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Annual report on the implementation of Council Regulation (EC) No 812/2004 – 2011

Netherlands

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Annual report on the implementation of Council Regulation (EC) No 812/2004¹ – 2011

Member State: Netherlands

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¹ Council Regulation (EC) No 812/2004 of 26.4.2004 laying down measures concerning incidental catches of cetaceans in fisheries and amending Regulation (EC) No 88/98.

Article 6 of the Regulation,

1. Each year, Member States shall send the Commission, by 1 June, a comprehensive annual report on the implementation of Articles 2, 3, 4 and 5 during the previous year. The first report shall cover both the remaining part of the year following the entry into force of this Regulation and the entire year that follows.

2. On the basis of the observers' reports provided according to Article 5(3) and all other appropriate data, including those on fishing effort collected in application of Council Regulation (EC) No 1543/2000 of 29 June 2000 establishing a Community framework for the collection and management of the data needed to conduct the common fisheries policy, the annual report shall include estimates of the overall incidental catches of cetaceans in each of the fisheries concerned. This report shall include an assessment of the conclusions of the observers' reports and any other appropriate information, including any research conducted within the Member States to reduce the incidental capture of cetaceans in fisheries. When reporting on the results of scientific studies or pilot projects as provided for in Articles 2(4) and 4(2), Member States shall ensure that sufficiently high quality standards are reached in their design and implementation and shall provide detailed information concerning those Standards to the Commission.

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Summary

This report contains the results of the on-going monitoring programme on the incidental bycatch of cetaceans in Dutch pelagic fisheries in 2011. EU Council Regulation 812/2004 requires observer coverage in ICES areas VI, VII and VIII in the period 1 December – 31 March (fleet segment NLD003 and NLD005) and outside this area in all areas year round (fleet segment NLD004 and NLD006). In the Dutch situation the monitoring is integrated with the collection of discards data under the EC Data Collection Regulations 1543/2000 and 1639/2001.

In 2011, during 14 fishing trips, 61 days and 131 hauls were observed in fleet segment NLD003 and NLD005; 133 days and 276 hauls were observed in fleet segment NLD004 and NLD006. With a total number of fleet days of 449 in fleet segment NLD003 and NLD005 and 1166 in fleet segment NLD004 and NLD006, the coverage was 13.6% and 11.2% respectively. Thus the targets of the Pilot Monitoring Scheme of 10% and 5% have been fulfilled.

Within a trial EM study on board a set gill/trammel net cutter, 3 day trips with trammel nets, targeting cod, have been observed (fleet segment NLD008). Total effort in this fleet segment was 212 days in 2011.

Within this Dutch programme, 9 days and 26 hauls have been observed on pelagic trawlers under French flag. The data collected during these trips have been send to the institutes carrying out the regulation in their countries.

No bycatch of cetaceans were recorded. The observed bycatch rate of 0.00 dolphins per day is in line with the findings in 2006 - 2009 when the bycatch rate was also 0.00 dolphins per day. During the 3 observer trips in fleet segment NLD008, one bycatch of a harbour porpoise was recorded.

ACOUSTIC DETERRENT DEVICES

1 General Information

The EU regulation obliges the use of pingers in certain fleet segments. According to the criteria mentioned in the regulation, the Dutch fishery includes no fleet segments in which pingers are mandatory. However, in a small scale study in trammel net fishery for cod, some fishermen were using DDD02 and banana pingers.

2 Acoustic Deterrent Devices

2.1 Mitigation measures

One vessel in fleet segment NLD008, used DDD02 pingers on the buoys of a net, approximately 500m long. Another vessel used banana pingers on a net of 1500m long. See table 1.

3 Monitoring and assessment

3.1 Monitoring and assessment of the effects of pinger use

A small scale study in which with Tpods and Cpods were operated to measure click activity in the vicinity of net segments with DDD02 and Banana pingers and nets without pingers did not produce enough data to draw conclusions with any accuracy on possible effects of pingers.

OBSERVER SCHEMES

4 General information on implementation of Articles 4 and 5

Council Regulation No 812/2004² is obliging Member States to monitor bycatches of cetaceans in certain fisheries, certain periods of the year and in certain European Waters and to report the results of the monitoring to the European Commission. In the Netherlands, the monitoring was commissioned by the Ministry of Agriculture, Nature Conservation and Food Quality to Wageningen IMARES, the former Netherlands Institute for Fisheries Research, and started on 1 January 2005.

The aim of this study is to assess the incidental bycatch of cetaceans in the Dutch pelagic fisheries. Under the regulation the following fleet segments in the Netherlands should be monitored:

- Pelagic fishery in the period of 1 December till 31 March in ICES areas VI, VII and VIII; in this report referred to as fleet segment NLD003 for single pelagic vessels and NLD005 for pair trawlers.
- Pelagic fishery in European waters during the year excluding the fishery in the period 1 December till 31 March in ICES areas IV, VII and VIII; in this report referred to as fleet segment NLD004 for single pelagic vessels and NLD006 for pair trawlers.

The regulation does not require monitoring of fishery with set gill nets (including also tangle net and trammel net) in ICES area IVc where (most of) the fishery activity from Dutch ports takes place. However, as part of a small pilot study on the usability of Electronic Monitoring on board small gill net cutters (< 10m), 3 observer trips were carried out on board a cutter fishing with trammel nets (fleet segment NLD008).

Under the regulation a coverage should be reached leading to a CV of the bycatch estimate of 30% or less. However, in a situation where there are very few bycatch incidents, this CV is not realistic (ICES 2009). Therefore the target of the current monitoring programme in the Netherlands is to cover the fleet effort according to the Pilot Monitoring Scheme (PMS) set for the first two years. The required pilot coverage is 10% for the period of 1 December till 31 March in ICES area VI, VII and VIII and 5% in the rest of the year with exclusion of fleet segment NLD003. In the Dutch situation the monitoring is integrated with the collection of discards data under EC Data Collection Regulations: C.R. 1543/2000³ and C.R. 1639/2001⁴ amended by C.R. 1581/2004⁵. The project under this regulation aims at an overall coverage of approximately 10% in European waters.

² Council Regulation (EC) No 812/2004 of 26.4.2004 laying down measures concerning incidental catches of cetaceans in fisheries and amending Regulation (EC) No 88/98

³ Council Regulation (EC) No 1543/2000 of 29 June 2000 establishing a Community framework for the collection and management of the data needed to conduct the common fisheries policy

⁴ Commission Regulation (EC) No 1639/2001 of 25 July 2001 establishing the minimum and extended Community programmes for the collection of data in the fisheries sector and laying down detailed rules for the application of Council Regulation (EC) No 1543/2000

⁵ Commission Regulation (EC) No 1581/2004 of 27 August 2004 amending Regulation (EC) No 1639/2001 establishing the minimum and extended Community programmes for the collection of data in the fisheries sector and laying down detailed rules for the application of Council Regulation (EC) No 1543/2000

Earlier studies on the incidental bycatch of cetaceans have been reported by Couperus (Couperus 1995; 1997; 2006; 2007; 2008; 2009; 2010; 2011) covering the period 1992 -1996 and 2004 - 2009. The format of this report is according to the template provided by the European Commission in 2010. Monitoring of bycatch of cetaceans is conducted by of the Centre of Fisheries Research (Centrum voor Visserijonderzoek: CVO) on behalf of the Ministry of Economic Affairs, Agriculture and Innovation. CVO hires IMARES to carry out the observer trips and to prepare the report.

Difficulties: In the observer programme for pelagic fleet (NLD003-006) the observer effort is spread quasi random over the year. The observer trips are scheduled equally over the year and observers join the first trawler that comes in if accommodation is available. However, the choice of area and target species are often last minute decisions of the owner of the vessel and may even alter during the trip itself. Therefore it is impossible to foresee or plan the exact effort in the area that has to be monitored under EC Regulation No 812/2004.

Cooperation with the four big fishing companies is sometimes hampered by disagreement between the companies involved about who is going to take the burden of observers on trips where (a lot of) discards is expected. For these trips companies may claim that they are not able to accommodate an observer, hoping that vessels of the other companies will take an observer instead. This may lead to certain periods with less observer effort, meaning that the coverage is biased towards trips where less discards are to be expected.

5 Monitoring

5.1 Description of fishing effort and observer effort in towed gear

Table 2 presents the fleet segments that have been studied. The fleet consists of 12 freezertrawlers and one pair of pair trawlers. The freezertrawlers fishing from December to March in ICES sub areas VI, VII and VIII comprise fleet segment NLD003. Fleet segment NLD004 are the same freezertrawlers fishing in area's I-XIV all year round. The single set of pair trawlers are here considered different fleet and are likewise divided in two fleet segments (in reports till 2007 the freezertrawlers and the pair trawlers have been treated as one fleet consisting of two fleet segments).

In 2011 on 14 trips an observer joined the vessel in segment NLD003-006. According to the national logbook database, the number of fleet days in 2011 was 1615. With 192 observer days the coverage of the pelagic fleet was 11.9%.

The text table provides the effort and coverage by fleet segment:

Fleet segment	Fleet days	Observer days	Coverage required according to PMS	Coverage achieved
NLD003	385	54	10%	14.0%
NLD004	929	113	5%	12.2%
NLD005	64	7	10%	10.9%
NLD006	237	18	5%	7.6%
NLD003 & NLD005	449	61	10%	13.6%
NLD004 & NLD006	1166	131	5%	11.2%

Table 2 provides fleet effort and observer coverage by ICES subarea.

Notice that a vessel may have visited several areas on one day which means that a day on which a vessel fished in two areas is counted as two days. Thus the sum of all days at sea is not necessarily the same as the total fishing days at sea. Observer days and fleet days during which no fishing took place are not counted as effort days.

5.2 Description of fishing effort and observer effort in static gear

In the Netherlands approximately 100 cutters, mostly smaller than 15m, fish with gill- trammel or tangle nets. Most of the fishermen fish part time and have jobs on land as well. The main effort is from April to September with tangle nets targeting sole. Approximately 20 cutters may fish from October to March with trammel nets for cod and turbot. Some of these cutters may also fish at wrecks with gill nets for cod. Due to the size of the vessels trips are almost never longer than a day. By far most effort is in sub area IVc, with a few days in VI.

A few cutters fish in summer with gill nets for bass and mullet.

An observer was on board of one vessel, fishing with trammel nets for cod and turbot (NLD008) as part of a small study on the usage of EM on board small gill netters (Helmond and Couperus 2011). The monitoring is not required according to the regulation. See table 3 for the fishing effort and observer coverage of this fleet segment.

6 Estimation of incidental catches

6.1 Incidental catch rates by fleet segment and target species

In the sampled fishing area's in the pelagic fishery no bycatch incidents have been observed (Table 2). In the trammel net fishery, during three observer trips, 1 harbour porpoise was caught. The 71 specimens/year is raised to the fleet effort.

7 Recording of incidental catches

On pelagic trawlers (fleet segments NLD003-NLD006), for each tow, the observer was present on the bridge during shooting and hauling. Position and time were recorded at the beginning of each haul. The time was recorded again when hauling started. The rear window of the bridge gives a good view on the rear deck, so that bycatches of cetaceans can be recorded from there. Of any bycatch, length and sex must be recorded. In the case of cetacean bycatches, and if the crew agrees, the animals are labelled and frozen for further examination at the institute.

On board the gill net cutter (NLD008), the observer recorded the time and length of the nets that were set. The observer kept looking at the location where the net came out of the water to avoid missing bycaught animals that might fall out of the net before being landed. Bycatches of porpoises, birds and protected fish species were recorded.

The bycaught specimen came on board and got stuck against the power block. One of the two crew members tried to pull it by the net through the block. As a result the animal fell back in the water. The species was harbour porpoise. The specimen looked fresh to the observer: there were no signs of decomposition. The estimated length was 110.

8 Discussion

With 13.6% coverage of fleet segment NLD003 and NLD005 and 11.2% coverage of fleet segment NLD004 and NLD006 the target of 10% and 5% has been fulfilled. The observer programme is combined with the collection of discards data which aims at an overall random coverage of 10%. The coverage in the fleet segments varies therefore from year to year.

The recorded bycatch in the pelagic fishery is 0.00, which is similar to rates found in 2005 - 2009. In the Dutch fishery, bycatches of dolphins occur mainly in the fishery for horse mackerel and mackerel west of Ireland in February and March (Couperus 1997). The relatively low bycatch rates in 2005 – 2010 compared to the rates in the 1990ies are probably related to a shift in effort towards the blue whiting fishery (Couperus 2006).

Due to the high number of hauls without bycatches it is not possible to estimate the bycatch rate with any accuracy with the current observer effort. The total bycatch mortality of cetaceans caused by Dutch pelagic freezer trawlers in the 2006-2010 season is in the order of magnitude of zero to several tens. However, data from the 1990ies suggest that the bycatch rate may vary, partly induced by changes in the quotas of pelagic target species.

The bycaught specimen in fleet segment NLD008 was one of 6 specimens caught, recorded during 24 days of Electronic Monitoring (Helmond and Couperus 2011). The authors do not extrapolate these bycatches to fleet level, because this study was not designed to estimate bycatch rate. The observer effort was part of a study on board one gill net cutter (<10m) on the usability of Electronic Monitoring. A single bycatch incident was recorded during 3 observer days. The study itself covered the period 10 December 2010 – 30 March 2011 (fleet effort of trammel nets and gill nets for cod: 370). If raised to the fleet for this period the estimated bycatch during this period would be 93 (41-164) with a CV 0.38.

9 Conclusions

The recorded bycatch in the pelagic fishery is 0.00, which is similar to rates found in 2005 - 2009. The required coverage of fleet segments NLD003-006 the target of 10% and 5% has been fulfilled. Recorded bycatches in the trammel net fishery indicates (Couperus 1994) that this fishery may have a high bycatch rate of harbour porpoises.

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TABLES

Table 1. Pingers used in fleet segment NLD008.

Metier	Fishing area	Pinger characteristics	Other mitigation measures
GTR demersal fish 140/320	IVc	DDD02 Banana pingers	no

Table 2. Fleet effort and observer effort in towed gear

Fishery segment (ref in this report)	Metier	Fishing area	Total fishing effort						Total observer effort achieved						Type of monitoring*	Coverage
			No. of vessels	No. of trips	Days at sea	Months of operation	No. of hauls	Total towing time	No. of vessels	No. of trips	Days at sea	Months of operation	No. of hauls	Total towing time		
NLD003	OTM small pelagic fish	Via	7	8	57	1,2,3 & 12	unk	unk	2	2	3	1,2,3 & 12	5		PMS	5%
NLD003	OTM small pelagic fish	VIIb	6	15	67	1,2,3 & 12	unk	unk	2	2	12	1,2,3 & 12	34		PMS	18%
NLD003	OTM small pelagic fish	VIIc	4	7	37	1,2,3 & 12	unk	unk	2	2	8	1,2,3 & 12	15		PMS	22%
NLD003	OTM small pelagic fish	VIIId	8	16	67	1,2,3 & 12	unk	unk	3	3	8	1,2,3 & 12	22		PMS	12%
NLD003	OTM small pelagic fish	VIIe	2	2	4	1,2,3 & 12	unk	unk	0	0	0	1,2,3 & 12	0		PMS	0%
NLD003	OTM small pelagic fish	VIIh	7	11	29	1,2,3 & 12	unk	unk	1	1	4	1,2,3 & 12	6		PMS	14%
NLD003	OTM small pelagic fish	VIIj	6	13	122	1,2,3 & 12	unk	unk	1	2	18	1,2,3 & 12	36		PMS	15%
NLD003	OTM small pelagic fish	VIIk	1	1	1	1,2,3 & 12	unk	unk	1	1	1	1,2,3 & 12	4		PMS	100%
NLD003	OTM small pelagic fish	VIIlb	1	1	1	1,2,3 & 12	unk	unk	0	0	0	1,2,3 & 12	0		PMS	0%
NLD004	OTM small pelagic fish	IIa	4	9	47	1-12	unk	unk	2	2	19	1-12	32		PMS	40%
NLD004	OTM small pelagic fish	IVa	9	20	164	1-12	unk	unk	3	4	32	1-12	77		PMS	20%
NLD004	OTM small pelagic fish	IVb	8	17	47	1-12	unk	unk	3	3	19	1-12	43		PMS	40%
NLD004	OTM small pelagic fish	IVc	7	18	51	1-12	unk	unk	1	1	5	1-12	14		PMS	10%
NLD004	OTM small pelagic fish	VIa	7	16	156	4-11	unk	unk	2	2	15	4-11	34		PMS	10%
NLD004	OTM small pelagic fish	VIIa	1	1	3	4-11	unk	unk	0	0	0	4-11	0		PMS	0%
NLD004	OTM small pelagic fish	VIIb	3	4	20	4-11	unk	unk	0	0	0	4-11	0		PMS	0%
NLD004	OTM small pelagic fish	VIIc	5	7	29	4-11	unk	unk	1	1	0	4-11	1		PMS	0%
NLD004	OTM small pelagic fish	VIIId	6	17	114	4-11	unk	unk	1	1	1	4-11	1		PMS	1%
NLD004	OTM small pelagic fish	VIIe	6	17	78	4-11	unk	unk	1	1	18	4-11	36		PMS	23%
NLD004	OTM small pelagic fish	VIIh	5	8	32	4-11	unk	unk	0	0	0	4-11	0		PMS	0%
NLD004	OTM small pelagic fish	VIIj	6	14	183	4-11	unk	unk	1	1	4	4-11	7		PMS	2%
NLD004	OTM small pelagic fish	VIIk	1	1	1	4-11	unk	unk	1	1	0	4-11	1		PMS	0%
NLD004	OTM small pelagic fish	VIIlb	1	1	4	4-11	unk	unk	0	0	0	4-11	0		PMS	0%
NLD005	PTM small pelagic fish	VIa	2	4	10	1,2,3 & 12	unk	unk	1	1	2	1,2,3 & 12	4		PMS	20%
NLD005	PTM small pelagic fish	VIIb	2	4	13	1,2,3 & 12	unk	unk	0	0	0	1,2,3 & 12	0		PMS	0%
NLD005	PTM small pelagic fish	VIIId	2	5	5	1,2,3 & 12	unk	unk	1	1	1	1,2,3 & 12	2		PMS	20%
NLD005	PTM small pelagic fish	VIIe	1	1	2	1,2,3 & 12	unk	unk	1	2	4	1,2,3 & 12	5		PMS	200%
NLD005	PTM small pelagic fish	VIIh	2	4	13	1,2,3 & 12	unk	unk	0	0	0	1,2,3 & 12	0		PMS	0%
NLD005	PTM small pelagic fish	VIIj	2	6	21	1,2,3 & 12	unk	unk	0	0	0	1,2,3 & 12	0		PMS	0%
NLD006	PTM small pelagic fish	IVa	2	8	41	4-11	unk	unk	1	1	1	4-11	1		PMS	2%
NLD006	PTM small pelagic fish	IVb	2	8	36	4-11	unk	unk	0	0	0	4-11	0		PMS	0%
NLD006	PTM small pelagic fish	IVc	2	8	15	4-11	unk	unk	1	1	1	4-11	3		PMS	7%
NLD006	PTM small pelagic fish	VIIb	2	4	8	4-11	unk	unk	0	0	0	4-11	0		PMS	0%
NLD006	PTM small pelagic fish	VIIId	2	9	57	4-11	unk	unk	1	2	5	4-11	8		PMS	9%
NLD006	PTM small pelagic fish	VIIe	2	6	19	4-11	unk	unk	1	2	9	4-11	14		PMS	47%
NLD006	PTM small pelagic fish	VIIh	2	4	8	4-11	unk	unk	1	1	2	4-11	4		PMS	25%
NLD006	PTM small pelagic fish	VIIj	2	8	53	4-11	unk	unk	0	0	0	4-11	0		PMS	0%

*PMS = Pilot Monitoring Scheme

Table 3. Fleet effort and observer effort in static gear

Fishery segment (ref in this report)	Metier	Fishing area	Total fishing effort						Total observer effort achieved						Type of monitoring*	Coverage
			No. of vessels	No. of trips	Days at sea	Months of operation	Total length of nets	Total soak time	No. of vessels	No. of trips	Days at sea	Months of operation	Total length of nets	Total soak time		
NLD008	GTR demersal fish 140/320	IVc	20	211	212	1-4 & 10-12	unk	unk	1	3	3	1-4 & 10-12	11	414	SS	1%

*SS = Scientific Study

Table 4. Bycatch rates

Metier	Fishing area	Main target species	Incidentally caught cetacean species	Number of incidents	Number of specimens incidentally caught by species		Incidental catch rates*		Total incidental catch estimate	CV
					With pingers	Without pingers	With pingers	Without pingers		
OTM small pelagic fish 1,2,3 & 12	VIa	bw		0	0	0	0	0	0	
OTM small pelagic fish 1,2,3 & 12	VIIb	bw,hom,mac		0	0	0	0	0	0	
OTM small pelagic fish 1,2,3 & 12	VIIc	bw,hom		0	0	0	0	0	0	
OTM small pelagic fish 1,2,3 & 12	VIIId	her, hom		0	0	0	0	0	0	
OTM small pelagic fish 1,2,3 & 12	VIIe	hom		0	0	0	0	0	0	
OTM small pelagic fish 1,2,3 & 12	VIIh	hom		0	0	0	0	0	0	
OTM small pelagic fish 1,2,3 & 12	VIIj	hom, mac		0	0	0	0	0	0	
OTM small pelagic fish 1,2,3 & 12	VIIk	hom		0	0	0	0	0	0	
OTM small pelagic fish 1,2,3 & 12	VIIIb	hom, pil		0	0	0	0	0	0	
OTM small pelagic fish 1-12	IIa	her		0	0	0	0	0	0	
OTM small pelagic fish 1-12	IVa	her		0	0	0	0	0	0	
OTM small pelagic fish 1-12	IVb	her		0	0	0	0	0	0	
OTM small pelagic fish 1-12	IVc	her		0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIa	her, bw, hom, arg		0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIIa			0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIIb	her, mac		0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIIc	bw		0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIIId	her, hom		0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIIe	hom		0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIIh	hom, mac		0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIIj	hom, mac		0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIIk	hom, mac		0	0	0	0	0	0	
OTM small pelagic fish 4-11	VIIIb	hom, pil		0	0	0	0	0	0	
PTM small pelagic fish 1,2,3 & 12	VIa	her		0	0	0	0	0	0	
PTM small pelagic fish 1,2,3 & 12	VIIb	hom, mac		0	0	0	0	0	0	
PTM small pelagic fish 1,2,3 & 12	VIIId	hom, her		0	0	0	0	0	0	
PTM small pelagic fish 1,2,3 & 12	VIIe	hom		0	0	0	0	0	0	
PTM small pelagic fish 1,2,3 & 12	VIIh	hom		0	0	0	0	0	0	
PTM small pelagic fish 1,2,3 & 12	VIIj	hom		0	0	0	0	0	0	
PTM small pelagic fish 4-11	IVa	her		0	0	0	0	0	0	
PTM small pelagic fish 4-11	IVb	her		0	0	0	0	0	0	
PTM small pelagic fish 4-11	IVc	her		0	0	0	0	0	0	
PTM small pelagic fish 4-11	VIIb	hom, mac		0	0	0	0	0	0	
PTM small pelagic fish 4-11	VIIId	her, hom		0	0	0	0	0	0	
PTM small pelagic fish 4-11	VIIe	hom, mac		0	0	0	0	0	0	
PTM small pelagic fish 4-11	VIIh	hom, mac		0	0	0	0	0	0	
PTM small pelagic fish 4-11	VIIj	hom, mac		0	0	0	0	0	0	
GTR demersal fish 140/320*	IVc	cod, turbot, brill	Phocoena phocoena	1	1	0	0.33	0	71	0.67

*The observer effort was part of a study on board one gill net cutter (<10m) on the usability of Electronic Monitoring. A single bycatch incident was recorded during 3 observer days. The study itself covered the period 10 December 2010 – 30 March 2011: During 24 observed days, 6 bycatches were recorded. Fleet effort during this period was 370 days in trammel nets and cod nets pooled. Raised to the fleet for this period: 93 (41-164) (Helmond and Couperus 2011). The authors did not publish the CV, but it can be calculated from the numbers presented: 0.38.

Signature

CVO Report: 12.008

Project number: 430 12130 19

Approved by:

Drs. F.A. van Beek

Head WOT, Centre for Fisheries Research

Signature:

A handwritten signature in black ink, appearing to read 'F.A. van Beek', with a long, sweeping underline.

Date:

28 June 2012