted that this was also being discussed in other fora, e.g. at FC-SC Working Group on Catch Reporting (WG-CR), FC-SC Working Group on Ecosystem Approach Framework to Fisheries Management (WG-EAFFM) and STACTIC. Canada indicated that it would draft a new template to assist in the provision of haul-by-haul data, based on the existing Standard Observer Report Template (Annex II.M), for consideration at the annual meeting in STACTIC.

9. *that the FC work jointly with SC to task appropriate NAFO bodies to develop a draft definition of bycatch and to compile a draft list of bycatch species per GC Action Plan*

Status: It was noted that this recommendation was an offshoot of the 2011 Performance Review and that this was already overtaken by events such as the establishment of this WG as well as the development of an Action Plan as outlined in Recommendation 5. The WG decided not to pursue this further.

5. Consideration of the SC advice pertaining to the selectivity of the 3M Cod and 3M Redfish fisheries in the Flemish Cap

The SC response (formulated in June 2015) to the FC request for advice pertaining to selectivity (formulated in September 2014) is contained in SCS Doc. 15/12. SC advises that the implementation of sorting grids in the Division 3M cod fishery would reduce catch of undersized cod. These devices would also reduce redfish bycatch and discards. In light of this advice, it was deemed that conducting selectivity experiments in the Flemish Cap would be useful. A recommendation to this effect was formulated (See Recommendation 1 in agenda item 7).

6. Development of a comprehensive strategy relative to bycatch and discards in the NAFO Regulatory Area that is consistent with the Ecosystem Approach to Fisheries Management and takes into account all bycatch and discard species

In September 2014, FC instructed the WG to “develop and recommend a comprehensive strategy relative to bycatch and discards in the NRA that is consistent with the ecosystem approach to fisheries management and takes into account all bycatch and discard species.” As a way to develop the strategy, the WG drafted an Action Plan, which is outlined in Recommendation 5 in agenda item 7 that identifies overarching objectives, as well as key themes.

The effective management and minimization of bycatch and discards represents one of the overarching objectives of that Action Plan. It was stressed that NAFO should strive, to the extent practicable, to attain this objective. In the identification of future priorities the parameters to consider are the bycatch of moratoria species, areas where there is a risk of causing serious harm to bycatch species, and fisheries with a high rate of discard.

7. Recommendations to forward to the Fisheries Commission

The WG agreed to forward to the Fisheries Commission the following **recommendations** for consideration and adoption:

1. **FC to encourage Contracting Parties to carry out selectivity experiments with sorting grids in the Div. 3M cod fishery (SCS. Doc. 15/12, p.21);**
2. **FC to request SC, based on analysis of logbook data and patterns of fishing activity, to examine relative levels of bycatch and discards of 3M cod/redfish, and stocks under moratoria in the different circumstances (e.g. fisheries, area, season, fleets, depth, timing);**
3. **The Secretariat to analyze data for trends, patterns, anomalies:**
 - ☐ In cases where bycatch thresholds (NCEM Article 6.3, Annex I.A footnote 21) are exceeded or trends are apparent, the analysis should provide additional information on the associated catch weights for the specific stocks (3NO Cod, 3M American Plaice, 3LNO A. Plaice);
 - ☐ Analysis should consider both historical and current CATs (2012 to current);
 - ☐ Trends in reported catch of non-Annex IA species (3M Witch Flounder and 3M Skate).
4. **FC to consider a modification of the notification process outlined in NCEM Article 5.12.d to ensure timely closure of the fishery. While there was general agreement on the principle of closing the directed fishery (and the retention of bycatch) based on projected catches, there was recognition that the text modifications proposed below may need to be further refined and that the language should be forwarded to STACTIC for that purpose.**
 - ☐ Delete the first "and then 100%";
 - ☐ Insert new paragraph (e) to read: *determines the date of closure of 3M redfish, and notifies all Contracting Parties 72 hours in advance. Closure date will be established by estimating the date on which the reported catch will reach 100% of the TAC, based on projected catches.*

5. FC to adopt the Action Plan outlined below:

Action plan

Overarching objectives:

- ☐ Effective management and the minimization of bycatch and discards, and improvement of selectivity, in fisheries of the NRA
- ☐ Accurate reporting of target, non-target and incidental catch.
- ☐ Account for total catch (retained and non-retained) in scientific assessments and management measures
- ☐ Management regimes are adaptive and address changing fishery conditions over time, or differences among areas and fleets
- ☐ Management measures reflect the precautionary and ecosystem approaches to fisheries management
- ☐ Identify priority areas for bycatch management, in particular areas where there is a risk of causing serious harm to bycatch species
- ☐ Ensure linkage to other NAFO bodies doing work related to bycatch management (e.g. STACTIC, WG-EAFFM, WG-ESA, WG-CR)

Issues for the Fisheries Commission to consider. These are the key themes of an action plan:

1. Data management

- ☐ IT technical issues and capacity
- ☐ Standardised formats and transmission (including fixed and mobile gear)
- ☐ Logbook data
- ☐ Gap identification
- ☐ Completeness (retained and non-retained)
- ☐ Opportunities for data sharing

2. Analysis and ongoing monitoring

- ☐ Trends, patterns, anomalies
- ☐ Time, area, depth, fleet-specific issues, fishery-specific issues
- ☐ Identification of best practices

3. Identification of priorities

- ☐ Moratoria species
- ☐ Areas where there is a risk of causing serious harm to bycatch species
- ☐ High rates of discards

4. Develop management options

- ☐ Selectivity measures
- ☐ Time area management
- ☐ Fishery-specific solutions and identification of best practices
- ☐ Avoid measures that incentivize bycatch and discards

8. Other Matters

No other matter was discussed.

9. Adoption of the Report

This report was adopted through correspondence after the meeting.

10. Adjournment

The meeting was adjourned at 1400 hrs on Tuesday, 14 July 2015. The Chair thanked the meeting participants for their cooperation and input and the Secretariat for the support. The participants likewise expressed their thanks and appreciation to the presiding Chair for her leadership.

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Annex 2. Agenda

1. Opening
2. Appointment of Rapporteur
3. Adoption of Agenda
4. Review of Status of the WG recommendations to FC from the July 2014 Meeting
5. Consideration of the SC advice pertaining to the selectivity of the 3M Cod and 3M Redfish fisheries in the Flemish Cap
6. Development of a comprehensive strategy relative bycatch and discards in the NAFO Regulatory Area that is consistent with the Ecosystem Approach to Fisheries Management and takes into account all bycatch and discard species
7. Recommendations to forward to the Fisheries Commission
8. Other Matters
9. Adoption of Report
10. Adjournment

Annex 3. Iceland's PowerPoint presentation

The Icelandic Fisheries Management System The Individual Transferable Quota System

- For every fishing year (Sep-Aug) the Minister of Fisheries and Agriculture issues a regulation deciding the total allowable catch (TAC) of any species under the ITQ system based on a recommendation from the Marine Research Institute
- 1% quota share = 1% of the annual catch quota
- Quota shares and catch quotas must be bound to fishing vessels or boats
- All economically important species are included in the ITQ system (95-97% of total catch value)

1

Example of quota allocation

- TAC in a specific species allocated on the basis of quota share is 60,000 tons for a given fishing year
- The quota share for our vessel is 1%
- The annual catch quota allocated to the vessel for the fishing year is therefore 600 tons of the species in question

2

The ITQ System

- The Minister of Fisheries and Agriculture decides which species are under the ITQ system
- When "new" species are incorporated into the ITQ-system, individual fishing vessels are allocated a "permanent" *quota share* (% of the TAC), based on their catches of previous 3 years
- Quota shares and annual catch quotas are divisible and transferable
- Permits for commercial fishing
- The allocation of quotas is subject to a certain fishing fee

3

Cod equivalents 2015/2016

- For various reasons, especially quota transfers, **cod equivalents** for all species are calculated

Cod	1,00		
Haddock	1,23	Plaice	0,81
Saithe	0,77	American plaice	0,26
Redfish	0,79	Lemon sole	1,21
Ling	0,88	Capelin	0,12
Tusk	0,47	Herring	0,23
Blue whiting	0,10	Lobster tails	5,98
Catfish	0,79	Shrimp	1,43
Greenland halibut	2,48	Monkfish	2,05

- **Cod equivalent** is a price index and based on last year's prices. Cod is always set = 1.0

4

Flexibility options – discards illegal

- Discards are illegal
- Vessels are obliged to have catch quota for their catches in all species, which are subjected to the ITQ system, no bycatch rule
- If vessels don't have sufficient catch quota for all their catches it is required that sufficient catch quota is transferred to them from other vessels
- Vessels are not allowed to commence a fishing trip unless they have sufficient catch quota for their probable catches

5

Flexibility options – discards illegal

- Undersized fish is only partially deducted from catch quotas
- Damaged fish (sealbitten etc) not deducted from quota
- Species conversion – converted by "cod-equivalent kilo"
 - cap on each species and is not allowed to change into cod
- Transfer between years
 - 5% can be caught in excess of a vessel's catch quota - deducted from next year's quota
 - 30% of each vessels unused catch quota can be transferred to the following fishing year

6

Flexibility options – discards illegal

- Vessels can “buy” catch quotas for excess landings – up to 3 days after landing. Are not allowed to continue fishing after that period until quotas have been “fixed”.
- Permission to land up to 5% excessive to quotas of– keep catches separate
 - Sold on auction, 20% of value to vessels (thereof share of crew), 80% of value into a special research and development fund. Divided into four seasons pr. year.

7

Other Management Measures

- Regulations concerning the type of fishing gear permitted, e.g. minimum mesh size regulations
- Fishing with trawls is prohibited in large areas near the coast
- Grids in fishing gear are obligatory in certain fisheries
- Extensive closures of fishing areas to protect spawning fish
- The MRI has the authority to close fishing areas temporarily
- MRI and Directorate
 - Monitor and use statistical methods to “assess” the discard policy and its effectiveness
 - “Minimum” assessment for 2010:
 - Cod – 0.43%
 - Haddock – 1.17%

8

Annex 4. Study Commissioned by the EU

ADVICE ON THE MANAGEMENT OF DISCARDS IN EU FISHERIES BEYOND EU WATERS

NAFO Ad Hoc Working Group on Bycatches, Discards and Selectivity (WG-BDS)



13-14 July 2015 Dartmouth, Nova Scotia, Canada

PURPOSE OF THE STUDY

Provide recommendations referring to the management of discards in the NAFO Area based on the Article 15 of the new Common Fisheries Policy (CFP) regulation (discards ban).



- From 1 January 2015 onwards fishermen in certain parts of the EU must land all the fish they catch.



- The pelagic and industrial fisheries, and in the Baltic the salmon fisheries and fisheries for cod.
- All catches of all species that are managed through TACs and quotas, and in the Mediterranean catches subject to minimum sizes, must be landed.

Exemptions → such as *de minimis*, high survivability and predator-damaged fish. These catches are not counted against the quota, but they must be documented in the logbook.

- By 2019 all fishermen will have the same obligation.

2

ANALYSIS

IDENTIFICATION OF ACTIVE EU METIERS WITHIN NAFO VS EU LANDING OBLIGATION

Metier Reference	Target species	Target assemblage	Gear type	Gear type code	ICES [4]	Area, subarea, Division	EU MS involved	No. trawlers involved
NAFO_001_COD	Atlantic cod (COD)	Mixed demersal fish	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3M	DK, PL, LT, EE, PT, GR, ES	35 (3-40 m)
NAFO_001_BSD	Beluga sturgeon (BSD)	Demersal + deep water species	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3MNO	LT, EE, PT, ES	30 (3-40 m)
NAFO_001_GSR	European herring (GSR)	Demersal + deep water species	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3MNO	LT, EE, PT, ES	30 (3-40 m)
NAFO_001_WHS	European herring (WHS)	Demersal + deep water species	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3MNO	PT, ES	Very low activity (2000 information)
NAFO_001_WIT	European herring (WIT)	Demersal + deep water species	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3MNO	LT, EE, PT, ES	Fishery in Div 3NO open in 2015
NAFO_001_PLA	European herring (PLA)	Demersal + deep water species	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3MNO	-	Fishery in international waters
NAFO_001_GAP	European herring (GAP)	Demersal + deep water species	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3MNO	-	Fishery in international waters
NAFO_001_SKA	European herring (SKA)	Mixed demersal + deep water species	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3MNO	EE, PT	20 (3-40 m)
NAFO_001_GHL	European herring (GHL)	Demersal + deep water species	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3MNO	EE, EE, DK, PL, EE, LT, IT	More than 1000 in 2015
NAFO_001_WIT	European herring (WIT)	Demersal + deep water species	OTB	Bottom otter trawl	4AD	NAFO Reg. Area, Div. 3MNO	-	Very low activity (2000 information)

3

ANALYSIS

NAFO CEM CONCERNING THE MANAGEMENT OF BYCATCH AND DISCARDS & THE EU FLEET

- NCEM Article 5 → (catch and effort limitations) defines the directed fisheries for different species.

- All regulated species in the NAFO area are managed by TACs and quotas,
- Exception of *Pandalus borealis* in Div. 3M, managed by effort allocation (Nº of fishing days),
- Specific obligation to discard: 'no more 3M redfish is retained on board after 100% of the TAC is taken [...]'.

- NCEM Article 6 → regulates the bycatch retention on board of the regulated stocks when these are fished as bycatch in other fisheries, by establishing retention limits.
- This implies that catches bigger than these retention limits must be discarded.

4

ANALYSIS

- NCEM Article 12 → (Conservation and Management of Sharks) deals with the conservation and management of sharks.
 - Prohibits discarding any part of shark retained on board except the head, guts or skin.
 - Prohibits vessels from having shark fins on board that total more than 5% of the total weight of sharks on board, up to the first point of landing.
 - No sharks have EU catch limits in the NRA.
- NCEM Article 14 → (Minimum Fish Size Requirements): no vessel shall retain on board any fish smaller than the minimum size approved, which it shall immediately return to the sea.
 - COD, PLA, YEL, GHL.

Metiers affected	Species with EU catch limits affected						
	COD	RED	PLA	YEL	WIT	SKA	GHL
NAFO_001_GSR	6,14						
NAFO_001_BSD	6,14	5,6	6,14	6,14	6	6	5,14
NAFO_001_COD	5,14						
NAFO_001_GHL	6,14			6,14	6,14		
NAFO_001_SKA							
NAFO_001_WIT							
NAFO_001_GHL							

5

ANALYSIS

REASONS FOR DISCARDING

- Compliance with regulations that limit catch/bycatch of species regulated with target or bycatch catch limits (Articles 5 and 6), or catches of target species below minimum landing sizes (Article 14).

These are measures originally implemented to manage fishing resources sustainably, through catch control and the protection of the juvenile fish respectively.

- High-grading of target species, such as COD and RED (e.g. selecting for larger individuals), to increase catch revenue by landing only the most valuable specimens and discarding those that, although marketable, would fetch a lower market value.

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ANALYSIS

POST-RELEASE SURVIVAL RATES

- Very low for the bottom otter trawl fisheries:
 - Muscular fatigue and/or depressurization increases with haul depth,
 - Little evidence of survival after few days: physiological stress (feeding and predator avoidance).
- Best-guest post-release survival estimates:

Species	Metier					Reference
	NAFO_001 GUL	NAFO_001 RED	NAFO_001 COD	NAFO_002	NAFO_003	
Greenland halibut (<i>Reinhardtius hippoglossoides</i>)	Low	Medium	No catches	No catches	Unknown	Pers. comm. (F. Gondales, IEO)
American plaice (<i>Pleuronectes americanus</i>)	Low	Medium	No catches	Medium	No catches	Pers. comm. (F. Gondales, IEO)
Cod (<i>Gadus morhua</i>)	Unknown	Low	Low	Low	Unknown	Benoit and Hurlbut (2003)
Redstart flounder (<i>Limanda ferruginea</i>)	No catches	Medium	No catches	Medium	No catches	Benoit and Hurlbut (2003)
Haddock (<i>Urophycis spp.</i>)	Unknown	Low	Low	No catches	Low	Pers. comm. (F. Gondales, IEO)
Northwest Atlantic (Haddock, herring)	No catches	No catches	No catches	No catches	Unknown	

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RESULTS

JUSTIFICATION?

- The requirements to discard under Article 5 (catch and effort limitations) and Article 6 (bycatch retention limits) are not justified given the very low level of post-release survival that is expected in all métiers.
- For the same reasons of low survival given above, the requirement to discard under Article 14 is also not justified.

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RESULTS

TECHNICAL MEASURES TO REDUCE BYCATCH

- **Over-quota and bycatch fish** (Articles 5 & 6)
The quota is one of the most important reasons to discard in NAFO directed fisheries and bycatch regulations is one of the most important reasons to discards species in moratoria.
 - **Input & output controls:**
 - **Input:** limiting the amount of fishing effort or capacity (limiting vessel numbers of a specified size, prohibiting new entrants, instituting buy-back schemes).
 - **Output:** limiting catch through → total allowable catch, or quotas of target, incidental or discarded bycatch species. Ex:
 - NAFO_001_RED control effort measures could be implemented to prevent the early closed of the fishery and thus prevent discards of bycatch of this species in other fisheries.
 - Individual quotas would help to control catches.
 - **Gear modification:**
 - Eliminator trawl → reduce cod, flounder, skate, dogfish, American plaice and lobster bycatch in haddock fisheries.
 - Flexigrid → flexible sorting grid that can improve the selectivity of trawl nets and reduces cod and saithe bycatch in blue-whiting fisheries.

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RESULTS

TECHNICAL MEASURES TO REDUCE BYCATCH

- **Undersized fish** (Article 14)
Four species with legal minimum landing size (MLS).
Only a problem in NAFO_001_COD.
 - **Improvement of the design and use of fishing gear:**
Technological measures to improve selectivity and change fishing methods may reduce the discards of undersized fish.
 - **Spatial closures:**
Positive measure to reduce the bycatch of juvenile fish of different species in this fishery and with a minimal or low impact on the fishery:
 - Greenland halibut effort restricting to >700m,
 - Shrimp fisheries effort restricting to >200m,
 - Possibility: SKA and YEL at <150m
 - **Temporal closures:**
Closing fisheries for a period of time is another tool that could be explored to reduce the bycatch problem in certain situations:
 - Morgan (2008), study of COD bycatch in the YEL fishery. Conclusion: possibility of reducing discards by closing or reducing the Canadian YEL fishery in the months with highest bycatch.

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RECOMMENDATIONS

- **COLLECT COMMERCIAL CATCH INDEPENDENT INFORMATION →**
 - ✓ To know the catch composition in the different areas in real time.
 - ✓ The NAFO observer program could be a key tool for discard and bycatch data collection and to control the implementation of the management measures. Assuring independence.
- **TO AVOID OR REDUCE DISCARDING OF UNDERSIZED FISH →**
 - ✓ Selectivity studies to well define the legal gear mesh size according to the minimum landing size.
 - ✓ Detailed spatial and temporal mapping of the distribution of juveniles of the different species. Collect fishery-dependent information with fishery independent data to predict discarding hotspot locations.
- **TO IMPLEMENT SPATIAL AND TEMPORAL MEASURES →**
 - ✓ Further studies of all fisheries and their bycatch would be needed. In particular, precise spatial and temporal maps of the distribution of the different species would be required to study possible measures (seasonal or area closures) to reduce bycatch.
 - ✓ It is likely that some of the closures would be beneficial for some species and detrimental to others.

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RECOMMENDATIONS

- **IMPROVING DATA ON DISCARDS →**
 - ✓ Supporting mechanisms to help fishers avoid the need to discard.
 - ✓ Redesigning the management system in a way that will counter the discards → it needs to be in continuous development.
 - ✓ Carrying out analysis of bycatch and discards that provide better policy packages and technical measures in order to achieve an even playing field in the final goal of preventing and reducing unwanted catches.
 - ✓ The CAT provide information on a broad level which is insufficient and misleading (i.e. Division taken and other species caught in the same day). Due to the limited data available the reported quantities may not reflect the true magnitude of the real bycatch and discards.
 - ✓ Using a tow-by-tow data could be a solution but the debate about the confidentiality of the disaggregated information remains unsolved.
 - ✓ Lack of a standard language for bycatch and discards throughout the NCEM, as well as the use of ambiguous or inconsistent terminology.

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Disclaimer

Although this study was funded by the European Union under the Framework Contract MARE/2012/21 – Specific Contract 5,

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Thanks for your attention

This research was funded by the European Union funds under the Framework Contract MARE/2012/21 – "Scientific advice for Fisheries beyond EU Waters" – Specific Contract No 5 "Management of discards in EU Fisheries beyond EU waters".

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