

Update of “Delineating catch quotas for Dutch demersal fisheries: a theoretical pilot study.”

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1. Introduction

A reduction of unwanted catches is a key element of the Common Fisheries Policy reform proposal (EC, 2010). To achieve this, a landing obligation (or discard ban) will be introduced, prohibiting the at-sea disposal of quota-regulated species. Instead these catches shall be brought back to shore and counted against a quota, where applicable.

In 2014, upon request by the ministry, more clarity was sought on how catch quotas could be calculated and what they would look like for the most relevant fish species of the Dutch demersal fishery. The report of that study (Miller *et al.* 2014) provided an overview of total allowable catch allocations (TAC), national quota, landings and discards statistics for some of the most-relevant quota-regulated species caught by the Dutch demersal fleet. A number of scenarios of how the new catch quotas could be calculated were presented. The theoretical implications of these alternative scenarios for the Dutch fleet were described under the assumption of no change in relative stability.

In 2015, the Ministry of Economic Affairs requested an update of Miller *et al.* (2014), and this report is the result of that update.

DISCLAIMER: This report does not aim to predict how catch quotas will actually be calculated, how the additional bycatch quota would be allocated amongst participants in the fishery, nor how the *de minimis exemptions* will be applied. It is provided merely as background information with possibly scenario's. More importantly, the report does not deal with potential behavioural responses in the fisheries following a change from landing quota to catch quota. One may expect that a fundamental change from a 'requirement to discard' to a 'requirement to land' will have a substantial influence on how individual fishermen will operate in the new system. However, these effects are not included in this report.

2. Assignment

1. Provide an overview of the most important species that are caught by Dutch demersal fisheries.
2. Provide an overview of total allowable catches (TACs), Dutch quota shares, and estimates of total landings and discards for plaice, sole, cod, dab/flounder, whiting, turbot/brill and skates/rays.
3. How would catch quotas be calculated for the Dutch demersal fleet, if a) discards would be allocated via the relative stability system and b) if additional subtraction of 5% or 10% of discarding is allowed (*de minimis exemptions*).

Note that (3) asks how catch quota *would* be calculated, while due to very limited information available to provide guidance on how this *should* be done, the current exercise merely present an answer to how they *could* be calculated.

3. Materials and Methods

TAC and quota information were derived from the annual TAC and quota regulations for the years 2010-2012 (EC 2010a, 2010b, 2011a, 2011b, 2012, 2013a, 2013b).

See Miller et al. (2014) for an overview of the most important fish species that were caught and discarded by Dutch demersal fisheries (beam trawls and otter trawls).

Previous attempts to extract data from an electronic data portal of the European Commission providing public access to relevant European fisheries catch and effort statistics (<https://fishreg.jrc.ec.europa.eu/web/datadissemination/home>) lead to questionable estimates. The statistics derived from this website were compared with statistics collated by ICES and differences were observed (ICES 2013). These differences in some cases were quite substantial (e.g. total landings of sole in 2010 were said to be 16 588 tonnes (Fishreg website) compared to 12 100 tonnes (ICES). Therefore, it was decided not to use the data from this portal, because it was not clear how some of the numbers were estimated. Likewise, discrepancies between Dutch data and the official STECF data exist. These differences are presented for information, though final analyses are carried out on the basis of STECF meeting of EWG 13-13 and EWG 14-13 (specifically the data tables annex in <https://stecf.jrc.ec.europa.eu/web/stecf/ewg1313> and <https://stecf.jrc.ec.europa.eu/web/stecf/ewg1413>). This report present landings and discard data for various stocks for the last three years (2010-2012): common sole (*Solea solea*), European plaice (*Pleuronectes platessa*), dab (*Limanda limanda*), turbot (*Psetta maxima*), Atlantic cod (*Gadus morhua*), and whiting (*Merlangius merlangus*).

In the case of turbot, TAC and quota figures provided are combined quotas including brill (*Scophthalmus rhombus*) although the landings and discard data only apply to turbot. Similarly, dab and flounder have a combined TAC, but the landings and discard data only apply to dab. Landings and discards data for skates/rays were not available, so these stocks were not examined.

In summary, the following statistics were provided for the period 2010-2012 (and for all fleets included in the STECF database):

1. Total Allowable Catch (TAC) (fleet totals);
2. Dutch quotas;
3. Landings (international fleet totals and Dutch totals);
4. Discards (international fleet totals and Dutch totals)

This report presents a number of theoretical scenarios of how catch quota *could* be calculated. There is no implied preference to the sequence in which the scenarios are presented. They are merely presented to facilitate future discussions about different options that could be used to determine the future catch quota. The scenario's also allow for an assessment of potential limiting conditions for Dutch fisheries under the assumption of no change in behavioural patterns in the fleets. We used the following theoretical scenarios:

1. TAC only

This scenario assumes no change in the quotas. i.e. the new catch-TACs are the same as the previous landings-TACs. Under this scenario the new quotas are likely to be limiting if the fleet is catching any fish above the stipulated landings-TAC for a given stock.

2. NL catch

This scenario assumes that catch quotas will be set for each country according to their historical catches (landings + discards). This scenario would require a change in relative stability unless all nations had the same discarding ratio.

3. TAC + EU %disc

This scenario assumes that catch quotas will be derived from the current landings-TAC adjusted up by the discards proportion of the European fleet (i.e. all fishing nations). For stocks that have discards included in the assessment, this scenario corresponds closest to how the landings-TACs are currently calculated. Under this scenario the new quotas are likely to be limiting if the Dutch fleet has a higher discarding ratio than the overall EU discarding ratio.

4. EU landing + EU %disc

This scenario assumes that catch quotas would be established based on historic catch statistics (i.e. landings+discards) and subsequent application of the current relative stability allocation key to obtain catch-quota per country. This generally leads to lower quotas compared to the previous scenario based on TACs. Under this scenario the new quotas are likely to be limiting if the Dutch fleet caught a higher proportion of their quota than other nations (e.g. underutilization in other countries) or if the Dutch fleet has a higher discard ratio than the overall EU discarding ratio.

Calculating catch quotas for the Dutch fleet, starts by calculating a catch-TAC on an overall (all nations) fleet level. Since the distribution of quota among countries would not change, the relative stability principle is applied using the current quota percentages for the Netherlands to derive a theoretical catch quota for the Dutch fleet. These theoretical catch quotas are compared with the Dutch catch that year by calculating the 'surplus' catch i.e. the difference between the theoretical quota and the Dutch catch. Where this is positive (i.e. Dutch catch < theoretical quota), then the catch-quota would not be limiting to the fishery. Where this is negative (i.e. Dutch catch > theoretical quota), the Dutch catch exceeded the catch-quota, and had this been in place, then it would have limited the fishery.

4. Results

Table 1 (below) shows the differences between the STECF estimates of landings and discards and the Dutch data reported to STECF. The Dutch landings data submitted to the STECF database is based on the logbook information. It is unclear why there are (small) differences between the Dutch landings data submitted and contained in the STECF database. The discard information from STECF is based on data submitted by The Netherlands in combination with international fill-ins for unsampled strata. The Dutch discard data is based on the raising of sampled strata to the overall fleet level. There are some substantial differences in estimated discards between the Dutch discard data and the STECF discard data which is due to the fill-in procedure used in STECF to compensate for unsampled strata.

STECF estimates of dab discards – and to a lesser extent plaice discards – are to a large extent based on fill-ins. Nevertheless, the STECF data were the only source available that could address all the main demersal species caught in European fisheries and were therefore used for the analyses presented below.

Table 2 details the 2010-2012 catch estimates for the overall (EU) fleet and the Dutch (NL) fleet. The Netherlands holds the majority share of the quota for sole, dab (+flounder) and turbot (+brill), roughly a third of the plaice quota, and minor shares of the cod and whiting quotas. Note that the quota are expressed as the initial quota as embedded in the TAC and quota agreements and do not take into account quota swaps with other countries. Over the period 2010-2012, plaice is the only species that the Dutch fleet has consistently landed in excess of the initial quota before swaps. For sole, cod and whiting landings in all years were less than the quota shares held by the Dutch fleet. For sole, this is in part because the fleet is able to 'bank' up to 10% of its quota to be caught in the following year. It is expected that in 2015 the Dutch fleet could utilise some of this 'banked' quota and are likely to at least fully land their quota. In the absence of brill and flounder landings estimates, the uptake of the turbot/brill and dab/flounder quotas cannot really be estimated.

Discarding ratios by the Dutch fleet on average exceeded those of the combined EU fleet for plaice, turbot and whiting and sole to a lesser extent (table 2). However, discard ratios of turbot are very low. Discarding rates for dab are very similar, perhaps as a result of the raising process used by STECF to derive total estimates (i.e. using discarding rates from sampled fleets to derive estimates for fleets with only landings data). The discard ratio for cod in the Dutch fleet is smaller than the EU fleet.

Table 3 presents the results of the four scenarios of catch quota calculation. The four scenarios (described above) are presented in the top row and can be summarized as:

1. **TAC only** - the new catch-TACs are simple the same as the previous landings-TACs.
2. **NL catch** - the catch quotas will be set for each country according to their historical catches
3. **TAC + EU %disc** - catch quotas will be derived from the current landings-TAC adjusted up by the discards proportion of the European fleet
4. **EU landing + EU %disc** - catch quotas would be established based on historic catch statistics (i.e. landings+discards) and subsequent application of the current relative stability allocation key.

The years 2010 to 2013 and the average 2010-2013 are presented in the blocks from top to bottom. Each scenario consists of four columns: 1) the new catch quota, 2) the surplus of the new catch quota compared to the yearly catch of the Dutch fleet, 3) the relative change in from landing quota to catch quota and 4) the relative catch surplus, i.e. column 2 expressed relative to the yearly catch of the Dutch fleet, Values in green generally indicate that the estimated yearly catch of the Dutch fleet would have been lower than the newly calculated catch quota and values expressed in red indicate that the yearly catch would have been higher than the newly calculated catch quota. The rows for turbot and dab should be interpreted with great caution because the catches of brill and flounder could not be included in the analysis.

The patterns across years are generally quite similar although there are some differences in the absolute magnitude of the differences between the newly calculated catch quota and the estimated catches. Under scenarios 1, 3 and 4, **plaice** and **whiting** catch quotas would likely have been insufficient for the Dutch fishery (assuming no significant change in selectivity). The same appears to hold true for **dab**, although the poor quality of the STECF discard estimates for this stock and the lack of flounder data, make it very difficult to make any definite statements regarding this stock.

Cod and **sole** catch quotas would have been sufficient under all scenarios except in scenario 4 where the discard ratio was applied to the landings.

Table 1. Comparison of landings and discards estimates (tonnes) from the STECF database (EWG 13-13 and EWG 14-13) and from Dutch data submitted to STECF.

LANDINGS	2010			2011			2012			2013		
	STECF	NL	% (STECF/NL)	STECF	NL	% (STECF/NL)	STECF	NL	% (STECF/NL)	STECF	NL	% (STECF/NL)
Sole	9133	9165	100%	7960	7995	100%	8823	8885	99%	9749	9817	99%
Plaice	27227	27231	100%	28761	29074	99%	31610	32524	97%	33156	34263	97%
Dab	5015	5056	99%	4627	4986	93%	3986	4519	88%	3144	3493	90%
Turbot	1180	1180	100%	1495	1497	100%	1696	1718	99%	1724	1739	99%
Cod	2541	2596	98%	1910	2325	82%	1855	2611	71%	1120	1616	69%
Whiting	585	585	100%	519	569	91%	451	507	89%	451	522	86%

DISCARDS	2010			2011			2012			2013		
	STECF	NL	% Diff (STECF/NL)	STECF	NL	% Diff (STECF/NL)	STECF	NL	% Diff (STECF/NL)	STECF	NL	% (STECF/NL)
Sole	1308	1070	122%	997	1310	76%	2084	1788	117%	1781	1771	101%
Plaice	21342	25670	83%	42060	26300	160%	32702	23920	137%	28734	25712	112%
Dab	39591	26420	150%	80599	21990	367%	28828	20032	144%	29702	26305	113%
Turbot	2	10	21%	49	40	122%	101	92	110%	112	0	NA
Cod	314	400	79%	200	230	87%	227	170	134%	331	141	235%
Whiting	2897	1710	169%	790	1710	46%	2020	1612	125%	591	550	107%

Table 2. Overview of TACs, landings and discards for six demersal species, combined for all countries (EU) and for the Netherlands (NL), including quota shares (%), for year 2010-2013 and average 2010-2013. Quantities are in tonnes. Relative discard ratio indicates how Dutch discards compare to overall discarding levels.

2010	EU					NL						
Species (North Sea)	TAC	Landings	Discards	Catch	%Disc. EU (Disc/ Catch)	quota	quota %	Landings	Discards	Catch	%Disc. NL (Disc/ Catch)	Rel. Discard ratio NL/EU
Sole	14050	12209	1514	13723	11%	10571	75%	9133	1308	10441	13%	1.14
Plaice	63825	58962	30124	89086	34%	22907	36%	27227	21342	48569	44%	1.30
Dab*	18810	7061	52024	59085	88%	11654	62%	5015	39591	44606	89%	1.01
Turbot*	4737	2325	5	2330	0%	2633	56%	1180	2	1182	0%	0.86
Cod in IV	33552	25971	5131	31102	16%	3219	10%	2541	314	2855	11%	0.67
Whiting	12897	10784	12399	23182	53%	599	5%	585	2897	3482	83%	1.56

2011	EU					NL						
Species (North Sea)	TAC	Landings	Discards	Catch	%Disc. EU (Disc/ Catch)	Quotum	Quotum %	Landings	Discards	Catch	%Disc. NL (Disc/ Catch)	Rel. Discard ratio NL/EU
Sole	14100	10394	1224	11617	11%	10571	75%	7960	997	8957	11%	1.06
Plaice	73400	64707	67974	132681	51%	26485	36%	28761	42060	70821	59%	1.16
Dab /	18434	6611	106262	112873	94%	11421	62%	4627	80599	85226	95%	1.00
Turbot /	4642	2690	58	2748	2%	2579	56%	1495	49	1544	3%	1.49
Cod	26842	22510	3343	25854	13%	2575	10%	1910	200	2110	9%	0.73
Whiting	14832	18678	10787	29466	37%	714	5%	519	790	1309	60%	1.65

2012	EU					NL						
Species (North Sea)	TAC	Landings	Discards	Catch	%Disc. EU (Disc/ Catch)	Quotum	Quotum %	Landings	Discards	Catch	%Disc. NL (Disc/ Catch)	Rel. Discard ratio NL/EU
Sole	16200	11142	2428	13570	18%	12151	75%	8823	2084	10907	19%	1.07
Plaice	84410	69868	47296	117164	40%	30462	36%	31610	32702	64312	51%	1.26
Dab*	18434	5964	43934	49898	88%	11421	62%	3986	28828	32814	88%	1.00
Turbot*	4642	2869	120	2989	4%	2579	56%	1696	101	1797	6%	1.40
Cod	26475	22260	4072	26331	15%	2540	10%	1855	227	2082	11%	0.71
Whiting	17056	12083	8489	20571	41%	843	5%	451	2020	2471	82%	1.98

2013	EU					NL						
Species (North Sea)	TAC	Landings	Discards	Catch	%Disc. EU (Disc/ Catch)	Quotum	Quotum %	Landings	Discards	Catch	%Disc. NL (Disc/ Catch)	Rel. Discard ratio NL/EU
Sole	14000	12611	2160	14771	15%	10492	75%	9749	1781	11530	15%	1.06
Plaice	97070	77892	44668	122560	36%	35086	36%	33156	28734	61890	46%	1.27
Dab*	18434	5249	40030	45279	88%	11421	62%	3144	29702	32846	90%	1.02
Turbot*	4642	2967	157	3124	5%	2579	56%	1724	112	1836	6%	1.21
Cod	26475	23057	7806	30863	25%	2540	10%	1120	331	1451	23%	0.90
Whiting	18932	14152	3050	17202	18%	912	5%	451	591	1042	57%	3.20

* for Dab and Turbot the TAC and quota apply to a combination of species (dab and flounder; turbot and brill). However, landing and discard information only applies to the individual species (dab and turbot) because landing and discard information for flounder and brill are not available in the STECF data set.

Table 2 – continued

Avg. 2010-2013	EU					NL						
Species (North Sea)	TAC	Landings	Discards	Catch	%Disc. EU (Disc/ Catch)	Quotum	Quotum %	Landings	Discards	Catch	%Disc. NL (Disc/ Catch)	Rel. Discard ratio NL/EU
Sole	14588	11589	1831	13420	14%	10946	75%	8916	1543	10459	15%	1.09
Plaice	79676	67857	47515	115373	40%	28735	36%	30189	31209	61398	51%	1.26
Dab /	18528	6221	60563	66784	90%	11479	62%	4193	44680	48873	91%	1.02
Turbot /	4666	2713	85	2798	3%	2593	56%	1524	66	1590	4%	1.46
Cod	28336	23449	5088	28537	18%	2719	10%	1857	268	2125	13%	0.72
Whiting	15929	13924	8681	22605	37%	767	5%	502	1574	2076	76%	2.03

* for Dab and Turbot the TAC and quota apply to a combination of species (dab and flounder; turbot and brill). However, landing and discard information only applies to the individual species (dab and turbot) because landing and discard information for flounder and brill are not available in the STECF data set.

Table 3. Scenarios of alternative methods of setting catch quotas and the implications of these for the Dutch demersal fishery for six different species for the years 2010-2013.

2010																
Species (North Sea)	1. Catch quota: TAC only				2. Catch quota: NL catch				3. Catch quota: TAC + EU %disc				4. Catch quota: EU landing + EU %disc			
	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)
Sole	10571	130	1.0	1%	10441	0	1.0	0%	11882	1441	1.1	14%	10325	-116	1.0	-1%
Plaice	22907	-25662	1.0	-53%	48569	0	2.1	0%	34610	-13958	1.5	-29%	31973	-16595	1.4	-34%
Dab /	11654	-32952	1.0	-74%	44606	0	3.8	0%	97515	52909	8.4	119%	36607	-7999	3.1	-18%
Turbot /	2633	1451	1.0	123%	1182	0	0.4	0%	2639	1456	1.0	123%	1295	113	0.5	10%
Cod	3219	364	1.0	13%	2855	0	0.9	0%	3855	1000	1.2	35%	2984	129	0.9	5%
Whiting	599	-2883	1.0	-83%	3482	0	5.8	0%	1288	-2194	2.1	-63%	1077	-2405	1.8	-69%
2011																
Species (North Sea)	1. Catch quota: TAC only				2. Catch quota: NL catch				3. Catch quota: TAC + EU %disc				4. Catch quota: EU landing + EU %disc			
	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)
Sole	10571	1614	1.0	18%	8957	0	0.8	0%	11815	2859	1.1	32%	8710	-247	0.8	-3%
Plaice	26485	-44336	1.0	-63%	70821	0	2.7	0%	54307	-16514	2.1	-23%	47876	-22946	1.8	-32%
Dab /	11421	-73805	1.0	-87%	85226	0	7.5	0%	195006	109781	17.1	129%	69932	-15294	6.1	-18%
Turbot /	2579	1035	1.0	67%	1544	0	0.6	0%	2635	1091	1.0	71%	1527	-17	0.6	-1%
Cod	2575	465	1.0	22%	2110	0	0.8	0%	2957	847	1.1	40%	2480	370	1.0	18%
Whiting	714	-595	1.0	-45%	1309	0	1.8	0%	1126	-183	1.6	-14%	1418	109	2.0	8%
2012																
Species (North Sea)	1. Catch quota: TAC only				2. Catch quota: NL catch				3. Catch quota: TAC + EU %disc				4. Catch quota: EU landing + EU %disc			
	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)
Sole	12151	1244	1.0	11%	10907	0	0.9	0%	14799	3891	1.2	36%	10179	-729	0.8	-7%
Plaice	30462	-33850	1.0	-53%	64312	0	2.1	0%	51083	-13229	1.7	-21%	42282	-22030	1.4	-34%
Dab /	11421	-21393	1.0	-65%	32814	0	2.9	0%	95547	62733	8.4	191%	30915	-1899	2.7	-6%
Turbot /	2579	782	1.0	44%	1797	0	0.7	0%	2686	890	1.0	50%	1661	-136	0.6	-8%
Cod	2540	458	1.0	22%	2082	0	0.8	0%	3005	923	1.2	44%	2526	444	1.0	21%
Whiting	843	-1628	1.0	-66%	2471	0	2.9	0%	1435	-1036	1.7	-42%	1017	-1454	1.2	-59%

Table 3 – continued

2013	1. Catch quota: TAC only				2. Catch quota: NL catch				3. Catch quota: TAC + EU %disc				4. Catch quota: EU landing + EU %disc			
Species (North Sea)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)
Sole	10492	-1038	1.0	-9%	11530	0	1.1	0%	12289	759	1.2	7%	11070	-460	1.1	-4%
Plaice	35086	-26804	1.0	-43%	61890	0	1.8	0%	55206	-6684	1.6	-11%	44299	-17591	1.3	-28%
Dab /	11421	-21425	1.0	-65%	32846	0	2.9	0%	98520	65674	8.6	200%	28053	-4793	2.5	-15%
Turbot /	2579	743	1.0	40%	1836	0	0.7	0%	2715	879	1.1	48%	1736	-100	0.7	-5%
Cod	2540	1089	1.0	75%	1451	0	0.6	0%	3400	1949	1.3	134%	2961	1510	1.2	104%
Whiting	912	-130	1.0	-12%	1042	0	1.1	0%	1109	67	1.2	6%	829	-213	0.9	-20%
Avg. 2010-2013	1. Catch quota: TAC only				2. Catch quota: NL catch				3. Catch quota: TAC + EU %disc				4. Catch quota: EU landing + EU %disc			
Species (North Sea)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)	Catch quota	Surplus (NL quota-NL catch)	Quota change	Rel. catch surplus (surplus/NL catch)
Sole	10946	487	1.0	5%	10459	0	1.0	0%	12676	2217	1.2	21%	10070	-388	0.9	-4%
Plaice	28735	-32663	1.0	-53%	61398	0	2.1	0%	48856	-12542	1.7	-20%	41609	-19789	1.4	-32%
Dab /	11479	-37394	1.0	-77%	48873	0	4.3	0%	123225	74353	10.7	152%	41377	-7496	3.6	-15%
Turbot /	2593	1003	1.0	63%	1590	0	0.6	0%	2674	1084	1.0	68%	1555	-35	0.6	-2%
Cod	2719	594	1.0	28%	2125	0	0.8	0%	3308	1184	1.2	56%	2738	613	1.0	29%
Whiting	767	-1309	1.0	-63%	2076	0	2.7	0%	1245	-831	1.6	-40%	1088	-987	1.4	-48%

* for Dab and Turbot the TAC and quota apply to a combination of species (dab and flounder; turbot and brill). However, landing and discard information only applies to the individual species (dab and turbot) because landing and discard information for flounder and brill are not available in the STECF data set.

5. Discussion

The new Common Fisheries Policy (CFP) sets out an obligation to land all catches of quota-regulated species and count them against an existing landing or catch quota. The new CFP also specifies that there may be additional quota agreed to accommodate for the current discards that should be counted against the quota in the future. The CFP does not specify how these catch quotas should be calculated. There are many different ways of how catch quota could be determined and allocated. Like Miller et al. (2014), this report does not aim to predict how catch quotas *will* be calculated or *should* be calculated. Nor does it specify how the additional bycatch quota *should* be allocated amongst participants in the fishery, nor how the *de minimis exemptions* will be applied. It is provided merely as background information with potential scenarios how it *could* be done.

More importantly, the report does not deal with potential behavioural responses in the fisheries following a change from landing quota to catch quota. One may expect that a fundamental change from a 'requirement to discard' to a 'requirement to land' will have a substantial influence on how individual fishermen will operate in the new system. However, these effects are not included in this report.

Data

There are three data sources that provide the underpinning of this report:

1. Annual TAC and quota regulations
2. STECF dataset on landings and discards (STECF EWG 13-13)
3. Dutch dataset on landings and discards submitted to STECF EWG 13-13.

The focus in this report is on the key demersal species in the North Sea that are of interest to the Dutch fisheries. The TAC and quota information is derived directly from the TAC and quota regulations (i.e. quota before swaps). For Dab and Turbot the TAC and quota apply to a combination of species (dab and flounder; turbot and brill). However, landing and discard information only applies to the individual species (dab and turbot) because landing and discard information for flounder and brill are not available in the STECF data set.

The landing information that underpins this report is generally consistent between different data sources. However, there are substantial discrepancies between the discard information contained in the Dutch submission to STECF and the final estimates contained in the STECF database. This is due to the fill-in procedure used in STECF where strata that do not have discard information provided by the country, are filled in based on average discard ratios of similar strata for other countries. The fill-in procedure attempts to generate as far as possible a consistent dataset. Although it does run the risk of raising discard data based on very small sample size, the STECF data is currently the only source that generates an EU wide perspective on landings and discards. It can be anticipated that the STECF will play a major role in the future decision-making on catch quota.

Catch quota calculation scenarios

Four different scenarios for catch quota calculation have been analysed in this report:

1. **TAC only** - the new catch-TACs are simple the same as the previous landings-TACs.
2. **NL catch** - the catch quotas will be set for each country according to their historical catches
3. **TAC + EU %disc** - catch quotas will be derived from the current landings-TAC adjusted up by the discards proportion of the European fleet
4. **EU landing + EU %disc** - catch quotas would be established based on historic catch statistics (i.e. landings+discards) and subsequent application of the current relative stability allocation key.

Scenario 1 (current TAC) indicates that for plaice, dab and whiting, the Dutch fleets exceed the current quota. This is due to the high discard ratios for these species. Because of the recent underutilisation of the Dutch quota for sole and cod, the direct transfer of TACs to catch quota would not be limiting for the Dutch fleet. It should be noted that in 2013, there was no underutilization for sole.

Scenario 2 (current catch) essentially allows fishing to continue as it is at present because national catches (landings and discards) are simply treated as the new catch quota. In cases where discard survival is not negligible, this scenario could actually lead to an increase in overall fishing mortality because of the high amount of fish removed from the system.

Scenario 3 (TAC + EU discard %) is often referred to as a likely scenario to be applied, whereby some suggest that only a certain proportion (e.g. 75%) of the current discard ratio would be added to the current landings TAC. If relative stability is to be adhered to, then this scenario is expected to create limiting conditions for Dutch bycatches of plaice and whiting. This is because nations that have a relatively low discarding ratio are likely to receive a greater increase in TAC than their current discard levels. And nations that discard at a higher ratio than the overall average would not get enough additional quota to cover their current levels of discarding.

Scenario 4 (EU landing + EU discard %) investigates a slightly different type of change on top of a possible catch-quota system. In this scenario, catch quotas are brought in line with current landings and thereby remove paper quota or precautionary TACs¹. For certain stocks (e.g. North Sea horse mackerel), not all nations fully utilise their available quota and the differences per country can be substantial. The consequences therefore vary largely per country. If the catch quotas are set as the current total landings plus a discard proportion, then all the countries fully landing their share would see a notable reduction in their allowable catch because one (or a few) other nations have not recently landed their full share. In the case of sole, the Netherlands has not fully utilised its quota in recent years and applying this method would seem to have little negative effect because this functions as a type of buffer. For plaice, the situation would be the reverse, because landings have been generally higher than the national quota, facilitated through quota swaps with countries which have underutilised their plaice quota. The plaice TAC has been underutilised by all countries combined and this would thus lead to a reduction in overall TAC and in Dutch quota. In addition, the system of banking and borrowing that is in place for some stocks currently provides the industry some flexibility in utilisation of their quota. The current scenario would have an unintended 'side effect' because underutilisation would be penalised.

It is uncertain how the catch quota will be determined for stocks that are currently managed under joint TACs (e.g. turbot/brill and dab/flounder). It could prove particularly difficult to determine if the jointly managed stocks have different discard rates and different economic value.

Implications of catch-quota for the Dutch fishery for different species

Under the scenarios examined, the introduction of a catch quota system would potentially be most limiting for the fishery on plaice and whiting. It could also prove to be potentially limiting for the fisheries on sole and dab. It could be potentially beneficial for the fisheries catching cod.

¹ Note that in the past 'precautionary TACs' were set for some species to prevent expansion of the fishery to those species. The precautionary TACs were not based on analytical assessments but rather as an upper cap of historical landings. They were by definition higher than the actual landings.

Plaice

New plaice quotas are likely to be restrictive for the Dutch fleet due to a large quota share, high discard ratios, and a higher discard ratio than the overall ratio. Plaice is discarded in large quantities by the Dutch fleet. The Dutch discard ratio exceeds the overall average implying that the likely increase in national quota to accommodate the landing of previously discarded fish would not be sufficient. Discarding of plaice is largely due to the overlap in distribution of marketable sized sole and undersized plaice. By changing to substantially larger mesh sizes and fishing further north of the Dutch coastline, it would be possible to decrease the quantity of discarded plaice but only at the expense of the catch of marketable sole.

Sole

Even though the Dutch discard ratio is only slightly higher than the rest of fleet, new sole quotas could be restrictive for the Dutch fleet given their large quota share. The likely impacts on the Dutch fleet are less obvious looking at the period 2010-2012 since the Dutch fleet landed less than its quota share in these years. There are indications of sole discard rates exceeding 15% in certain years. However, the current assessment of sole ignores discarding due to a lack of a historic time series. Hence, the current advice from ICES does not consider discards when deciding on the level of catch that should correspond to the appropriate F level as laid out in the agreed management plan for the stock. The introduction of catch quota for sole should thus go hand in hand with including discards in the assessment.

Dab

The discard rates for dab are very high. Unfortunately it is not easy to compare estimated discarding rates between countries since data availability is limited and raising procedures in STECF may blur these differences. While there is currently no single-species TAC for dab, the high level of discarding of this species suggests that it could be an economically problematic species for the fishery following the implementation of a discard ban. The sheer quantities caught would take up substantial storage space on-board could otherwise be used for marketable fish and would potentially require more frequent return trips to offload landings. Landings of this stock are insignificant in relation to discards. Should a catch quota be implemented for this stock, it would be important to consider historical *catches* rather than *landings* when dividing this up between nations and fleets.

Whiting

The Dutch fleet only holds a small proportion of the whiting TAC and the Dutch discard ratio for this stock is significantly higher than those of the other fleets. This could lead to new catch quota that is lower than the current TAC for the Dutch fleet. The low landings (lower than the quota share) suggest that this stock could be less problematic than plaice and dab for example.

Turbot

Proportionally, the Dutch fleets have a much higher discarding ratio than other nations, but the amount of discards is very low. It is difficult to evaluate how restrictive the catch TAC for this stock could be to the Dutch fishery without considering the extent of brill discarding.

Cod

Though the Dutch fleets only have a small proportion of the overall TAC, they land less than their available quota and discard at a lower ratio than other nations. Hence, future catch quotas are unlikely to be restrictive for the Dutch fleets. In none of the last three years has the Dutch discard ratio of cod exceeded the stock average. This suggests that should the additional bycatch quota be divided equally among participating fishing nations, then the Netherlands would receive a relatively large quota compensation to cover level of discarding currently experienced.

Skates and rays

There was insufficient information in the STECF data to answer questions regarding these species. This is probably due to an misspecification of the category RAJ (all ray species combined) whereas several member states submitted data by individual ray species. Quick examination of the Dutch data for 2011 suggest that discarding of these species is relatively low compared to the quota and that the Dutch fleet is generally landing less than the quota.

De minimis exemptions

STECF 13-16 has shown that the *de minimis* rules in article 15 can be interpreted in many different ways (STECF 2013). *De minimis* could for example apply at an individual member state level or across several states involved in a fishery or region. Similarly, it could apply at the individual species level or for all species combined. At an operational level it could apply at an individual vessel, fleet, member state or regional (multi- state) level.

Because of these uncertainties, it is not possible at present to determine whether or not the *de minimis* exemptions will apply to the Dutch fisheries. However, in our interpretation of the text this would not have an effect on the calculations of the catch quota. The *de minimis* exemptions provide for the possibility to discard a limited amount of fish, which will not be subtracted from the catch quota, but which needs to be carefully documented.

6. Quality Assurance

IMARES utilises an ISO 9001:2008 certified quality management system (certificate number: 124296-2012-AQ-NLD-RvA). This certificate is valid until 15 December 2015. The organisation has been certified since 27 February 2001. The certification was issued by DNV Certification B.V. Furthermore, the chemical laboratory of the Fish Division has NEN-EN-ISO/IEC 17025:2005 accreditation for test laboratories with number L097. This accreditation is valid until 1th of April 2017 and was first issued on 27 March 1997. Accreditation was granted by the Council for Accreditation.

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Justification

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The scientific quality of this report has been peer reviewed by the a colleague scientist and the head of the department of IMARES.

Approved: Dr. D.C.M. Miller
Researcher

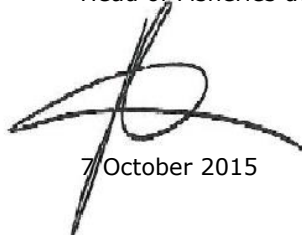
Signature:



Date: 7 October 2015

Approved: Dr. ir. N.A. Steins
Head of Fisheries department

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Date: 7 October 2015