ICES Technical Service
Celtic Seas and Greater North Sea ecoregions
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Version 3: 18 November

EU request to provide likely catches in 2020 of specific bycatch / non-targeted stocks that have zero catch advice (cod in divisions 7.e–k and 6.a and in Subdivision 21, whiting in divisions 6.a and 7.a, and plaice in divisions 7.h and 7.j–k)

Service summary

ICES has provided estimates of the likely catches of a number of stocks under the assumption that the TACs for the other stocks are set in line with ICES advice.

For cod (*Gadus morhua*) in divisions 7.e–k, it is possible to use a mixed-fisheries forecast to estimate catches of cod under scenarios 1–3; where the TAC for the target stock (haddock) is in line with the fishing mortalities specified in those scenarios.

For cod in divisions 7.e–k:

- 1854 tonnes[*] are estimated to be caught when haddock is fished at F_{MSY};
- 1331 tonnes[*] are estimated to be caught when haddock is fished at $F_{MSY\ lower}$; and
- 1606 tonnes[*] are estimated to be caught when haddock is fished midway between F_{MSY} and $F_{MSY\ lower}$.

For cod in Division 6.a, cod in Subdivision 21, and whiting in Division 6.a, the *status quo* fishing mortality scenario provides the best estimates of catches. This would correspond to catches in 2020 of:

- 1279 tonnes for cod in Division 6.a;
  [†]and
- 1171 tonnes for whiting in Division 6.a.

For whiting in Division 7.a, bycatch levels were forecasted using a model of whiting bycatch in the *Nephrops* fishery. Catches between 901 and 917 tonnes are predicted in all fleets, depending on the amount of *Nephrops* catches taken in 2020.

For plaice in divisions 7.h–k, ICES is not in a position to estimate total catches because discard rates are unknown. Recent landings have been around 100 tonnes.

For cod in Subdivision 21 it is not possible to estimate catches in 2020 the most recent catch estimates in 2018 were 284 tonnes[‡].

Request

EU DGMARE has asked ICES to evaluate the following:

Given the zero catch advice for the following:

Cod in divisions 7e-k,
Cod in division 6a,
Cod in subdivision 21 (Kattegat),
Whiting in division 7a,
Whiting in division 6a,
Plaice in divisions 7hjk.

[*] Version 2: Number corrected as an error in input data was detected
[†] Version 3: Estimate for cod in Subdivision 21 removed
[‡] Version 3: Paragraph inserted

ICES is requested to

- *Estimate the amount, in tonnes, that is likely to be caught by operators who fish for other species in these areas (bycatch / non-targeted) in 2020.*

- *ICES is requested to assume that the other target and bycatch stock's TACs in the same areas are set in line with the latest ICES advice (For example in line with MSY advised catches) for 2020.*

- *Where MSY catch options are available, ICES is requested to assume three scenarios:*
  ***Scenario 1)** that the other target stocks are set at the lowest MSY point in their lower range*
  ***Scenario 2)** that the other target stocks are set at the medium point between their lower range and the MSY point figure and*
  ***Scenario 3)** that the other target stocks are set at their MSY point figure.*
  For data poor stocks of category 5 or 6, where only precautionary advice is available, ICES is requested to assume that these other target stocks are set in line with that advice.

- *ICES is asked to provide a global amount as well as amounts per Member State.*

ICES approach address this request:
The ICES approach used in ICES Technical Service from 5 November 2018 "EU request to provide estimates of the likely catches in 2020 of specific bycatch/non -targeted stocks with zero or low catch advice, assuming ICES advice for target stocks is followed" relied mainly on a status quo fishing mortality approach that did not take into account the potential change in behaviour of fishers who, for example would no longer be pursuing a directed fishery against stocks. Where possible ICES should please provide an estimate that includes this change in fishing pattern if considered likely by ICES.

Moreover, ICES is requested to calculate by-catch TACs for 2020 by assuming that in 2020 the other targeted and by-catch fisheries will use the most selective gear currently available on the market.

ICES planning

1) Where FCube models are available, ICES can explore the scenarios and provide catch estimates corresponding to the requested scenarios. The only fully operational model that covers this request is the Celtic Sea; therefore, we could run this analysis for COD ek and PLE hjk.

2) For the other stocks, ICES can provide some background analysis of which fleets have fished these stocks in the past, species mixing, effort, and possible bycatch. If links to target species can be established, then this may be used to extrapolate future catches under potential scenarios for target stocks.

3) It will not be possible to forecast potential change in behaviour of fishers, or changes in fishing patterns due to update of selective gears in the future.

Basis of the advice

This technical service was completed using the ICES data sources and, where available, the results of both single-species and mixed-fisheries forecasts.

For cod.27.7e-k, where there is an operational mixed fisheries model, the catch of cod and catches in the target stock (had.27.7b-k) and a bycatch stock (whg.27.b-k) were explored under different F scenarios for the target stock in FCube.

Where no mixed fisheries model was available (whg.27.6a, whg.27.7a, and ple.27.7h-k), landing and effort data from the Working Group on Mixed Fisheries Advice (WGMIXFISH) were used to determine the target stocks in the main métiers with bycatches of those stocks. The relative change in fishing mortality advised in the single species advice for the main target stocks in the area, together with expert knowledge of technical interactions, was also used to estimate the amount of bycatch stock likely to be caught.

Where no mixed fisheries data was available (cod.27.6a and cod.27.21), single species advice and STECF Fisheries Dependant Information (FDI) was used to describe trends in the fishery and technical interactions. Information on landings and discards was also taken from ICES InterCatch data.

Results

1 Cod in divisions 7 e-k

Cod was landed by nine main métiers operating in the Celtic Sea. From 2008 to 2018, the landings of cod were predominantly taken by bottom trawls targeting other gadoids (haddock and whiting), slope species such as hake, monkfish, and megrim (OTB_DEF, OTT_DEF). There are lesser catches in métiers targeting *Nephrops* with otter trawls (OTB_CRU, OTT_CRU), fin fish with gillnets (GNS_DEF) and flatfish with beam trawls (TBB_DEF) (Table 1.1,). Cod can be mainly considered a bycatch fishery during this period, because cod typically represented less than 10% of species landed in each métier (Table 1.1). The main species typically landed with cod are whiting, haddock, monkfish, and megrim (Figure 1.1).

Table 1.1 Summary species mixing with cod in Celtic Seas landings from 2008 to 2018, covering ICES area, 27.7e-k. The proportion of cod within the total landings of all species for that métier, demonstrates to what extent a métier targets cod. Cod is not targeted in this area.

Gear type	Cod landingsandings	Total landings	Proportion of cod (%)of Cod %
OTB_DEF	21310	378178	6
OTT_DEF	7079	81619	9
TBB_DEF	2959	119531	2
GNS_DEF	2718	134671	2
OTB_CRU	2156	27835	8
SCC_DEF	1954	51009	4
OTT_CRU	1682	10641	16
MIS_MIS	796	13203	6
GTR_DEF	485	19542	2

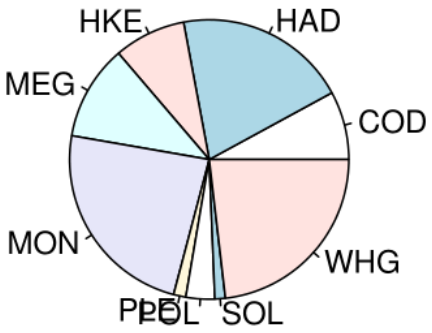

Figure 1.1 Species composition of métiers which typically land cod, from 2008 to 2018, covering ICES area 27.7e–k,

Table 1.2 Summary of métiers, effort (kilowatt/hours), catches (tonnes), landings (tonnes), and discards (tonnes) of cod in division 27.7. e–k in 2018.

Métier	kW_hours	Catch	Landings	Discards
OTB_DEF	4550	745	688	57
OTT_DEF	350	160	148	12
OTB_CRU	356	140	130	11
TBB_DEF	3547	140	130	11
SSC_DEF	184	96	88	7
GNS_DEF	1849	74	68	6

The pattern observed in landings is also mirrored in effort and discarding within the fishery, where the highest levels of effort is executed by OTB_DEF métier; this resulted in the highest landings and discards of Celtic Sea cod in 2018 (Table 1.2). The main species targeted by this OTB_DEF métier are the three gadoid species; cod, haddock and whiting, for which mixed fisheries forecasts are produced annually. These mixed fisheries considerations combine single species stock assessments with information on the average catch composition and fishing effort of the fleets catching these three gadoids. These scenarios are based on the assumption that the fishing patterns and catchability of the fleet in 2019 and 2020 are the same as that in 2018. Due to the substantial increase in the single species advice for haddock (+164%; ICES, 2019a), and the reduction in the whiting advice (−59%; ICES, 2019b), there is an incompatibility between the single stock advice and mixed fisheries options.

In the 2020 Celtic Seas mixed fisheries advice, haddock has become the least limiting of the three species and cod is the most limiting (as it was last year). To explore the impact of fishing haddock at F_{MSY}, $F_{MSY\ lower}$, and an intermediate value, a number of additional mixed fisheries scenarios were carried out and these are shown in Table 1.3. The forecasted projections from these scenarios result in different catch advice for cod, haddock, and whiting; these vary to differing degrees from the single species stock advice (Table 1.4). The resulting spawning-stock biomass (SSB) in 2021, for the different species under the different scenarios, is shown in Table 1.5.

ICES was requested to provide a global amount of total catch, as well as amounts per Member State. Partitioning of catches in 2020 is normally based on relative stability keys. These may or may not be consistent with recent landings shares by member state for information; the total landings and percentage of the total in 2018 is provide in Table 1.6.

Table 1.3 Mixed-fisheries scenarios considered for this request.

Scenarios	Explanation
Haddock F_{MSY}	All fleets set their effort corresponding to that which is required to catch their haddock stock share (F = 0.4), regardless of other catches.
Haddock $F_{MSY\ lower}$	All fleets set their effort corresponding to that which is required to catch their haddock stock share, where the haddock TAC is set according to the EU MAP $F_{MSY\ lower}$ (F = 0.26), regardless of other catches.
Haddock $F_{MSY\ lower} – F_{MSY}$	All fleets set their effort corresponding to that which is required to catch their haddock stock share, where the haddock TAC is set according to the intermediate point (F = 0.33) between $F_{MSY\ lower}$ (F = 0.26) and F_{MSY} (F = 0.4) , regardless of other catches.

Table 1.4 Mixed-fisheries advice in the Celtic Sea. Catch (in tonnes) per mixed-fisheries scenario 2020, in absolute values.

Stock	Single-stock catch advice (2020)	Catch per mixed-fisheries scenario (2020)		
		Haddock F_{MSY}	Haddock $F_{MSY\ lower}$	Haddock $F_{MSY\ lower} – F_{MSY}$
cod.27.7e-k	0	1854§	1331§	1606§
had.27.7b-k	16671	16666	11415	14112
whg.27.7b-ce-k	6481	8772§	6003§	7423§

Table 1.5 Mixed-fisheries advice in the Celtic Sea. Spawning stock biomass (in tonnes) per mixed-fisheries scenario 2021, in absolute values.

Stock	Single-stock Advice SSB (2021)	Spawning stock biomass (2021)		
		Haddock F_{MSY}	Haddock $F_{MSY\ lower}$	Haddock $F_{MSY\ lower} – F_{MSY}$
cod.27.7e-k	4447	2535§	3061§	2782§
had.27.7b-k	47629	47598	53057	50244
whg.27.7b-ce-k	33720	31811§	34121§	32932§

§ Version 2: Number corrected as an error in input data was detected

Legend

	SSB 2021 > B_{pa} and MSY $B_{trigger}$
	SSB 2021 > B_{lim} and < B_{pa} and MSY $B_{trigger}$
	SSB 2021 < B_{lim}

Table 1.6 Officially reported landings per stock in 2018 by Member State.

Stock	Total official landings in 2018	Landings per Member State, tonnage and proportion				
		Belgium	France	Ireland	UK	Others
cod.27.7e-k	1385	49 (4%)	499 (36%)	706 (51%)	130 (10%)	0.5 (< 1%)
had.27.7b-k	6591	89 (1%)	4478 (68%)	1434 (22%)	581 (9%)	8 (< 1%)
whg.27.7b-ce-k	9019	103 (1%)	3666 (41%)	4628 (51%)	590 (7%)	33 (< 1%)

2 Cod in Division 6.a

Cod in division 6a is considered a minor bycatch stock of fisheries targeting Northern Shelf haddock, saithe, and anglerfish. The majority of the catches of cod are taken by the demersal finfish trawl fishery (Table 2.1). In 2018, cod made up 1% of total catch from this fishery. Catches of cod have been rising over recent years, but were slightly lower in 2018. In 2018 the discard rate was estimated to be 37% (ICES, 2019b).

Table 2.1 Cod in Division 6.a. Catch distribution by fleet in 2018 as estimated by ICES.

Catch	Landings				Discards		
1890 tonnes	Demersal finfish trawl 96%	*Nephrops* fleet <1%	Gillnet <1%	Other 3%	Demersal finfish trawl 89%	*Nephrops* fleet 10%	Other 1%
	1129 tonnes				760 tonnes		

ICES advice for the main target species in demersal trawl fisheries in Division 6.a indicates a 2% and 1% increase in the fishing mortality of haddock and saithe respectively, and a 30% reduction in catches of anglerfish (Table 2.2). These three stocks overlap with, and can be considered to be the main target stocks in, fisheries with bycatches of cod in division 6.a. Their activities also extend into the North Sea. Assuming that the TACs in Division 6.a are set in line with the advice for haddock, saithe, and anglerfish, the most reasonable assumption is that fishing mortality in cod in 2020 will be similar to current values.

Recent catch estimates used in the assessment are presented in the latest advice (Table 7 in ICES, 2019c), and include official and ICES landings estimates, adjustments for misreporting, and discard estimates. The most recent advice provided in 2019 suggests that catches in 2020 corresponding to a *status quo* fishing mortality would be 1279 tonnes. This is the best estimate available for catches of this stock in 2020 (ICES, 2019c).

Table 2.2 Percentage change in fishing mortality, harvest rate, or advised catch between 2019 and 2020, as implied by ICES advice for the main demersal stocks in the West of Scotland and Rockall.

Species	Corresponding EC TAC area	ICES stock code	F2019	Advised F 2020	Change*
Cod (*Gadus morhua*)	6a; Union and international waters of 5b east of 12º00'W	Cod.27.6a	0.70	0	-100%
Anglerfish (*Lophiidae spp.*)	6; Union and international waters of 5b; international waters of 12 and 14	Anf.27.3a46	NA	NA	-30%
Whiting (*Merlangius merlangus*)	6; Union and international waters of 5b; international waters of 12 and 14	Whg.27.6a	0*	0*	0%
Saithe (*Pollachius virens*)	6; Union and international waters of 5b, 12, and 14	Pok.27.3a46	0.36	0.363	1%

Species	Corresponding EC TAC area	ICES stock code	F2019	Advised F 2020	Change*
Haddock (*Melanogrammus aeglefinus*)	Union and international waters of 5b and 6a	Had.27.46a20	0.190	0.194	2%
Haddock (*Melanogrammus aeglefinus*)	Union and international waters of 6b, 12 and 14	Had.27.6b	0.162	0.168	4%
Norway lobster (*Nephrops norvegicus*)	6; Union and international waters of 5b	Nep.fu.13	11.1**	15.1	36%
Norway lobster (*Nephrops norvegicus*)	6; Union and international waters of 5b	Nep.fu.12	4.8**	11.7	44%
Norway lobster (*Nephrops norvegicus*)	6; Union and international waters of 5b	Nep.fu.11	6.4**	10.8	69%
Megrim (*Lepidorhombus whiffiagonis*)	Union and international waters of 5b; 6; international waters of 12 and 14	Lez.27.4a6a	3258	8350	256%

* % change in fishing mortality, harvest rate, or catch advised by ICES for 2020 relative to 2019.
** Whiting 6a – biennial advice advised 0 TAC for 2019 and 2020.
*** Fishing mortality or harvest rate in 2018.

3 Cod in Subdivision 21 (Kattegat)

The main gear types landing cod in the Kattegat could be identified using STECF FDI data from 2008 to 2016. Cod was landed by four gear types operating in the Kattegat. These landings of cod were predominantly taken by TR2 gear. The TR2 gear type refers to bottom trawls and seines (OTB, OTT, PTB, SDN, SSC, and SPR) with mesh equal to or larger than 70 mm, and less than 100 mm, targeting *Nephrops* (Norway lobster).

Table 3.1 Summary species mixing with cod in in Subdivisions 21 (Kattegat landings from 2008 to 2016. The proportion of cod within the total landings of all species for that gear type demonstrates to what extent a métier targets cod. Cod is not targeted in this area.

Gear type	Description	Cod landings	Total landings	Proportion of cod %
TR2	Bottom trawls and seines (OTB, OTT, PTB, SDN, SSC, SPR) of mesh: TR2 equal to or larger than 70 mm and less than 100 mm	1196	25433	5
GN1	Gillnets, entangling nets	135	1429	9
NONE	Unspecified gear type	126	2896	4

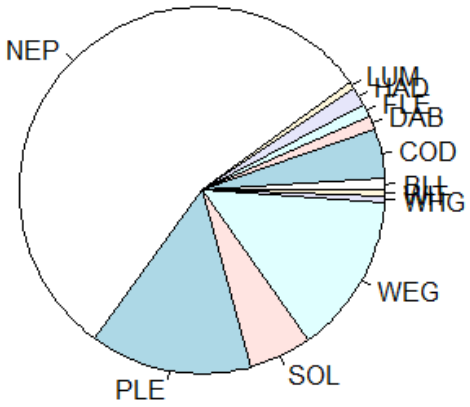

Figure 3.1 Species composition of gear types which typically land cod, from 2008 – 2016, covering the subdivision 21, Kattegat.

There is no targeted cod fishery in Kattegat at present, as landings of cod make up less than 10% of the landing; cod is mainly taken as bycatch in the *Nephrops* landing. This implies that the fishing mortality of the stock is most closely linked to effort directed to the *Nephrops* fishery. The Swedish sorting grid has a bycatch of less than 1.5% of cod in the *Nephrops* fishery, and has been extensively used in previous years. The removal of the effort system since 2016, however, reduced the incentives to use this gear. There are also gears available that successfully reduce cod bycatches from flatfish catches, though these gears are not in use at present.

The ICES landings and the discard estimates in recent years, based on observer trips, did not represent the total removals from the stock. Unreported catches have historically been a concern for this stock, and have been estimated as part of the unaccounted removals from 2011 onwards within the assessment model. ICES concluded the catch data to be of reasonable quality from 2011 onwards. The unaccounted removals now estimated in the model include North Sea cod, which use the area as nursery and migrate back to the North Sea for spawning, as well as possible increased natural mortality from seal predation. The advice is based on an assessment indicative of trends. The current absolute level of fishing mortality is still unknown, because the assessment model is estimating total removals from the stock. This estimate is a combination of fishing mortality, natural mortality, and migration out from the Kattegat area. It is not possible, at present, to estimate the relative contribution of these processes. The level of fishing mortality, therefore, remains unknown and it is not possible to catches in 2020 corresponding to a *status quo* fishing mortality. The most recent catch estimates in 2018 were 284 tonnes (Table 3.1).

Table 3.1 Cod in Subdivision 21. Catch distribution by fleet in 2018 as estimated by ICES.

Catch (2018)	Landings		Discards
284 tonnes	Active gears 87%	Passive gears** 13%	72 tonnes
	212 tonnes††		

4 Whiting in Division 7.a

The stock size of whiting (*Merlangius merlangus*) in Division 7.a (Irish Sea) is estimated to be extremely low (ICES, 2019e). The spawning-stock biomass (SSB) has been declining since the start of the time-series and has been well below B_{lim} since the mid-1990s. Recruitment (R) has been low since the early 1990s. Fishing pressure (F) has declined since 2015 but remains above F_{MSY} and F_{lim} in 2018. The current ICES advice is that when the MSY approach is applied, there should be zero catches in 2020 and 2021.

The majority of whiting caught are discarded with most caught in the *Nephrops* fishery. These tend to be below the EU minimum conservation reference size (MCRS). The introduction of highly selective gears to reduce finfish catch and

** Version 3: Other gears replaced by passive gears
†† Version 3: Number corrected

discards in the *Nephrops* fishery, appears to have reduced whiting catches since mandatory introduction in 2013. However, discards levels have remained high relative to the landings. During 2016 – 2018 the mean catch of whiting has been 665.7 t (sd = 154) with landings contributing 4% of catch. In 2018, 98% of discards and 94% of catch originated form *Nephrops* directed bottom trawl fisheries (Table 4.1).

Table 4.1 Whiting in division 7a, 2018 catch distribution by fleet.

Catch (2018)	Landings			Discards	
899 tonnes	Finfish-directed otter trawls	*Nephrops*-directed otter trawls	Other gears	*Nephrops*-directed otter trawls	Other gears
	38%	14%	48%	98%	2%
	46 tonnes			853 tonnes	

This stock was benchmarked in 2017 by the Benchmark Workshop on the Irish Sea Ecosystem (WKIrish3; ICES, 2017), and is assessed by a category 1 method (analytical assessment and forecast). The Working Group for the Celtic Seas Ecoregion (WGCSE) updated the assessment in their 2019 report (ICES, 2019g) with 2018 data. The advice for this stock is typically biennial. In response to an EC request for advice on the removal of TACs for certain stocks, ICES advises that removing the EU TAC for whiting in ICES Division 7.a may generate a high risk of the stock being unsustainably exploited. However, ICES notes that the TAC is not currently controlling exploitation.

A linear model of whiting catch with covariates is proposed. The method uses multi-model inference with *a priori* selection of covariates of whiting bycatch, with model selection by Akaike Information Criterion (AIC). Estimates of whiting catch in Division 7a since 2005 are used; this part of the time-series was identified as the beginning of the period in which the catches are dominated by discards, exceeding 90% annually.

The whiting catch from 2005 to 2018 was partitioned to the *Nephrops* fishery using the observed catch breakdown between 2016 and 2018, with 83% of catches attributed to *Nephrops* fisheries in Division 7a. The discard estimates were explored by calculating catch rates of whiting: *Nephrops*, as outliers, were removed. The model used to forecast whiting bycatch uses 'Technical measures'; fishing effort targeting *Nephrops* and whiting stock dynamics. The forecast assumptions are shown in Table 4.2.

Table 4.2 Forecast assumptions.

Parameter	Value	Comment
Technical measures	Factor level '2'	Highly selective gear
Nephrops catch	7300	2018 catch
	11285	Maximum catch during 2013–2018
	10142.1	Median catch during 2013–2018
	7300	Minimum catch during 2013–2018
Recruitment	118853	Geometric mean (GM) recruitment 2000–2018

Forecast catch in 2020

Forecast whiting bycatch in Division 7a is using the constructed model of whiting bycatch. The forecast catch assumptions are based on the scenarios as shown in Table 4.3. The *Nephrops* fishery accounted for 83% of whiting bycatch during 2016–2018; the model prediction of whiting bycatch is raised to all fleets (Table 4.3).

Table 4.3 Whiting bycatch forecast for 2020 in Division 7a, derived form a model of whiting bycatch. All weights are in tonnes.

Scenario	*Nephrops* fishery catch prediction	All fleets catch prediction
2018 *Nephrops* catch	838	901
Maximum *Nephrops* catch 2013–2018	852	917
Median *Nephrops* catch during 2013–2018	848	912
Minimum *Nephrops* catch during 2013–2018	838	901

5 Whiting in Division 6.a

The majority of the catches of whiting in division 6.a are taken by the *Nephrops*-directed otter trawl fishery. In 2018, whiting made up 4% of total catch from this fishery. The discard rate for whiting in 2017 was 87%. Whiting is a relatively low value species and there has been no targeted fishery for whiting in division 6.a since the early 2000s.

Table 5.1 Whiting in Division 6.a. Catch distribution by fleet in 2018 as estimated by ICES.

Catch (2018)	Landings			Discards		
1723 tonnes	Finfish-directed otter trawl 78%	*Nephrops*-directed otter trawl 3%	Other gear 19%	Finfish-directed otter trawl 12%	*Nephrops*-directed otter trawl 69%	Other gear 19%
	176 tonnes			1547 tonnes		

ICES advice for *Nephrops* stocks in 2020 indicate an increase in all Functional Units (FU): a 69% increase in FU 11, a 44% increase in FU 12, and a 36% increase in FU 13 (Table 5.1 in cod6a section). Current TAC management operates at the scale of Subarea 6, and it is not currently possible to partition the discards or relative fishing mortality for whiting to individual functional units. Assuming that the *Nephrops* TAC in Subarea 6 is set in line with the advice for FUs 11–13, however, the most reasonable assumption is that fishing mortality in whiting in 2020 will be similar to, or slightly higher than, current values. The most recent advice provided in 2018 suggests that catches in 2019 corresponding to a *status quo* fishing mortality would be 1171 tonnes; 441 tonnes of which would be wanted catch and 730 tonnes unwanted catch. This is the best estimate available for catches of this stock in 2020.

6 Plaice in divisions 7.h and 7.j–k

Plaice is landed by a four main métiers (DCF level 4) operating in the Celtic Seas. Over a 10 year period (2008–2018), the landings of plaice were predominantly taken by bottom trawls targeting gadoids (cod, haddock, and whiting), and slope species such as hake, monkfish, and megrim (OTB_DEF, OTT_DEF). Some minor catches were also found in beam trawl (TBB_DEF) and seine net fisheries (SSC_DEF) (Table 6.1; Figure 6.1). Plaice is a very minor bycatch in all fisheries, typically representing less than 2% of species landed in each métier (Table 6.1). However any effort by the main métiers operating in this area, landing any of the target species identified in Figure 1.1, is likely to result in minor bycatch of this plaice stock.

Table 6.1 Summary species mixing with plaice in Celtic Seas landings from 2008 to 2018, covering ICES area, 27.7h-k. The proportion of plaice within the total landings of all species for that métier demonstrates to what extent a métier targets plaice. Demonstrating that plaice is not the target within this area.

Gear type	PLE Landings (tonnes)	Total Landings (tonnes)	Proportion of Cod %
OTB_DEF	741	163452	<1
TBB_DEF	293	14629	2
OTT_DEF	177	58758	<1
SCC_DEF	101	16228	1

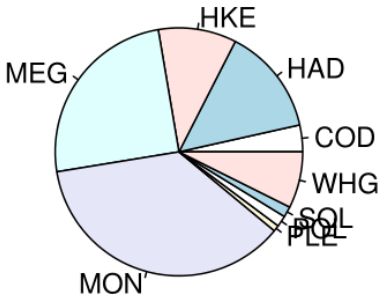

Figure 6.1 Species composition of metiérs which typically land plaice, from 2008 to 2018, covering ICES area, 27.7h-k,

As a category 3 stock, plaice in this area does not have a full analytical assessment. It has, therefore, no quantitative method for the forecast and as such there is currently no accepted method for producing forecasts for inclusion in FCube. While approaches for including stocks with only trends-based advice has been explored at the WGMIXFISH-Methods meeting, it was concluded that this methodology would need further testing before it could be used for advice (ICES, 2018).

The ICES advice for the majority of the target stocks in fisheries catching plaice is for large reductions in fishing mortality in 2020 (Table 6.2). For the three main species caught with plaice (monkfish, megrim, and hake; Figure 6.1) there are small increases in fishing mortality advised.

Annual discard estimates cannot be estimated due to insufficient sampling information; discards are considered to be in the order of 30%, however, and may be increasing. ICES has never provided catch advice for this stock because of the uncertain discard rates. Landings in 2018 are estimated at 97 tonnes (ICES, 2019f).

Table 6.2 Percentage change in fishing mortality, harvest rate, or advised catch between 2019 and 2020; as implied by ICES advice for the main demersal stocks being landed in mixed fishing operations with plaice.

Species	Corresponding EC TAC area	ICES stock code	F 2019	Advised F 2020	Change*
Plaice (*Pleuronectes platessa*)	7h, 7j and 7k	ple.27.7h-k	0.34	0.0	−100%
Cod (*Gadus morhua*)	7b, 7c, 7e-k, 8, 9 and 10; Union waters of CECAF 34.1.1	cod.27.7e-k	0.87	0	−100%
Anglerfish *(Lophius piscatorius*)	7	mon.27.78abd	0.25	0.28	+12%
Whiting (*Merlangius merlangus*)	7b, 7c, 7d, 7e, 7f, 7g, 7h, 7j and 7k	whg.27.7b-ce-k	0.62	0.35	−44%
Hake (*Merluccius merluccius*)	6 and 7; Union and international waters of 5b; international waters of 12 and 14	hke.27.3a46-8abd	0.24	0.26	+8%
Haddock (*Melanogrammus aeglefinus*)	7b-k, 8, 9 and 10; Union waters of CECAF 34.1.1	had.27.7b-k	0.77	0.4	−48%
Sole (*Solea solea*)	7h, 7j and 7k	sol.27.7h-k	NA	NA	−32%
Megrim (*Lepidorhombus whiffiagonis*)	7	meg.27.7b-k8abd	0.18	0.191	+6%

* % change in fishing mortality, harvest rate, or catch advised by ICES for 2020 relative to that advised 2019.

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