COMMON DOLPHIN BYCATCH IN UK FISHERIES

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Abstract

A summary of recent bycatch estimates of common dolphins in UK based fisheries is provided. Bycatches of common dolphins have been monitored in several gill and tangle net fisheries in the southwest of the UK and the most recent estimates suggest around 590 common dolphins per year may be caught in these fisheries. Not all fisheries have been adequately sampled yet. Bycatch in the pelagic pair trawl fishery for bass exceed 400 animals in 2004, but bycatch rates, fishing effort and annual takes have been declining steeply since then.

Introduction.

The bycatch of short-beaked common dolphins (*Delphinus delphis*) has been reported over many years in the UK. Records of bycatch date back decades from a variety of gear types (Northridge 1988). An observer programme operated in 1994 in the English (Cornish) and Irish hake gillnet fishery recorded four common dolphins by-caught in 55,828 net km.h., giving an annual estimated bycatch in this fishery of 200 (95% CI 4 - 500) in 1994 (Tregenza and Collet, 1998).

A later programme to examine the effects of pinger use on hake gillnets in the Celtic Sea in 1997-1999 (SMRU et al 2001) that was primarily targeted at harbour porpoise bycatch, also noted bycatches of dolphins in the same fishery. Over 160 days of observation, one common dolphin was taken among 181 net hauls that were equipped with pingers (Dukane Netmark 100), while three other dolphins (one common dolphin, one Atlantic white-sided dolphin (*Lagenorhynchus acutus*) and one unidentified delphinid) were taken in 237 unpingered fleets of hake gillnets nets.

No further dedicated bycatch monitoring of set nets was carried out until 2005 when an observer programme was initiated in the UK to address national obligations under the Habitats Directive and in part to address obligations under EU Council Regulation 812/2004 on cetacean bycatch. Annual estimates of bycatch in static nets have been made since 2005 and have been reported annually to the European Commission.

Even before the recent observation programme on set net fisheries in the region was developed, increasing numbers of records of stranded common dolphins through the 1990s and into the early years of the 21st Century led to increasing public concern. This led to vociferous criticism of fisheries operated by vessels from outside the region by several local environmental groups, newspapers and other interests.

One such fishery was the winter pelagic pair trawl fishery, largely prosecuted by Scottish boats. This fishery began in the mid 1990s and was initially confined to the month of March. Since 2001 the season has been extended and currently it runs, sporadically, from October to April or May. Skippers from this small fishery (3 pair

teams in 2000) approached the Sea Mammal Research Unit to help them to minimise dolphin bycatch, and a collaborative research and mitigation programme has been running since then. This programme of research has enabled observations to be made on board the vessels concerned and annual estimates of bycatch have been made until very recently when fishing effort has declined for economic reasons. At the same time, bycatch mitigation measures for this fishery have been developed.

Bycatch estimates for these fisheries are summarised in this paper.

Static Net fisheries

Between 2005 and 2008 some 3077 static net fishing operations have been monitored on UK based vessels in the Irish Sea, Celtic Sea and English Channel. About 70% of these have been in ICES Division VIIe, the western Channel, which is where much of the fishing effort is located. We have yet to assess how the sampling effort compares with fishing effort geographically. A summary of the observed bycatches of common dolphins is presented below:

Table 1: Summary of observations of common dolphin bycatches in static gear in Cornish Fisheries 2005-2008, stratified by overall gear type.

Common Dolphins Observed Bycaught			
	Total	Tangle	Gill
2005	13	10	3
2006	4	3	1
2007	3	1	2
2008	2	2	0
Totals	**22**	**16**	**6**
	Observed fishing operations		
	Total	Tangle	Gill
2005	586	380	205
2006	1000	417	588
2007	714	313	395
2008	769	280	489
Totals	**3077**	**1393**	**1667**
	Bycatch Rate (animals/100 hauls)		
2005	2.22	2.63	1.46
2006	0.40	0.72	0.17
2007	0.42	0.32	0.51
2008	0.26	0.71	0.00
Totals	**0.72**	**1.15**	**0.36**

Annual fishing effort in recent years has been approximately 30-40,000 days at sea per year by UK boats using set nets in the Celtic & Irish Seas and English Channel. We estimate that, based on a figure of 39,000 days at sea in 2008, and our observations of the number of fishing operations per day by fishing metier, that this was equivalent to about 154,000 net operations in 2008. A crude extrapolation would therefore suggest that the total mortality for common dolphins was around 1,122 individuals. This would be a biased estimate because, although we have made over

3000 observations of fishing operations, common dolphin bycatch has only been reported in nets targeting hake, monkfish, turbot and pollack among about 1500 observations in the western Channel and Celtic Sea. We have made over 1500 observations in several other fishery types (for sole, bass, mullet etc), and we have not observed any bycatch in those metiers. We cannot say that bycatch only occurs in fisheries for hake, monkfish, pollack and turbot, but these are the only ones for which we are able to make estimates. These four metiers accounted for an estimated 64,000 operations out of an estimated total of 153,000 (in 2008). Estimating bycatch only for those metiers for which we have recorded bycatch rates leads to a more reliable estimate of 594 common dolphins (Table 2). This estimate should be treated as a provisional one, as the variation on the observed bycatch rate from year to year warrants further investigation, as does the spatial distribution of the bycatch.

Table 2: Estimates of common dolphin bycatch in UK set net fisheries in ICES divisions VIIdefghj

Fishery by target species	Bycatch rate (per 100 hauls)	Obs'vd hauls	Obs'ved mean hauls / day	Days at Sea	Estim. total hauls	Obs'ved bycatch no	Estim. bycatch	CV	95% UCL	95% LCL
Common Dolphins										
Hake	0.01829	164	2.68	1765	4730	4	115	0.43	142	95
Monkfish	0.01896	634	3.34	3117	10411	14	230	0.38	272	167
Pollack	0.00499	401	9.08	4727	42917	2	214	0.71	329	279
Turbot	0.0061	328	2.89	1972	5698	2	35	0.71	53	45
All Metiers - unstratified	0.00728	3022	3.95	39011	154095	22	1122	0.31	1934	594
Best Estimate:										
Summed all 4 estimated metiers				11580	63757	22	594	0.27	797	22

Bass pair trawl fishery

Bycatch estimates in the bass pair trawl fishery have also been made annually whenever feasible since 2000 and are tabulated below. The fishery is small and fishing effort has declined in recent years as fuel prices have increased and bass availability has declined. Estimates of bycatch for the 2000-01 winter season through the winter season of 2005-06 are presented in Table 3.

Since the winter of 2006-2007 research in this fishery has focused on monitoring the use of pingers (DDD02-F), and almost all the tows that have been observed have been using these pingers.

During the 2006-2007 season 8 common dolphin bycatches were observed in three observed tows in which the pingers were absent or broken. A further 18 observed tows with active pingers resulted in zero bycatch. There were probably about 100 tows in the fishery during the 2006-07 season, with about 60 days at sea. We do not know how many of the approximately 80 unobserved tows were made using pingers, but the proportion was quite high. One skipper recorded 12 tows, 11 of which were

made using pingers without bycatch, and one of which was made without pingers and in which 3 dolphins were reported caught. The recorded total (observed and self reported) for the year was therefore 11 animals in four un-pingered tows, and no animals in 30 tows in which pingers were used.

Table 3: Estimates of bycatch in the UK bass pair trawl fishery 2000-2006.

Season ending:	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Estimated fleet effort (hauls)	332	386	493	396	123	59
No hauls observed	91	91	111	133	152	54
No of unobserved hauls	241	295	382	263	71	5
Percent of hauls observed	27%	24%	23%	34%	68%	92%
Number of dead dolphins	52	9	26	169	95	77
Av no of animals per haul	0.57	0.10	0.23	1.27	0.63	1.45
Estimate of total bycatch	**190**	**38**	**115**	**439**	**139**	**84**
95% Upper Conf Limit	265	84	202	512	146	85
95% Lower Conf Limit	172	23	88	379	139	84
CV of bycatch estimate	0.24	0.60	0.40		0.07	0.03

These results suggest that the pingers are effective. It is not yet clear how effective they are. Nor is it possible to estimate the seasonal total mortality in the 2006-07 because we do not know the proportion of tows made with and without functional pingers. Total mortality is unlikely to have been more than a few tens of animals.

No observations were made in the winter of 2007-2008 because there was so little effort due to high fuel prices and low bass availability. One pair team operated for 3 days (probably about 5 operations) in early 2008, and are believed to have been using pingers.

Data from the 2008-2009 season are still being analysed. 15 tows were observed in November 2008 without any bycatch. There are therefore now at least 33 observed tows without any cetacean bycatch in this fishery while the DDD02-F devices were being properly used. This might be compared with 77 bycatch incidents among 300 observed tows during 2001-2006.

Discussion

Bycatch of common dolphins in UK fisheries probably totals at least 500-600 animals per year. The highest rate per operation is in the bass pair trawl fishery, but the rate here has been in steep decline in the past three winter seasons because of the use of an apparently effective mitigation measure. Much lower rates per operation are seen in several large mesh static net fisheries, for monkfish, turbot, hake and pollack. Nevertheless high effort levels in these fisheries lead to an estimate of over 590 animals in 2008. This estimate should be considered as a preliminary one, because it is based on pooled annual bycatch observations to obtain an estimate of bycatch rate

per haul. The observed rate was particularly high in 2005 (Table 2) and further work is needed to investigate the implications of this. However, the estimate as it stands only covers 41% of all static net effort, bycatch rates remaining undefined in the remaining 60% of the overall fishery. Furthermore, anecdotal accounts indicate that a low level of bycatch is also found in demersal trawl fisheries in the same region in the winter months.

Quite why common dolphins seem so susceptible to bycatch in this area and at this time of year is unknown. Densities appear to be much higher in the winter and to decline during April for the summer months (SMRU unpublished data), increasing again in November. The region is also host to large aggregations of several small pelagic fish during the winter, including sprats (*Sprattus sprattus*), young mackerel (*Scomber scombrus*), horse mackerel (*Trachurus trachurus*), herring (*Clupea harengus*), sardines (*Sardina pilchardus*) and anchovies (*Engraulis encrasicolus*). It is likely that a high density of animals feeding on these and other fish in an area that is very heavily fished is likely to lead to a high rate of encounters between fishing gear and dolphins with some fatal consequences.

Stomach contents data (SMRU/IoZ unpublished) of stranded animals suggest that horse mackerel, sardines and mackerel dominate the diet, but *Trisopterus* species were also present (15% by number), so some more demersal feeding may occur. At least two animals that were bycaught and examined on board a pelagic trawler contained monofilament netting, again suggesting an association with static net fisheries.

Bycatches of common dolphins in gill and tangle net and pelagic trawl fisheries in the UK cannot be viewed in isolation. Similar fisheries exist throughout the range of this population in Irish, Spanish, French and Portuguese waters.

References

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