Discards monitoring in the gillnet fishery for sole

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Key words: gillnet fishery, sole, discards, self-reporting, observer trips

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1 Background

Approximately 2-3% of the Dutch fishing quota for sole (Solea solea) is caught by a 60-vessel strong inshore fleet of gillnetters. From their home ports in IJmuiden, Scheveningen and Den Helder, these vessels fish typically with bottom-set gillnets for sole during 1 day trips between March and October. Sole caught by gillnetters is typically of good quality and reserves a niche in the market. Some of the vessels are certified with the Marine Stewardship Council (MSC) or Friends of the Sea (FOS). As a condition of these certificates, fishers self-report via logbooks during each trip the kg landings and count the number of discards by species.

Under the European Data Collection Framework (DCF), gillnetters qualify to be monitored by observers. However, their deployment is often difficult due to a lack of space on board, in particular for vessels smaller than 12 m length. In 2013, for the first time, two trips for sole were accompanied by an observer from IMARES. In 2011 as part of a pilot project, an electronic monitoring system (CCTV) was installed onboard a single vessel to monitor the bycatch of harbour porpoises.

In this document, data from these three sources (self-reporting, observer trips and CCTV) were used to describe landings and discard compositions. Because IMARES was only involved in setting up the protocol for the self-reporting and analysing the data, IMARES cannot guarantee the validity of the results herein.

IMARES wrote this document after a request by the Fishery Study Group on sole gillnet fisheries. The study group and this work is financed by the Ministry of Economic Affairs.

2 Methods

2.1 Self-reporting

Self-reported landings and discards were recorded by species in a logbook during single trips. Undersized fish and unwanted invertebrate discards were counted by default from three 100 m sections of net at the beginning, middle and end of the deployment. If large amounts of discards were present, 50 m instead of 100 m of net were sampled and marked accordingly in the logbook. Discards were recorded in numbers, landings in weights.

2.2 Observer trips

Two trips were accompanied by a scientific observer from IMARES in May and September 2013, respectively. In May, the same sampling protocol as for the self-reporting programme was used to sample discards from 3 times 100 m sections of gillnet (see protocol in the Annex). On the second trip in September, a slightly different approach was used mainly due to very small amounts of discards in the catch: discards were counted from 5 * 100 m panels in the first deployment of the net and from the full length of net (12500 m) in the second deployment. In addition to the self-reporting methods, also lengths of plaice and dab discards were measured.

Because the two trips were done during two different seasons (the first in spring, the second in late summer), the bycatch numbers of dab were expected to vary. In May, juvenile dab appear on the fishing grounds and move slowly into deeper water. This can be quite a localised phenomenon.

2.3 Electronic monitoring - CCTV

In a pilot project, an electronic monitoring system (CCTV) was used between the 10th of December 2010 until the 16th of October 2011. This pilot was set-up to test whether CCTV could effectively replace an observer onboard a gillnetter smaller than 10 m, and to see whether it can register the unwanted bycatch of marine mammals (Helmond and Couperus 2012). In 2012 and 2013, no additional CCTV information was collected on catches in the sole gillnet fishery.

3 Data Analysis

Operators from 3 different vessels provided logbook sheets with catches and discards, from 168 different trips between January and August 2013. Some of these logbook sheets were not included in the analysis, because of gear issues (n=2), and missing fishing effort information (n=4). Of the remaining 162 trips, sub-sampled numbers of reported discards were raised to the deployment by multiplying measured numbers by the fraction of the total length of deployed net over the fraction that was sampled for discards (by convention: 3 x 100 m, see protocol above). From the observer scheme, two trips from different vessels targeting sole were included.

For the self-reported and observer data, a discard per unit effort rate (DPUE) was calculated by dividing the raised numbers per deployment by the total length in m of net deployed (x1000 for km) and by the duration of the deployment (in hours).

The data from the CCTV project were not further used, because the resolution (i.e. species identification) was not as detailed compared with the other two data sources.

4 Results

Of the 162 trips from the self-reporting scheme that were included in the analysis, 63 trips had no discards (Table 1). For all trips it was assumed that the sampling and recording was done exactly in the same manner and according to the protocol (see Annex), because none of the returned logbook sheets contained a remark about any special circumstances, for example that shorter sections of net were sampled. For at least one vessel, the actual fishing time (soak time) was not filled in; instead the departure and arrival time were used to calculate fishing time. This potentially overestimates fishing time and thus, underestimates actual discard rates.

Table 1

Number of trips by vessel and month in which no discards were recorded.

Month	Vessel A	Vessel B	Vessel C
Jan	3	0	5
Feb	3	0	5
Mar	3	0	4
Apr	5	0	0
May	7	0	0
Jun	8	0	0
Jul	5	0	0
Aug	2	0	13

Between vessels, there was a vessel-specific pattern on how regularly discards were recorded (Figure 1). Compared to the second and third vessel, the first vessel (trips 1 – 51 on x-axis, Figure 1) hardly reported any discards. Discards of dab were most frequently recorded by the third vessel (Figure 1), also per kg landings (Figure 2). While whitefish discards were predominantly recorded by the first vessel (Figure 1) and crustacean discards by the second vessel (Figure 1). In numbers per kg landings, most frequently dab or flying crabs were noted in the logbook or by an observer, respectively (Figure 2).

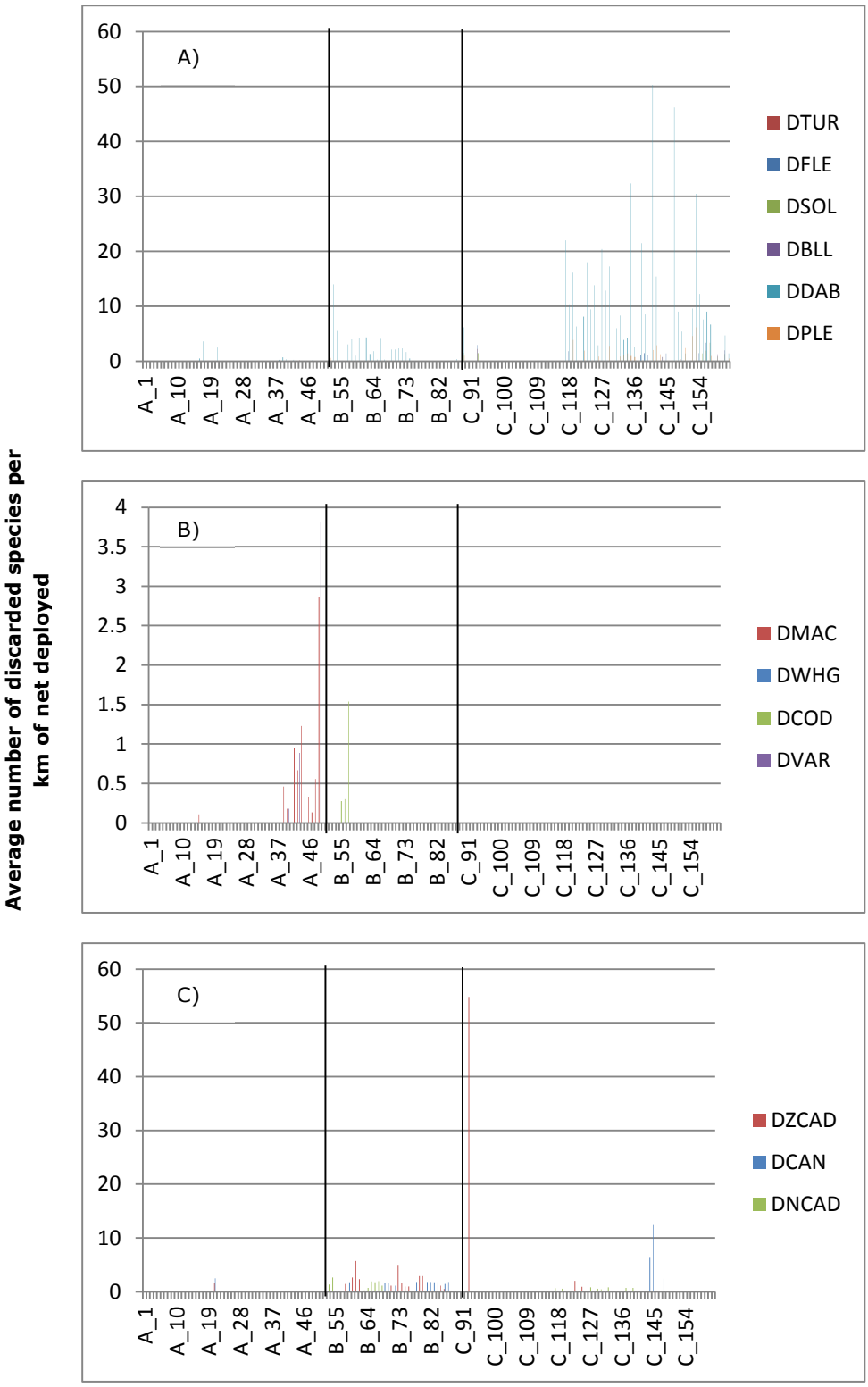

Figure 1 *Average number of discarded flatfish (A), whitefish (B) and crustacean (C) species (for species codes see Annex) per km of deployed net and hour of fishing; sorted by vessel (coded 'A' to 'C'; separated by black horizontal lines) and tripID (in chronological order per vessel).*

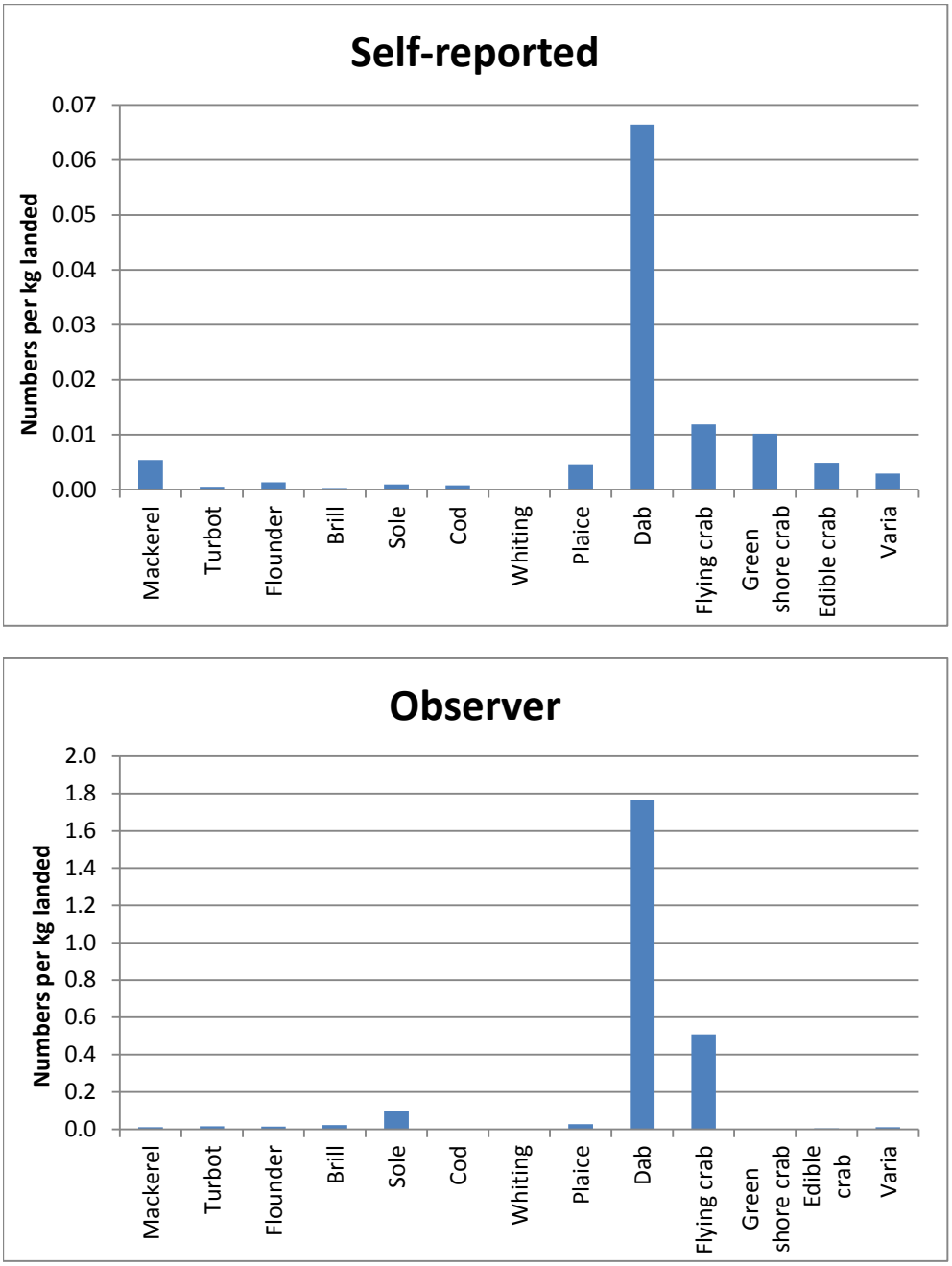

Figure 2 *Average sampled number of discarded species per 300 m of sampled net and per kg landings.*

Per kg landings, the highest number of sampled discards were self-reported for dab, followed by flying and green shore crabs and plaice (Figure 2). For the observer trips, flying crabs were followed by dab and then sole (Figure 2). Lengths of plaice and dab discards as measured during the observer trips are presented in Figure 3.

In both self-reported and observer trips, the majority of the landings comprised sole, followed by dab (Figure 4). During the observer trips no cod was landed.

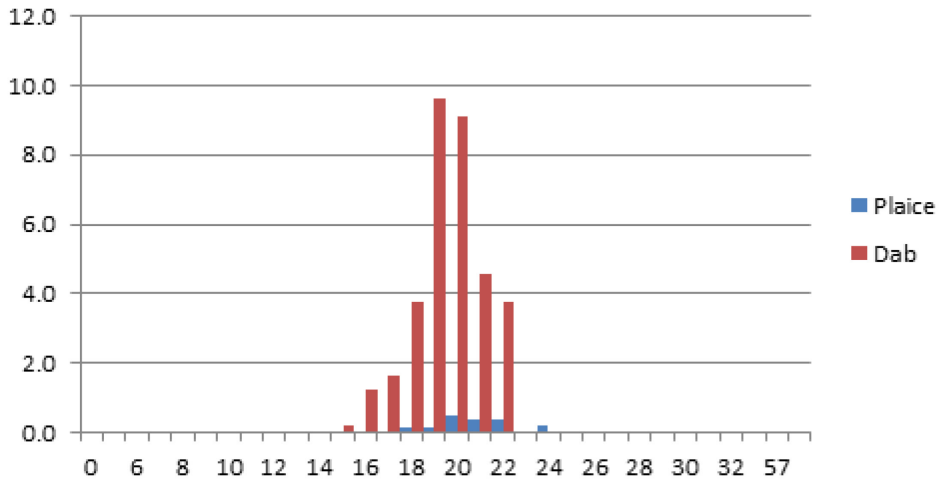

Figure 3 *Total numbers per km of net and hour of fishing per length class of plaice and dab discarded during the two observer trips.*

4.1 Interpretation of results by the Fishery Study Group

The results from the self-reporting scheme were discussed in the Fishery Study Group on the sole gillnet fishery. The fishers agreed that there is a lot of variation in the amount and composition of discards, because many factors can influence catch composition: season, fishing area, time of the day, tide, water temperature, net type etc. So large differences in presence and abundance of discards between trips and vessels are plausible.

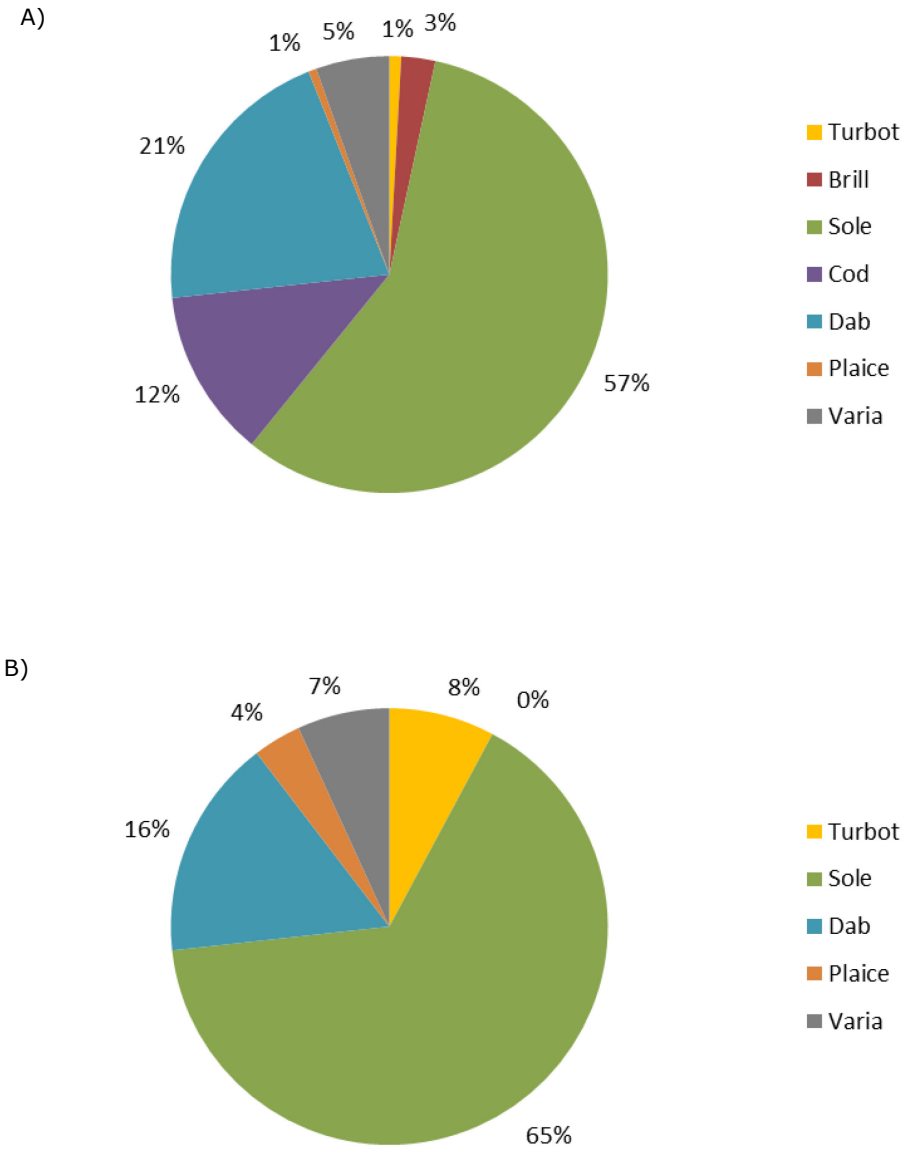

Figure 4 *Landings composition of Dutch gillnet fishers targeting sole from A) n=162 self-reporting trips based on MSC logbook information and B) n=2 observer trips in 2013.*

5 Conclusions

Dab and flying crabs seem to be the most common bycatch in the gillnet fishery targeting sole, although their occurrence also depend on seasonal and spatial dynamics. Roundfish discards occur in much lower quantities.

A comparison of bycatch compositions between self-reported and observer data was difficult, because of the highly unbalanced nature of the data (162 self-reported versus 2 observer trips). Nevertheless, given the high variation in discard rates and compositions between fishing operations, the results of the observer trips do not disagree with the results of the self-registered sampling. It seems that bycatches in the gillnet fishery are common, although in 41% of the self-reported trips no discards were registered. Fishers state that discards mainly occur in the first six months of the year and that the amount of discards vary greatly between fishing operations due to a wide range of factors influencing catch composition.

The motivation to sample and register discards may be different between vessel owners. In 2012, seven fishers participated in the self-reporting scheme, while only 3 vessels participated in 2013. The reduction in participation implies that the motivation decreased. One issue that may demotivate fishers to participate, is that in 2013 a decision has been made not to have the MSC certificate renewed.

In general, the concept of a self-reporting programme where the data collector has a stake in the outcome may raise discussions on reliability of the results. Therefore, other data sources need to be available for comparison and validation. In 2013, data from 2 observer trips were available for the first time. This is a start, but it is also still a very low coverage of the total number of gillnet trips for sole.

Justification

Rapport C195/13
Project Number: BO-12.04-001-038

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

Approved: Floor Quirijns
Senior Fisheries Scientist

Signature:

Date: 05-12-2013

Approved: Nathalie Steins
Head of Fisheries Department

Signature:

Date: 05-12-2013

Annex 1 Protocol self-sampling gillnet fishery

A. Meeldijk, B. Couperus en M. Kraan - september 2011

- Naast het invullen van de vangst op het logboek, dienen nu ook de discards genoteerd te worden.
- Discards moeten onderscheiden kunnen worden van aan te landen soorten. Dit doen we door voor de soortnaam een **D** op te schrijven. (zie voor de meeste soorten lijst onderaan)
- Discards zijn al die vissen en krabben die de visser normaal overboord zou gooien of in zijn net zou laten zitten, dus ondermaatse commerciële vissen, krabben en vis die wel gevangen is maar niet aangeland wordt.
- Per vis-sessie worden **3 stukken net van 100m** bemonsterd, 1 aan het begin, 1 in het midden en het laatste stuk van het net. Bij het binnenhalen van het net wordt dus meteen bemonsterd.
- Als er zeer veel discards in zitten (bijvoorbeeld omdat er 'in de schar gelopen' is) kan volstaan worden met 3x50 m net te tellen. Als er niet zoveel discards zijn dan 3x100 m net. Dit besluit wordt genomen tijdens het tellen in het eerste stuk net. GEEF DIT DAN AAN MET '50m' BIJ OPMERKINGEN IN HET LOGBOEK. Als dat er niet staat gaan we uit van 100m net.
- De discards moeten opgeschreven worden **in aantallen**, dus niet in kilo's. Tel het aantal stuks in het net, turf ze per soort en noteer het totaal aantal stuks op het logboek.
- LET OP: alle interacties met bruinvis moeten ook opgeschreven worden!

Vis / benthos soort	Code vissoort	Discards
Makreel	MAC	DMAC
Tarbot	TUR	DTUR
Bot	FLE	DFLE
Griet	BLL	DBLL
Tong	SOL	DSOL
Kabeljauw	COD	DCOD
Wijting	WHG	DWHG
Schol	PLE	DPLE
Schar	DAB	DDAB
Zwemkrab	CAD	DCAD
Strandkrab	CAN	DCAN
Noordzeekrab	NCAD (CRE)	DNCAD
Bruinvis		PHO
Zeehond		SEAL

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