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Feeding Association Between Harbour Porpoise (*Phocoena phocoena*) and Flyshoot Fishing

Pieke Molenaar and Jip Vrooman

Wageningen Marine Research, Haringkade 1, 1976 CP, IJmuiden The Netherlands

Human fishing activities can provide easily accessible food resources for predators and scavengers such as fish, crustaceans, birds, and marine mammals. Feeding associations between cetaceans and fishing activities have been recorded for both passive (stationary nets or lines) and active (gears are moved, towed, or dragged to catch the fish) fishing methods (Northridge, 1984, 1991; Fertl & Leatherwood, 1997; Tixier et al., 2021; Bonizzoni et al., 2022). Cetaceans may, for example, eat fish out of gill- and trammel nets, take fish from long-lines, or trail behind trawlers that discard unwanted catch or lose fish that slip through the cod-end mesh (Fertl & Leatherwood, 1997; Tixier et al., 2021; Bonizzoni et al., 2022). Such associations provide easily accessible prey, though such interactions may also increase the risk of cetacean bycatch (Northridge, 1984, 1991; Waring et al., 1990; Lowry & Teilmann, 1994; Morizur et al., 1996; Fertl & Leatherwood, 1997; Read, 2008; Tixier et al., 2021; Bonizzoni et al., 2022). Dolphins, for example, have been recorded to swim into a trawl to catch fish and are occasionally bycaught while doing so (Jaiteh et al., 2013; Santana-Garcon et al., 2018). For some fisheries, it also poses a socioeconomic issue if fishery catches are reduced (Tixier et al., 2021).

While there are records of baleen whales exploiting fishing or aquaculture activities (National Marine Fisheries Service [NMFS], 1991; Fertl & Leatherwood, 1997; Chenoweth et al., 2017), most cetacean–fisheries interactions concern odontocetes. Examples include killer whales (*Orcinus orca*) interacting with purse seine nets targeting herring (*Clupea harengus*) in Norway (Similä, 2005; Mul et al., 2020); northern bottlenose whales (*Hyperoodon ampullatus*), sperm whales (*Physeter macrocephalus*), and pilot whales (*Globicephala* sp.) depredating on Greenland halibut (*Reinhardtius hippoglossoides*) fisheries in Canada (Karpouzli & Leaper, 2004; Johnson et al., 2021); and Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) associating with prawn (*Penaeidae*) trawlers in Australia (Broadhurst, 1998; Chilvers & Corkeron, 2001). Bonizzoni et al. (2022) recently reviewed the literature on odontocete feeding behind trawl nets and found records for more than 19 species of odontocetes.

The harbour porpoise (*Phocoena phocoena*) is one of the smallest odontocetes and is considered to be shy and elusive. Although there are records of harbour porpoises associating with passive gill- and trammel nets (Higashisaka et al., 2018; Maeda et al., 2021; Macaulay et al., 2022), literature mentions only one record of a harbour porpoise interaction with towed fishing gear (Bonizzoni et al., 2022; also see Fertl & Leatherwood, 1997). In this paper, we provide evidence for the first time of harbour porpoise associations with flyshoot (Scottish seine) fisheries in the English Channel.

Scientific observers were on board a flyshoot trawler (31.5 m; 680 hp) operating in the English Channel (Figure 1) to study fish behaviour. On 29 and 30 March 2022, harbour porpoises were seen following the cod-end of the net. To obtain information on their behaviour underwater, an underwater camera (GoPro Hero 4) was mounted on top of the cod-end (Figures 2 & 3), with the lens aimed in the current's direction and towards the cod-end rope. During one haul, an additional Big Blue dive light was mounted besides the camera. One observation was made with another underwater camera (GoPro Hero 8), which offered additional footage *inside* the trawl net. Harbour porpoise footage was collected during eight hauls dispersed over both days of which seven recordings were of sufficient quality for further analyses.

The flyshoot trawl is towed over the sea floor, where the cod-end of the trawl (where the fish is collected) hovers a few meters above the sea floor. Water depth on the recorded locations was between 46 and 56 m. The fishing technique is similar to Danish anchor seining (Seafish, 2022a) but uses a buoy instead of an anchor. The flyshoot fishing gear consists of two long weighted seining ropes, a trawl net, and a large buoy (Seafish, 2022b; Figure 3). There are three phases in the flyshoot fishing process: (1) setting the seining ropes and trawl, (2) herding the fish, and,

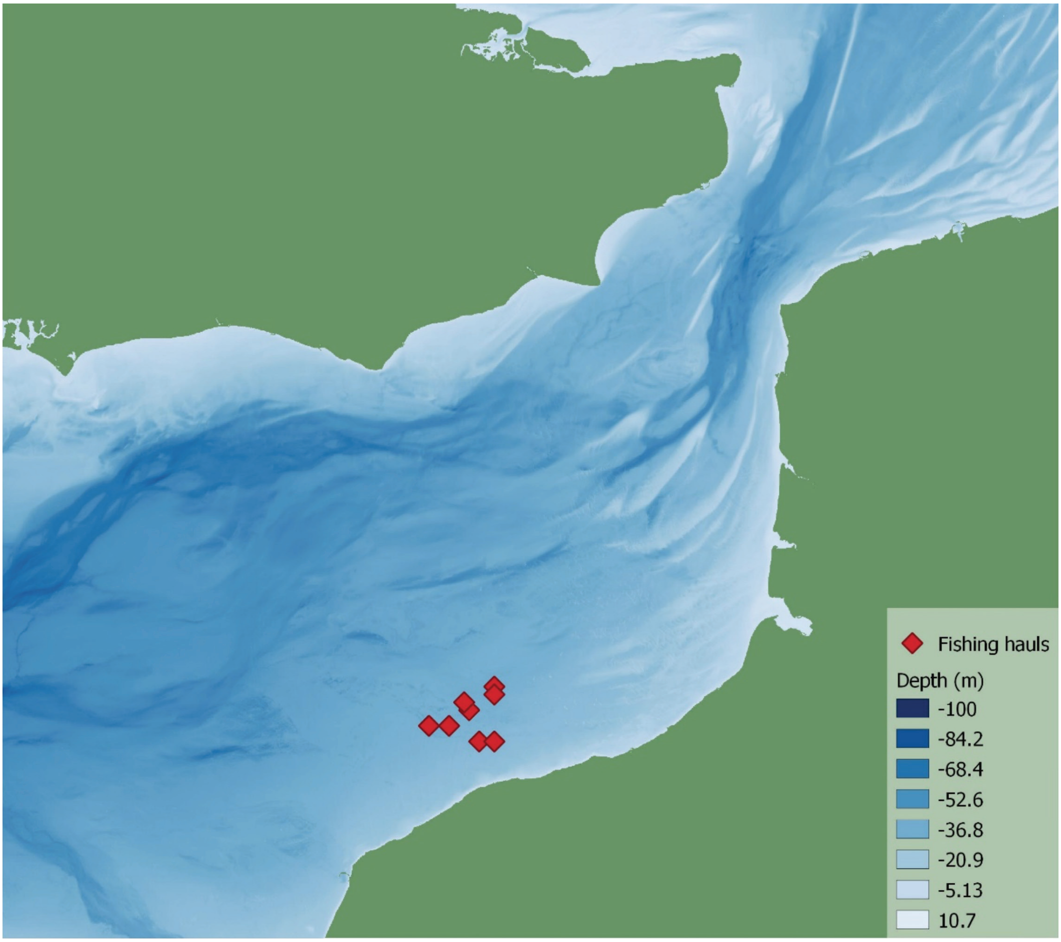

Figure 1. Locations in the English Channel of the eight flyshoot hauls where the video footage was collected. Depth profile in blue.

finally, (3) hauling in the net and capturing the fish (Figure 3). On the fishing ground, the trawler sets in a consecutive order: a buoy, the first 3,500 m seining rope, the trawl, and the second 3,500 m seining rope. This gear is set in a diamond shape (Figure 3). After setting the gear, the buoy is picked up, and both seining ropes are slowly retrieved. The fish herding phase starts with retrieving both seining ropes (45 m/min) while the vessel is moving forward at a speed (over ground) of 0.5 to 1.5 kts (1 to 2.7 km/h). When both seining ropes have straightened, fish are herded in the trawl path, followed by the fish capture phase (Figure 3). During this last phase, the retrieval speed of the seining ropes and trawl net are increased stepwise up to 110 m/min.

One flyshoot haul takes ~90 min, and the technique is only effective during daylight hours since fish can only be herded when they can visually observe the moving seining ropes. Fishing occurs primarily from April until October in the North Sea, and during other months in the English Channel. A flyshoot cod-end mesh size of 80 mm is used to catch a mix of demersal and pelagic fish. The main target species are red mullet (*Mullus* sp.), squid (*Loligo* sp.), gurnards (*Chelidonichths* sp.), and cuttle fish (*Sepiida* sp.), but valuable non-target catch includes more than 20 species. Based on landed weights, those species include mackerel (*Scomber scombrus*), horse mackerel (*Trachurus trachurus*), whiting (*Merlangius merlangus*), seabass (*Dicentrarchus labrax*), and a mix of other roundfish and flatfish. The total catch weight (marketable and unwanted catch combined) is highly variable and ranges between 200 up to 4,000 kg per haul.

The acquired raw video footage was rendered to one video file per haul using *Adobe Première Pro*, Version 2022. From those files, a selection

Figure 2. Impression of camera set-up positioned on the upper side of the cod-end prior to setting the flyshoot trawl net. (*Photo credit:* P. Molenaar)

of suitable footage was made for further analyses. Footage per haul was reviewed visually, and the presence of harbour porpoises was noted. Every time the minimum number of porpoises present increased, the time was noted. Caught fish species were identified if possible. For other species, such as northern gannets (*Morus bassanus*), their time of first appearance was noted. The time of recorded events was subtracted from the time the cod-end was lifted, so the appearance of those events could be related to the capture process within a haul.

Data on harbour porpoise behaviour could be obtained during seven hauls (Figures 4 & 5; supplementary video; the supplementary video for this paper is available in the "Supplemental Material" section of the *Aquatic Mammals* website: https://www.aquatic-mammalsjournal.org/index.php?option=com_content&view=article&id=10&Itemid=147). The images showed harbour porpoises swimming behind the cod-end, moving in and out of the camera frame. The animals were seen chasing and/or catching fish that escaped through the mesh (Figure 5b; supplementary video). There was no record of harbour porpoises picking fish that were meshed in the cod-end. As the haul proceeded towards the end of the capture phase, more fish were collected in the cod-end, leading to increased numbers of small fish passing through the cod-end mesh. Simultaneously with the proceeding capture phase, the (minimum) number of porpoises observed at the same time increased (Figure 4). The number of harbour porpoises visible at once (in one frame) ranged from zero to nine (Figures 4 & 5c; supplementary video), but most of the time, one, two, or three harbour porpoises were visible concurrently (Figure 4b).

Observed fish species that were taken as prey by harbour porpoises included red mullet, whiting, and poor cod (*Trisopterus minutus*). Other fish species identified escaping through the mesh included lesser spotted dogfish (*Scyliorhinus canicula*), horse mackerel, and black seabream (*Spondyliosoma cantharus*). In the analysed footage, there was no clearly visible capture of those species, but species identification was often difficult. Porpoises feed on a wide range of fish species, and red mullet, whiting, and poor cod have all been documented before as prey (Börjesson et al., 2003; Angerbjörn et al., 2006; Sveegaard et al., 2012; Leopold, 2015).

Of the 90 min that a flyshoot haul requires, harbour porpoises were observed following the cod-end for 20 up to 50 min (Figure 4a). During all observed hauls, 1 to 3 min before the cod-end is lifted from the water (at approximately 10 m depth), northern gannets were observed diving to catch fish that escaped from the cod-end (Figure 5d; supplementary video). At this point, harbour porpoises moved away from the cod-end area and were either visible farther away or not seen in the video frames (Figure 5d), but they had been observed from the vessel moving away from the cod-end.

This paper is the first documentation of harbour porpoises following flyshoot fishing vessels and preying on fish escaping the net's cod-end. To our knowledge, there is only one other publication describing porpoises following active fishing gear (Bonizzoni et al., 2022; see also Fertl & Leatherwood, 1997). Fishers, however, state that they frequently observe harbour porpoises during their flyshoot fishing operations—both in the English Channel and the North Sea. In the latter sea basin, fishers mention similar observations from twin-rig otter trawl fisheries targeting plaice (P. Molenaar, pers. comm., 2022).

Harbour porpoises generally have high metabolic rates and have been shown to forage at high rates (catching many fish per hour and feeding nearly continuously) (Lockyer, 2003; Wisniewska et al., 2016; Hoekendijk et al., 2017). These flyshoot fishery operations provide prey at relatively low energetic costs. It minimizes necessary search time, and the escaping fish are easier to catch since they are likely fatigued or disoriented when they slip through the 80 mm mesh. Each haul seems to provide feeding opportunities for at least 20 to 50 min.

Cetaceans are acoustic animals that use echolocation for catching prey, navigation, and communication. Sound thus plays a major role in the foraging and socializing behaviour of cetaceans. It can be hypothesized that the harbour porpoises have learned to recognize the sound of setting the trawl net as this is generally accompanied by chain "noise." The observed increase of animals when a haul is proceeding could indicate that animals arrive from

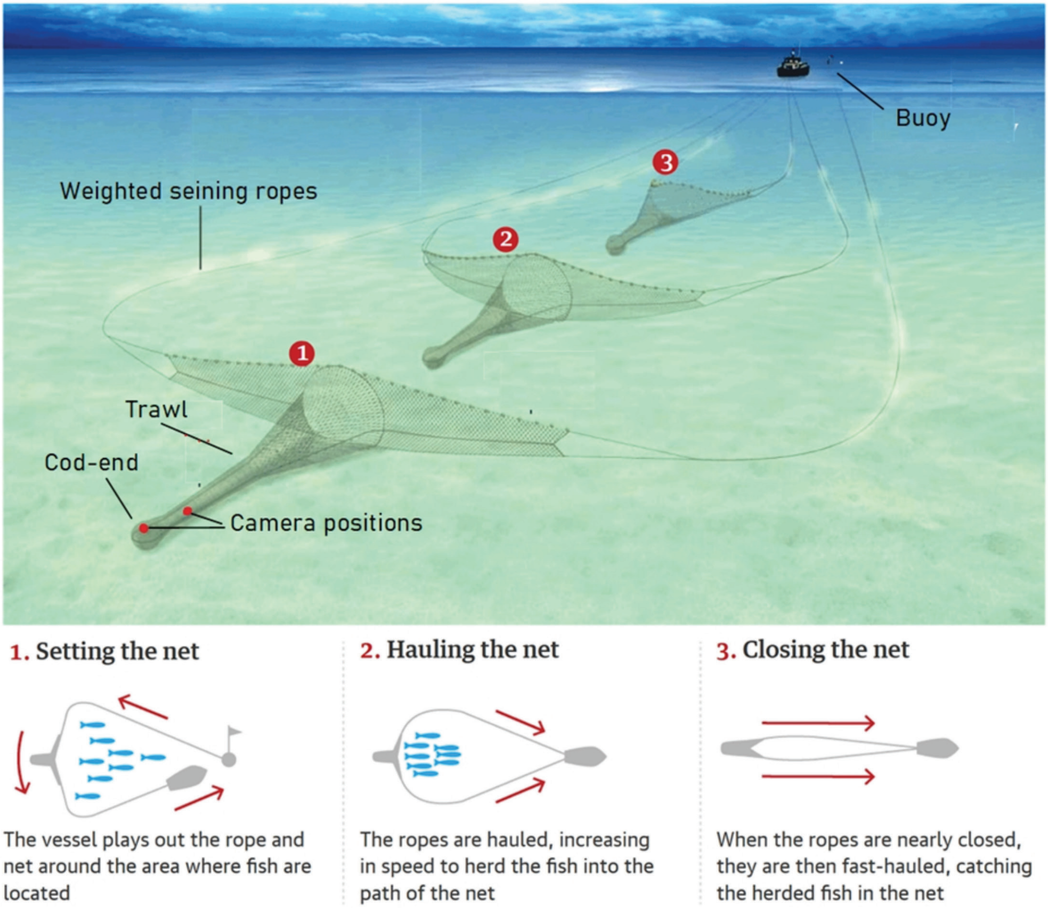

Figure 3. Schematic view of flyshoot or Scottish seining and the camera positions. The vessel first sets the seining rope and the trawl net, which rest on the sea floor. After that, the lines and trawl net are retrieved to herd and catch the fish. (*Picture sources:* Seafish [www.seafish.org] and the Food and Agriculture Organization of the United Nations [FAO]; courtesy of Guardian News & Media Ltd).

different locations, having associated the net setting with a foraging opportunity. Sperm whales appear to respond to acoustic cues from fishing activities, and the same is suggested for killer whales (Thode et al., 2015; Mul et al., 2020). Dolphins can also be attracted to the sound of trawlers, and it is reported that dolphins appear to locate trawlers from considerable distances (Bonizzoni et al., 2022).

The harbour porpoises seemed to increase their distance to the cod-end once the northern gannets started predating on the escaped fish. The northern gannets appear in the final minutes of each haul. At this stage, the cod-end is near the surface and within the diving range of the gannets. Although northern gannets can dive over 25 m deep, their average dive depth is shallower than 20 m (Brierley & Fernandes, 2001). It could be hypothesised that the accompanied withdrawal of the harbour porpoises is due to the risk of being "hit" by one of the diving birds. An alternative hypothesis could be that the gannets catch the fish before the porpoises have the opportunity to do so and the latter lose interest.

Associations between fisheries and cetaceans fall into different categories, being detrimental or beneficial to one or both of the involved parties. In this case, harbour porpoises are feeding on escaping fish, so no depredation of the catch takes place. We did not observe harbour porpoises picking meshed fish from the cod-end; only fish that slipped through the mesh were taken. It is therefore unlikely that this behaviour causes any income loss to the fisheries. There was one shot at the beginning of one haul where a porpoise swam

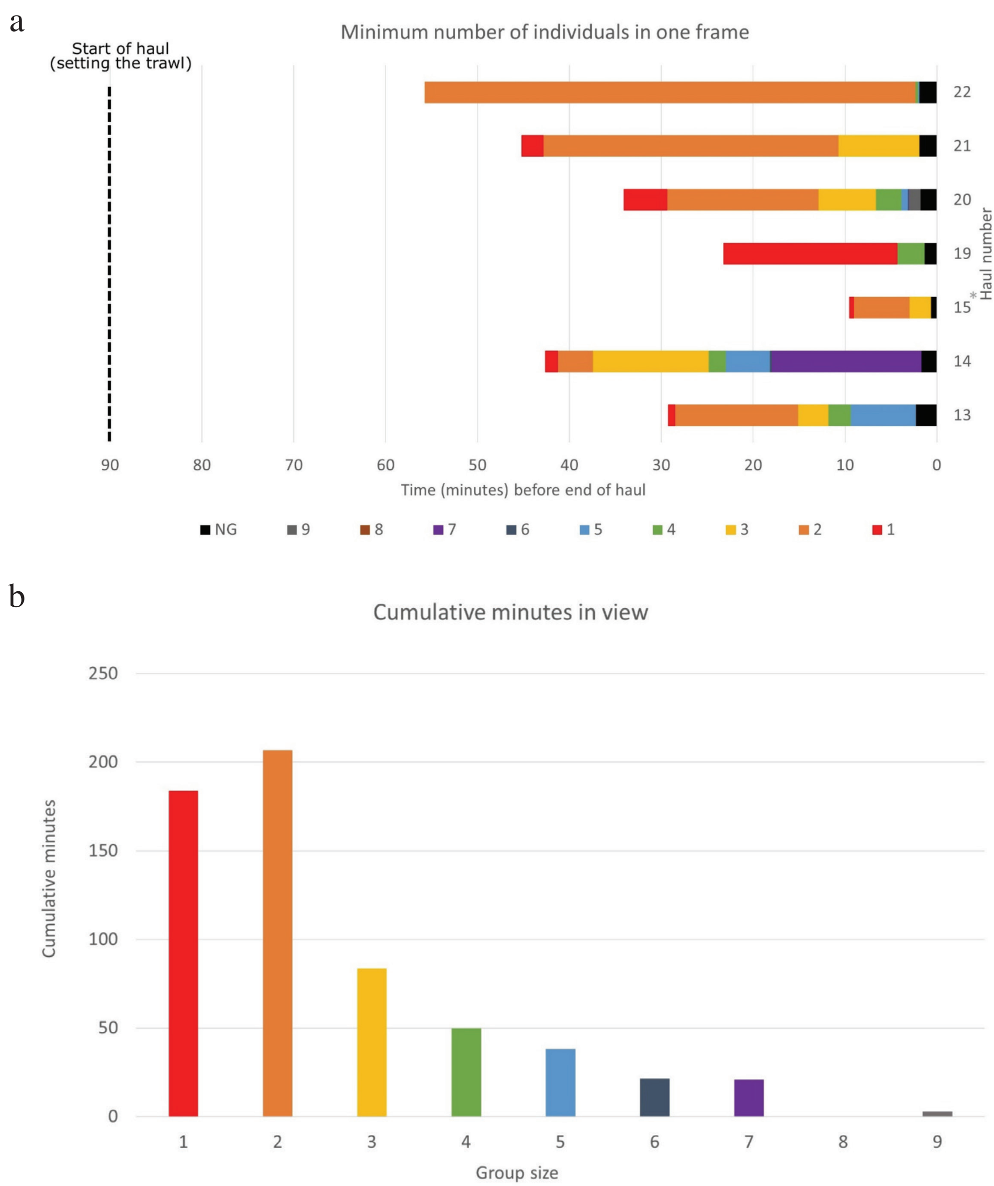

Figure 4. (a) Minimum number of individuals present as the haul proceeds for each haul separately and an indication of the time when the northern gannets (*Morus bassanus*; NG) "enter" the footage and the harbour porpoises (*Phocoena phocoena*) stay further away. *During the first phase of haul 15, a twisted cod-end obstructed the video frame. Only during the last minutes of the haul did the cod-end straighten, enabling good footage; and (b) cumulative minutes (summed over all hauls) for each number of harbour porpoises simultaneously in view.

inside the trawl net before the actual hauling of the trawl started. At this moment, there were no fish in the trawl net yet. This porpoise was not seen inside the net following the start of the haul. Such behaviour might be detrimental to the fishers in case catch is predated on, and it may increase the chance of accidental bycatch. Harbour porpoise bycatch is most common in gillnet fisheries and is considered a substantial threat to the species in some areas (Berggren, 1994; Jefferson & Curry, 1994; Lowry & Teilmann, 1994; Vinther & Larsen, 2004; Bjørge et al., 2013; IJsseldijk et al.,

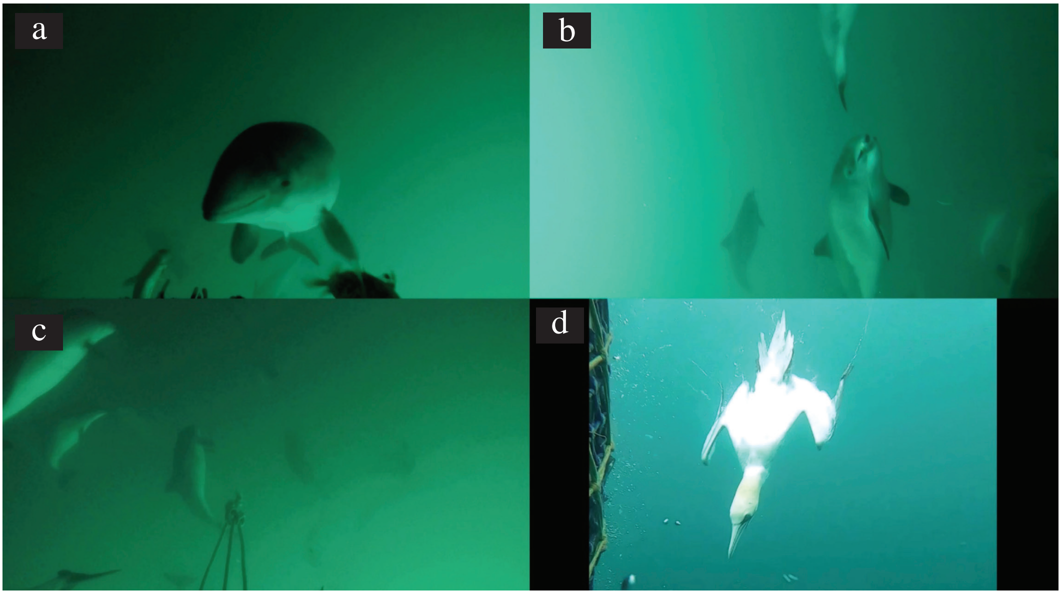

Figure 5. (a) Shot of harbour porpoise close to the camera and the cod-end (bottom of image); (b) multiple harbour porpoises in frame with one catching fish; (c) nine harbour porpoises observed simultaneously; and (d) a northern gannet joining in. (Photos provided by P. Molenaar)

2021). However, reports of catches in active fishing gear, such as trawls, are rare and include (parts of) carcasses that lie on the seabed (P. Molenaar, pers. obs., 2022). There are some anecdotal observations of harbour porpoises incidentally being bycaught in this fishery, but fishers state that it hardly ever occurs, even though harbour porpoises are frequently present around their vessels. There is low observer coverage in the described flyshoot fishery, and systematic monitoring and higher observer coverage could provide more insight.

The recorded association provides new insights into harbour porpoise behaviour at sea. The method presented in this paper provides an easy, cost-efficient approach to collect behavioural observations. Multiple cameras mounted to the cod-end and application of additional lighting could improve identification of both harbour porpoises and caught prey species. Future monitoring could provide information on porpoise group composition (including identifying the sex of the animals), species they prey on, food intake, (potentially cooperative) hunting behaviour, and potential interspecies interaction with northern gannets, for example. An alternative or supplementary method to detect/monitor this kind of porpoise interaction would be to use passive acoustic monitoring devices (e.g., C-POD, F-POD, Soundtrap). The partly automated analysis of C-POD and F-POD data allows for extraction of both harbour porpoise presence and feeding behaviour.

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Literature Cited

Angerbjörn, A., Börjesson, P., & Brandberg, K. (2006). Stable isotope analysis of harbour porpoises and their prey from the Baltic and Kattegat/Skagerrak Seas. *Marine Biology Research*, *2*(6), 411-419. https://doi.org/10.1080/17451000601023896

Berggren, P. (1994). Bycatches of the harbour porpoise (*Phocoena phocoena*) in the Swedish Skagerrak, Kattegat and Baltic Seas: 1973-1993. *Reports of the International Whaling Commission*, Special Issue 15, 211-215. https://eprints.ncl.ac.uk/217510

Bjørge, A., Skern-Mauritzen, M., & Rossman, M. C. (2013). Estimated bycatch of harbour porpoise (*Phocoena*

phocoena) in two coastal gillnet fisheries in Norway, 2006-2008: Mitigation and implications for conservation. *Biological Conservation*, *161*, 164-173. https://doi.org/10.1016/j.biocon.2013.03.009

Bonizzoni, S., Hamilton, S., Reeves, R. R., Genov, T., & Bearzi, G. (2022). Odontocete cetaceans foraging behind trawlers, worldwide. *Reviews in Fish Biology and Fisheries*, 1-51. https://doi.org/10.1007/s11160-022-09712-z

Börjesson, P., Berggren, P., & Ganning, B. (2003). Diet of harbor porpoises in the Kattegat and Skagerrak Seas: Accounting for individual variation and sample size. *Marine Mammal Science*, *19*(1), 38-58. https://doi.org/10.1111/j.1748-7692.2003.tb01091.x

Brierley, A. S., & Fernandes, P. G. (2001). Diving depths of northern gannets: Acoustic observations of Sula Bassana from an autonomous underwater vehicle. *The Auk*, *118*(2), 529-534. https://doi.org/10.1093/auk/118.2.529

Broadhurst, M. K. (1998). Bottlenose dolphins, *Tursiops truncatus*, removing by-catch from prawn-trawl codends during fishing in New South Wales, Australia. *Marine Fisheries Review*, *60*(3), 9-14. https://aquadocs.org/handle/1834/26423

Chenoweth, E. M., Straley, J. M., McPhee, M. V., Atkinson, S., & Reifenstuhl, S. (2017). Humpback whales feed on hatchery-released juvenile salmon. *Royal Society Open Science*, *4*(7). https://doi.org/10.1098/RSOS.170180

Chilvers, B. L., & Corkeron, P. J. (2001). Trawling and bottlenose dolphins' social structure. *Proceedings of the Royal Society of London B: Biological Sciences*, *268*(1479), 1901-1905. https://doi.org/10.1098/rspb.2001.1732

Fertl, D., & Leatherwood, S. (1997). Cetacean interactions with trawls: A preliminary review. *Journal of Northwest Atlantic Fishery Science*, *22*, 219-248. https://doi.org/10.2960/J.v22.a17

Higashisaka, H., Matsuishi, T., & Akamatsu, T. (2018). Presence and behavior of harbor porpoises (*Phocoena phocoena*) around set nets revealed using passive acoustic monitoring. *Fisheries Research*, *204*, 269-274. https://doi.org/10.1016/j.fishres.2018.03.003

Hoekendijk, J. P., Spitz, J., Read, A. J., Leopold, M. F., & Fontaine, M. C. (2017). Resilience of harbor porpoises to anthropogenic disturbance: Must they really feed continuously? *Marine Mammal Science*, *34*(1), 258-264. https://doi.org/10.1111/mms.12446

IJsseldijk, L. L., Scheidat, M., Siemensma, M. L., Couperus, B., Leopold, M. F., Morell, M., Gröne, A., & Kik, M. J. L. (2021). Challenges in the assessment of bycatch: Postmortem findings in harbor porpoises (*Phocoena phocoena*) retrieved from gillnets. *Veterinary Pathology*, *58*(2), 405-415. https://doi.org/10.1177/0300985820972454

Jaiteh, V. F., Allen, S. J., Meeuwig, J. J., & Loneragan, N. R. (2013). Subsurface behavior of bottlenose dolphins (*Tursiops truncatus*) interacting with fish trawl nets in northwestern Australia: Implications for bycatch mitigation. *Marine Mammal Science*, *29*(3), E266-E281. https://doi.org/10.1111/j.1748-7692.2012.00620.x

Jefferson, T. A., & Curry, B. E. (1994). A global review of porpoise (Cetacea: Phocoenidae) mortality in gillnets. *Biological Conservation*, *67*(2), 167-183. https://doi.org/10.1016/0006-3207(94)90363-8

Johnson, K. F., Hussey, N. E., & Ferguson, S. H. (2021). Observation of marine mammal and bird interactions focused around a commercial fishing vessel in central Baffin Bay, Nunavut. *Arctic Science*, *7*(2), 567-574. https://doi.org/10.1139/as-2020-0014

Karpouzli, E., & Leaper, R. (2004). Opportunistic observations of interactions between sperm whales and deep-water trawlers based on sightings from fisheries observers in the northwest Atlantic. *Aquatic Conservation: Marine and Freshwater Ecosystems*, *14*(1), 95-103. https://doi.org/10.1002/aqc.595

Leopold, M. (2015). *Eat and be eaten: Porpoise diet studies* (Doctoral thesis). Wageningen University, Wageningen, Netherlands. https://library.wur.nl/WebQuery/wurpubs/fulltext/361729

Lockyer, C. (2003). A review of methods for defining population structure in the harbour porpoise (*Phocoena phocoena*). *NAMMCO Scientific Publications*, *5*, 41-69. https://doi.org/10.7557/3.2739

Lowry, N., & Teilmann, J. (1994). Bycatch and bycatch reduction of the harbour porpoise (*Phocoena phocoena*) in Danish waters. *Reports of the International Whaling Commission*, Special Issue 15, 203-209.

Macaulay, J., Kingston, A., Coram, A., Oswald, M., Swift, R., Gillespie, D., & Northridge, S. (2022). Passive acoustic tracking of the three-dimensional movements and acoustic behaviour of toothed whales in close proximity to static nets. *Methods in Ecology and Evolution*, *13*(6), 1250-1264. https://doi.org/10.1111/2041-210X.13828

Maeda, S., Sakurai, K., Akamatsu, T., Matsuda, A., Yamamura, O., Kobayashi, M., & Matsuishi, T. F. (2021). Foraging activity of harbour porpoises around a bottom-gillnet in a coastal fishing ground, under the risk of bycatch. *PLOS ONE*, *16*(2), e0246838. https://doi.org/10.1371/journal.pone.0246838

Morizur, Y., Tregenza, N., Heessen, H., Berrow, S., & Pouvreau, S. (1996). *By-catch and discarding in pelagic trawl fisheries* (Final report). https://archimer.ifremer.fr/doc/00000/1236

Mul, E., Blanchet, M-A., McClintock, B. T., Grecian, W. J., Biuw, M., & Rikardsen, A. (2020). Killer whales are attracted to herring fishing vessels. *Marine Ecology Progress Series*, *652*, 1-13. https://doi.org/10.3354/meps13481

National Marine Fisheries Service (NMFS). (1991). *Final recovery plan for the humpback whale (*Megaptera novaeangliae*)*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

Northridge, S. P. (1984). *World review of interactions between marine mammals and fisheries*. Food and Agriculture Organization of the United Nations.

Northridge, S. P. (1991). *An updated world review of interactions between marine mammals and fisheries*. Food and Agriculture Organization of the United Nations.

Read, A. J. (2008). The looming crisis: Interactions between marine mammals and fisheries. *Journal of Mammalogy*, *89*(3), 541-548. https://doi.org/10.1644/07-MAMM-S-315R1.1

Santana-Garcon, J., Wakefield, C. B., Dorman, S. R., Denham, A., Blight, S., Molony, B. W., & Newman, S. J. (2018). Risk versus reward: Interactions, depredation rates, and bycatch mitigation of dolphins in demersal fish trawls. *Canadian Journal of Fisheries and Aquatic Sciences*, *75*(12), 2233-2240. https://doi.org/10.1139/cjfas-2017-0203

Seafish. (2022a). *SDN – anchor seine*. https://www.seafish.org/responsible-sourcing/fishing-gear-database/gear/sdn-anchor-seine

Seafish. (2022b). *SSC – Scottish seine*. https://www.seafish.org/responsible-sourcing/fishing-gear-database/gear/ssc-scottish-seine

Similä, T. (2005). *Interactions between herring fishery and killer whales in northern Norway* (ICESCM 2005/R:0). https://www.ices.dk/sites/pub/CM%20Doccuments/2005/R/R0305.pdf

Sveegaard, S., Andreasen, H., Mouritsen, K. N., Jeppesen, J. P., Teilmann, J., & Kinze, C. C. (2012). Correlation between the seasonal distribution of harbour porpoises and their prey in the Sound, Baltic Sea. *Marine Biology*, *159*, 1029-1037. https://doi.org/10.1007/s00227-012-1883-z

Thode, A., Mathias, D., Straley, J., O'Connell, V., Behnken, L., Falvey, D., Wild, L., Calambokidis, J., Schorr, G., Andrews, R., Liddle, J., & Lestenkof, P. (2015). Cues, creaks, and decoys: Using passive acoustic monitoring as a tool for studying sperm whale depredation. *ICES Journal of Marine Science*, *72*(5), 1621-1636. https://doi.org/10.1093/icesjms/fsv024

Tixier, P., Lea, M. A., Hindell, M. A., Welsford, D., Mazé, C., Gourguet, S., & Arnould, J. P. Y. (2021). When large marine predators feed on fisheries catches: Global patterns of the depredation conflict and directions for coexistence. *Fish and Fisheries*, *22*(1), 31-53. https://doi.org/10.1111/faf.12504

Vinther, M., & Larsen, F. (2004). Updated estimates of harbour porpoise (*Phocoena phocoena*) bycatch in the Danish North Sea bottom-set gillnet fishery. *Journal of Cetacean Research and Management*, *6*(1), 19-24.

Waring, G. T., Gerrior, P., Payne, P. M., Parry, B. L., & Nicolas, J. R. (1990). Incidental take of marine mammals in foreign fishery activities off the Northeast United States, 1977-88. *Fishery Bulletin*, *88*, 347-360.

Wisniewska, D. M., Johnson, M., Teilmann, J., Rojano-Doñate, L., Shearer, J., Sveegaard, S., Miller, L. A., Siebert, U., & Madsen, P. T. (2016). Ultra-high foraging rates of harbor porpoises make them vulnerable to anthropogenic disturbance. *Current Biology*, *26*(11), 1441-1446. https://doi.org/10.1016/j.cub.2016.03.069