Progress towards ending overfishing in the Northeast Atlantic

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Progress towards ending overfishing in the Northeast Atlantic

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Abstract

The reformed Common Fisheries Policy of the EU, in force since 2014, stipulates that overfishing by the fleets of its member states has to end latest in the year 2020. This study examines exploitation and status of 119 stocks fished by 20 countries in the Northeast Atlantic. In the year 2018, about 40% of the stocks were still subject to overfishing (F > Fmsy), about 34% of the stocks were outside safe biological limits (B < Bpa) and about 68% of the stocks were too depleted to produce maximum sustainable yields (B < Bmsy). Reduction in the number of overfished stocks has stalled, possible because of an agreement between the European Commission (EC) and the International Council for the Exploration of the Seas (ICES), its advisory body for total allowed catches (TACs), wherein the EC requests ICES to give TAC advice leading to overfishing for many stocks. As a result, it is unlikely that overfishing will end in the Northeast Atlantic in 2020.

Introduction

Most countries have entrusted the proper management of the fish and invertebrates exploited by their fishers to their political leaders, as opposed to having civil servants implement fixed harvest rules. But politicians cannot withstand the temptation to allow fishers higher catches than the stocks can support. International conventions and agreements as well as regional and national laws stipulate that fished stocks have to be managed such that they are large enough to produce maximum sustainable yields (MSY). The member states of the EU in particular have agreed to end overfishing in the year 2020. The Common Fisheries Policy (CFP 2013) of the European Union calls for rebuilding all commercially used fish stocks above levels that are capable of producing the maximum sustainable yield (MSY) as its explicit objective of the legally binding Basic Regulation (11 December 2013). As a first step to achieve this goal, fishing pressure had be reduced to the maximum sustainable level by 2015, latest by 2020. Moreover, the CFP asserts that member states have to put in place measures to adjust the fishing capacity of their fleet to their fishing opportunities, with the objective of achieving a stable and enduring balance between them. At the same time, the Marine Strategy Framework Directive (MSFD) aims for good environmental status for all commercial fish and shellfish, which should be within safe biological limits and exhibit a population, age and size distribution that is indicative of a healthy stock, by 2020.

For the Northeast Atlantic, which is managed by total allowable catch (TAC), this can be done by settings TACs such that the related fishing mortality does not exceed the target value F_{MSY}. The purpose of this study is to explore progress towards ending overfishing in 2020 and to identify possible obstacles.

Material and Methods

Definitions

MSY is the maximum sustainable yield, i.e., the maximum yearly catch that a stock can support in the long term.

Fmsy is the fishing mortality that will, after several generations, lead to catches equal to MSY and to a stock size equal to Bmsy.

Bmsy is a biomass level around which stock size fluctuates when fishing at Fmsy (ICES 2016). It is the lowest biomass level that can produce maximum sustainable yields in the long term.

MSY Btrigger is the parameter in the ICES MSY framework which triggers advice on a reduced fishing mortality relative to Fmsy. MSY Btrigger is considered the lower bound of spawning–stock biomass fluctuation around Bmsy. If the observation on fluctuation in biomass is insufficient to estimate MSY Btrigger, the reference point is normally set at Bpa (ICES 2016). Following ICES advice for Greenland halibut (2019), this study assumes that an approximate relation between MSY Btrigger and Bmsy is MSY Btrigger = 0.5 Bmsy.

Bpa is a lower biomass threshold constituting the border of safe biological limits. It indicates a 5% probability that recruitment may be impaired. Given that Bpa is a proxy for MSY Btrigger we also assumed an approximate relation between Bpa and Bmsy with Bpa = 0.5 Bmsy.

Blim is the lowest biomass reference point. It indicates a 50% probability that recruitment may be impaired. This study assumes an approximate relation between Blim and Bmsy as Blim = 0.3 Bmsy (e.g. ICES ghl, 2019).

Data

Biomass and fishing mortality for 2017 or 2018 as well as recent Bpa and Fmsy reference points were obtained from the Stock assessment graphs database (ICES 2019a). Some missing stocks such as spurdog (*Squalus acanthias*) were added using the information given in the advice documents (ICES 2018a) if their assessments provided or allowed estimates of stock status.

If ICES advice documents included time series of catches by country, such as, for instance, the 2018 advice for spurdog (ICES 2018b), these catches were used to assign stocks to countries. Otherwise, fisheries nominal catch statistics 2006-2017 for the Northeast Atlantic (ICES 2019b) were used to assign stocks to the countries fishing them. No assignment was made if zero catches were reported for all years since 2006.

Methods

In some stocks, ICES did not provide absolute estimates of stock status or exploitation but rather ratios for B/Bmsy and F/Fmsy (e.g. plaice (*Pleuronectes platessa*) in the Bristol Channel and Celtic Sea, ICES ple 2019). These relative estimates were used for the purpose of this study.

For the stocks where no estimate of Bmsy but an estimate of Bpa was available, a proxy estimate of Bmsy = 2 * Bpa was used (see Definitions).

In some stocks, ICES only provided qualitative assessment of stock status, such as in Herring (*Clupea harengus*) West of Scotland, West of Ireland where current biomass is described as "below possible reference points" (ICES her 2019). For the purpose of this study, such stock status assessments were translated into a proxy B/Bmsy = 0.25, i.e., below the approximate Blim = 0.3 Bmsy defined above. Some stocks such as European eel (*Anguilla anguilla*) (ICES 2018c) were described as so strongly depleted that their status was set to B/Bmsy=0.02 for the purpose of this study.

In some stocks, ICES did not make a statement about stock size but advised strongly reduced catches relative to the maximum catch in the time series (e.g. roundnose grenadier *Coryphaenoides rupestris* in the Northeast Atlantic and Arctic Ocean, ICES rng 2019), suggesting indirectly that the stock was below levels that can produce maximum sustainable yields. In these cases B/Bmsy was set to 0.5 (3 stocks) or to 0.25 (one stock) for the purpose of this study.

Results

Altogether 119 stock assessments published by ICES (114 in 2019 and 5 in 2018, related to the 2018 and 2017 situation, respectively) for the Northeast Atlantic were analyzed for the purpose of this study. Ninety-one of these (4 in 2017) contained information about stock size and 71 (3 in 2017) contained information about exploitation. Of these, 29 stocks (31.9%) had stock sizes at or above the minimum size required to produce maximum sustainable yields (B >= Bmsy) and 42 stocks (59.2%) were exploited at or below the maximum sustainable level (F <= Fmsy). Only 23 stocks (34%) had sizes and exploitation rates that were both compatible with the prescriptions of the CFP (2013). In contrast, 31 stocks (34.1%) were outside safe biological limits (B < Bpa), 62 stocks (68.1%) were too depleted to produce maximum sustainable yields, and 29 stocks (40.8%) were subject to ongoing overfishing (F > Fmsy). Figure 1 shows the 67 stocks for which information on stocks size and exploitation was available.

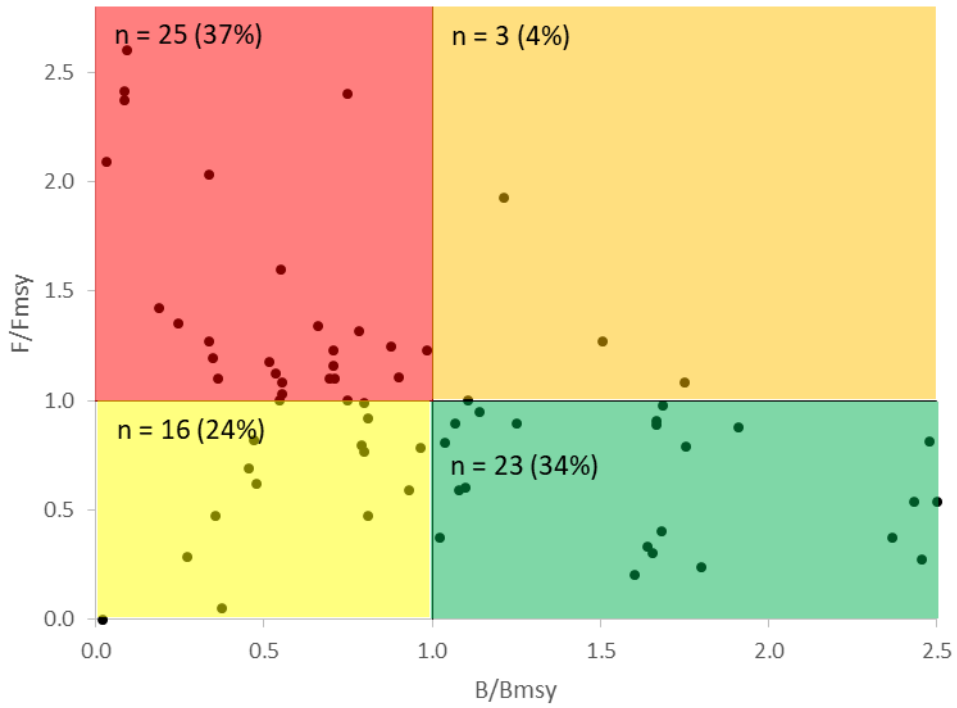

Figure 1. Kobe plot of exploitation and stock size relative to sustainable levels for 67 stocks with available information in the Northeast Atlantic for the year 2018 (3 stocks for 2017).

Table 1 shows for the 20 northern European countries the number of stocks that were fished by them between 2006 and 2018 and the percentages of their stocks that, in 2018 (3 in 2017), were overfished, outside safe biological limits, or smaller than the minimum biomass required to produce MSY. The binding targets for these percentages according to the Law of the Sea (UNCLOS 1982) and the Common Fisheries Policy of the EU (CFP 2013) are zero. Note that most countries fish, in addition, outside of the area considered here, so their global ranking will be different from the ranking for the Northeast Atlantic presented here. For example, Mediterranean stocks are known to be in particularly bad shape (Froese et al. 2018; STECF 2019) and are fished by France and Spain.

Table 1. Northern European countries with number of assessed stocks fished by them between 2006 and 2018 (data for 3 stocks only until 2017), percentage of stocks that were subject to overfishing in 2018/2017 (F > Fmsy, used for ranking), percentage of stocks that were outside of safe biological limits (B < Bpa), and percentage of stocks that were below the level that can produce maximum sustainable yields (B < Bmsy). For all columns with percentages, the target value prescribed by UNCLOS and by the CFP is zero.

Rank	Country	Stocks	F > Fmsy %	B < Bpa %	B < Bmsy %
1	Portugal	20	25.0	21.4	57.1
2	Spain	37	30.0	19.2	57.7
3	Iceland	24	33.3	26.3	52.6
4	Russian Federation	24	35.7	30.0	60.0
5	Ireland	31	36.0	44.0	64.0
6	United Kingdom	70	37.8	27.8	59.3
7	France	65	39.5	27.5	60.8
8	Norway	49	42.3	25.0	61.1
9	Belgium	44	47.1	31.4	65.7
10	Faeroe Islands	30	50.0	25.9	66.7
11	Netherlands	41	50.0	34.5	69.0
12	Germany	41	50.0	34.1	70.7
13	Denmark	57	50.0	40.0	77.5
14	Greenland	17	54.5	20.0	53.3
15	Sweden	40	55.0	41.9	83.9
16	Lithuania	15	71.4	42.9	85.7
17	Finland	10	75.0	62.5	87.5
18	Poland	18	80.0	50.0	81.3
19	Estonia	10	80.0	55.6	100
20	Latvia	11	80.0	60.0	100

Discussion

The purpose of this study was to provide a recent update of exploitation and status of stocks fished by northern European countries in the Northeast Atlantic before the year 2020 when the Common Fisheries Policy of Europe (CFP 2013) and its Marine Strategy Framework Directive (MSFD 2008), in accordance with the Law of the Sea (UNCLOS 1982) and the United Nations Fish Stock Agreement (UNFSA 1995), demands an end of overfishing and the rebuilding of stocks sizes above the level that can produce maximum sustainable yields. The results for 2018 (3 stocks for 2017) are still far away from the target: 40.8% of the stocks were subject to ongoing overfishing, 34.1% of the stocks were outside safe biological limits and 68.1% of the stocks had stock sizes below the level that can produce maximum sustainable yields. Only xx% of the stocks were, both, of sufficient size and fished sustainably (green zone in Figure 1).

Note that the results for overfishing and safe biological limits match very well with those found by the Scientific, Technical and Economic Committee for Fisheries (STECF), which advises the EU on fishing matters, and which found close to 40% of the stocks in the Northeast Atlantic to be overfished and around 35% to be outside safe biological limits in 2017 (STEFC 2019). STEFC notes that it did not evaluate "the number or proportion of stocks above/below Bmsy [..], because an estimate of Bmsy is only provided by ICES for very few stocks" (STECF 2019, p. 7). This limitation is overcome in the present study

by applying approximate relations between MSY Btrigger, Bpa and Bmsy as used by ICES (see Definitions).

The results of this study confirm for the year 2018 the observation by STEFC that "progress until 2017 has been too slow to allow all stocks to be maintained or restored to at least Bpa & MSYBtrigger, and managed according to Fmsy by 2020" (STEFC 2019, p. 8).

A reason for this slow progress towards the CFP targets for 2020 may be found in the "Administrative Agreement (AA) between the European Commission and the International Council for the Exploration of the Sea" (EC-ICES 2018), referred to as "Agreement" hereafter. The Agreement recognizes in its introduction that the EC "in the context of the CFP shall aim to ensure that for the exploitation of the resources that restores and maintains populations of harvested species above levels which can produce the Maximum Sustainable Yield (MSY), the **MSY exploitation rate** shall be achieved by 2015 where possible and at the latest by 2020 **for all stocks** [bold font applied for emphasis]." However, this agreement contains an Annex IIB which lists all stocks to be assessed by ICES and specifies "...the policy basis to be used when computing figures included in the management advice" (EC-ICES 2018, p. 15). Annex IIB lists 200 stocks for which ICES is requested to give advice on total allowable catches (TAC). It prescribes that ICES is to give TAC advice based on Fmsy for only 43 (21.5%) of the stocks; ICES is to advise TACs with ranges around Fmsy (including overfishing) for 58 (29.0%) of the stocks; and ICES is to advise TACs that may constitute overfishing and may reduce stock sizes to the border of safe biological limits (Bpa) for 99 (49.5%) of the stocks, a policy with the misleading name "precautionary approach" (PA).

An example of the implementation of this agreement can be seen for plaice in the western Baltic (ICES ple 2019b), which is one of the species for which the Agreement requests TAC advice according to PA. Consequently, the advice given by ICES for catches in 2020 reads: "In the context of the EU multiannual plan for the Baltic, which considers this stock to be bycatch, the EC has requested that ICES provide advice based on the precautionary approach. ICES advises that catches of up to 10 636 tonnes are considered to be precautionary." TAC according to the legally binding MSY exploitation rate is given in Table 3 of the advice document as 5675 tonnes, i.e., about half (53.4%) of the 'precautionary' TAC advised by ICES on request by the EC for consideration by the Council of Ministers.

As quoted above, the EC recognizes in the Agreement that under the CFP (2013) all stocks have to be managed according to the MSY exploitation rate. There is no special clauses for bycatch species in UNCLOS (1982), UNFSA (1995), or the CFP (2013), and such treatment would make no sense, because many bycatch species such as sharks and rays (all marked for PA management in the Agreement) are threatened by extinction and require more (and not less) protection from overfishing than the target species. The prescriptions for ecosystem-based fisheries management in the Marine Strategy Framework Directive of the EU (MSFD 2008) and in the CFP (2013) call for minimization of fisheries impact on non-target species. In summary, the Agreement between the EC and ICES, which requests from ICES 'PA' advice for three quarter of the exploited stocks, is probably the main reason for the lack of progress in reducing overfishing in the Northeast Atlantic and the likely massive failure of ending overfishing in 2020.

Slow progress is observed also in the reduction of overcapacity (SHI 2019), considering that in accordance with the biological indicator outputs (estimated following the 2014 Balance Indicator Guidelines, COM 2014) more than half of the fleet segments operating in Northeast Atlantic in 2017 may not be in balance with their fishing opportunities.

Fisheries management in the Northeast Atlantic remains strongly influenced by national interests, either by independent countries such as Iceland, Norway and Russia or by the Ministers in charge of fisheries in the EU member states, who decide the TACs for the next year in annual joint meetings in Brussels. In this context it is instructive to look at the information in Table 1. Numbers of fished and assessed stocks range from 10 in Estonia and Finland to 70 in the UK. The percentage of overfished stocks ranges from 25% in Portugal to 80% in Estonia, Latvia and Poland. The increase in percentages of depleted (B < Bpa) and underperforming (B < Bmsy) stocks is roughly aligned with the percentage of overfished stocks, demonstrating clearly the fallacy of thinking that overfishing is good for the national fisheries. Ministers should understand that overfishing shrinks the stocks as well as future catches, and that the short term gain in catch obtained from overfishing is only a small fraction of the loss in catch in subsequent years. Countries near the top of the list in Table 1 seem to have understood this lesson much better than those near the bottom.

Conclusions

International conventions and agreements (UNCLOS 1982, UNFSA 1995) require northern European countries to manage the stocks fished by them such that they can produce maximum sustainable yields. Specifically, the CFP (2013) obliges EU member states to end overfishing latest in 2020. However, efforts to reduce the number of overfished stocks are stalling at 40%, probably because the EC has requested ICES to advise TACs that constitute overfishing for many stocks. Northern European countries differ widely in the percentage of stocks they are overfishing, and some countries may still decide to honor their legal commitments and end overfishing in 2020 by setting the TACs accordingly. The alternative would be a resounding and systemic failure of the notion that politicians are capable of properly managing public goods.

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