Observations of the 1992 U.S. Pelagic Pair Trawl Fishery in the Northwest Atlantic

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Introduction

Pelagic pair trawling involves a large-mesh, mid-water net towed between two vessels usually of similar size and horsepower. Meshes are several meters large at the mouth of the net decreasing in size back to the codend where they range from 13 to 30 cm. Large-mesh pelagic pair trawls have been used in the Northeast Atlantic primarily for albacore, *Thunnus alalunga*, (Prado, 1988; Anonymous, 1991) and off Mozambique, Africa, for several species of tunas (Schwarz[1]).

[1] A. Schwarz. 1993. Rio Rivuma, Boston, Mass. Personal commun.

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ABSTRACT—Pelagic pair trawling for tuna, Thunnus *spp., and swordfish,* Xiphias gladius, *was introduced in U.S. Northwest Atlantic waters in 1991. During autumn (October–November) of 1992 under the authority of the Federal Atlantic Swordfish Regulations, the National Marine Fisheries Service placed observers aboard pelagic pair trawl vessels to document the catch, bycatch, discard, and gear used in this new fishery. The fishery is conducted primarily at night along shelf-edge waters from June to November. In late 1991, revised regulations restricted swordfish to bycatch in this fishery resulting in pelagic pair trawl vessels targeting tuna throughout 1992. Analyses of 1992 data indicate that albacore,* T. alalunga, *was the predominant species caught, although yellowfin tuna,* T. albacares, *and bigeye tuna,* T. obesus, *were the preferred target species. Bycatch also included swordfish, large sharks, pelagic rays and other pelagic fishes, other tunas, and marine mammals.*

In the Northwest Atlantic, pelagic pair trawlers have targeted albacore and other tunas and swordfish, *Xiphias gladius*, in this mid-water fishery.

With the U.S./Canada, or Hague Line, boundary decision of 1984, the U.S. swordfish harpoon fishery effectively disappeared owing to loss of fishing grounds. U.S. swordfishermen investigated alternative fisheries, and a small number began to target swordfish with a new gear type, the pelagic pair trawl, in 1991. Three pairs of vessels targeted swordfish during this first season. In 1992, two additional pairs entered the fishery. However, swordfish regulations in 1992 precluded continued targeting of swordfish and mandated observer coverage. This paper summarizes the catch, bycatch, and fishing methods from pelagic pair trawl trips observed in October and November 1992 off the U.S. mid-Atlantic coast.

Materials and Methods

Observers were placed on pelagic pair trawlers selected by NOAA's National Marine Fisheries Service (NMFS) during the period from 14 October to 19 November 1992. To maximize observer coverage of this pair trawl fleet, observers were placed on one vessel of a pair, and coverage was waived for the second vessel for that trip. Although this fishery is generally conducted from late June to mid-November, observations and data reported in this paper cover only the latter part of the 1992 fishery.

Observers collected vessel, economic, gear, catch, bycatch, and discard data on each trip. Additionally, location, effort, environmental, and complete catch data were recorded for each tow retrieved and processed aboard the observed vessel. As time permitted, length and sex data were recorded for individual animals, and biological samples (gonads, hardparts for ageing, stomachs, tissue samples, etc.) were collected. For tows retrieved and processed by the nonobserved vessel of the pair, only tow location, effort, environmental, and catch data for the retained species were recorded. Hence, no discard data were collected for tows processed on the nonobserved vessel.

Results

The nine observed trips ranged from 4 to 11 days in duration with an average of 7 days. Vessels departed from ports in southern New England and New York. Fishing occurred primarily in the mid-Atlantic region near Hudson Canyon with a smaller amount of effort as far south as Norfolk Canyon (Fig. 1). Bottom depths fished were predominantly from 433 to 814 m (237 to 445 fathoms), but ranged from 137 to 2,597 m (75–1,420 fathoms). Limited fishing effort south of Hudson Canyon occurred in November as tuna became more dispersed and the weather deterioriated.

Pelagic pair trawl fishing operations were conducted at night with an intended target species of bigeye tuna, *T. obesus*. Bigeye tuna was preferred since it was more highly valued than other tuna species caught. Pelagic nets were towed for an average period of 4.4 hours at speeds ranging from 3.2 to 4.8 knots (4.0 knots average). The size of the net, vessel, and horsepower, and the swimming capabilities of the target species likely dictated the observed tow-

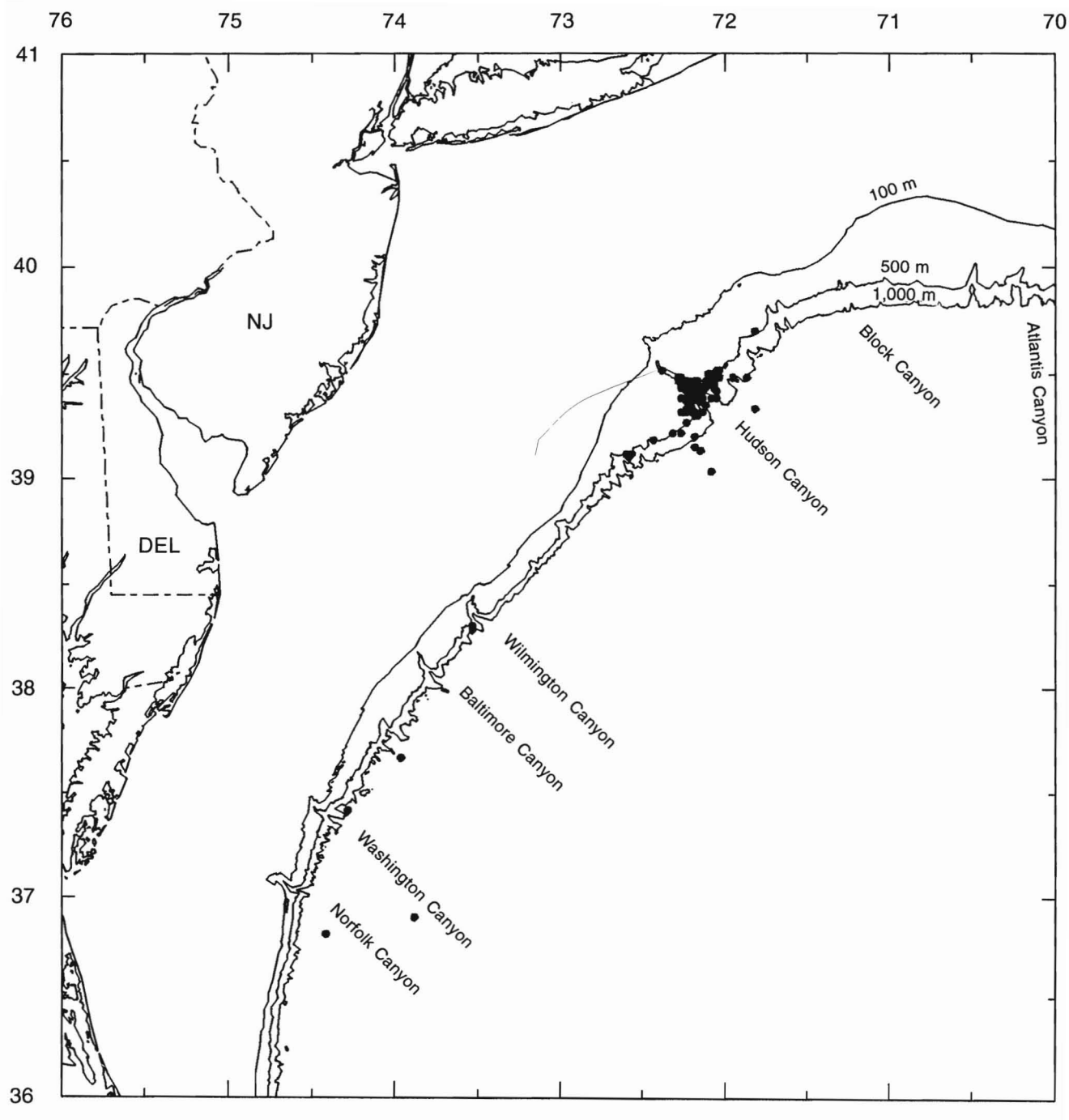

Figure 1.—Distribution of all tows from observed pelagic pair trawl trips, Oct.–Nov. 1992.

ing speeds. One vessel of the pair typically retrieved the net and processed the fish. Pelagic pair trawl fishermen generally alternated processing the catch between the two vessels each tow.

Two different pelagic nets, Le Drezen[2] (French manufacture) and Shuman (American manufacture) were used by the vessels. The vessels towed these trawls about 183 m (100 fathoms) apart with net openings ranging from about 23 to 55 m (13–30 fathoms) depending

[2] Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

on the net used (Anonymous, 1991; Venturo, 1993). Most observed vessels utilized a transducer, or net sounder, placed on either the headrope or footrope to determine the depth and opening of the net. While fishermen believe that net depth recorded by the transducer is important to fishing success and marine mammal avoidance (Venturo, 1993), only limited headrope, or gear, depth data were collected in 1992. With the transducer, fishermen are able to adjust headrope depth during a tow and from tow to tow. Headrope depths observed ranged from 9 to 55 m (5-30 fathoms) below the surface.

Observers were placed aboard 9 of the 11 vessels operating in the fishery in 1992 and recorded vessel characteristics for the five pairs involved. One pair included three vessels, with one vessel alternating from trip to trip with the two other vessels. A majority of the vessels were <10 years old and ranged in length from 23 to 27 m (74-87 feet). Vessel size appeared to be well matched for most of the pairs; however, horsepower between vessels of a pair was more disparate, e.g. 850 hp versus 675 hp. Dissimilar vessel specifications may have been otherwise compensated for but not recorded by observers.

A total of 101 pelagic pair trawl sets was made during the 9 observed trips with 48 tows observed. From 1 to 3 tows were made each night. The remaining 53 tows were retrieved by the nonobserved vessel of the pair, and thus not all catch was directly seen by the observer. Since pair trawl captains must work in close cooperation, catch information was usually passed via radio to the nonretrieving vessel. This timely transfer of catch information allowed the observer to record all retained catch but not discarded catch. Due to close proximity of the vessels during trawl setting and retrieval, observers often reported they could see much of the catch as it was being dumped out of the net onto the other vessel for processing.

In addition to pelagic pair trawl fishing, three vessels fished with bottom trawls during the day for anglerfish, *Lophius americanus*; squids; silver hake, *Merluccius bilinearis*; and scup, *Stenotomus chrysops*. This bottom fishing was not done in a paired configuration. A total of 46 otter trawl tows were made with 38 tows (83%) observed.

Albacore, yellowfin tuna, *T. albacares*; bigeye tuna, and swordfish were the primary species caught and landed (Table 1) from pelagic pair trawl operations. While most captains intended to target bigeye tuna owing to its higher value, albacore was the predominant species caught (70%). Small amounts of bonito, *Sarda sarda*; mako shark, *Isurus* sp.; and little tunny, *Euthynnus alletteratus*, were also retained. Tuna species were landed both dressed (headed, gutted, and tailed) and round, while all landed swordfish were dressed.

In accordance with 1992 swordfish regulations, each vessel was allowed to retain and land two swordfish per trip. Fifty-three swordfish were caught on the observed trips with 15 retained and 38 discarded. Of the discarded swordfish, 18 were released alive, 15 of which were tagged. The two-fish retention regulation resulted in highgrading, or upgrading, of swordfish on two observed trips. Highgrading typically involves discarding processed/stored fish to replace them with larger fish or species of a higher value later in the trip.

Table 1.—Retained and discarded catch from observed pelagic pair trawl tows, Oct.–Nov. 1992.

Species	Round weight (kg)	Average round weight/fish (kg)
Retained catch		
Albacore	27,717	21
Yellowfin tuna	5,433	24
Bigeye tuna	3,668	76
Swordfish	1,684	112
Bonito	9	5
Other pelagic fishes	3	—[1]
Subtotal	38,514	
Discarded catch		
Swordfish	1,170	
Albacore	1,271	
Hammerhead shark	295	
Blue shark	91	
Myctophidae	56	
Little tunny	48	
Fish unspecified	26	
Yellowfin tuna	18	
Roughtail stingray	18	
Angel shark	7	
Atlantic torpedo	5	
Loligo squid	4	
Cownose ray	2	
Louvar	2	
Jellyfish	1	
Nmeichthyidae	—[1]	
Subtotal	3,014	
Total observed catch	41,528	

[1] Dash = <1 Kg.

Discarded bycatch (excluding marine mammals) included swordfish, three tuna species, three species each of sharks and rays, Myctophidae, squid, *Loligo pealei*; unspecified fish, louvar, *Luvarus imperalis*; jellyfish, and snipe eels (Nemichthyidae) (Table 1). A total of 12 marine mammals were caught on four observed trips (Table 2).

Owing to night fishing operations and because marine mammals were not always brought on board, species identification and determination of condition were difficult. For example, one tow with three unidentified marine mammals was released in entirety in the water since one of the mammals was believed to have been alive. Atlantic pilot whales, *Globicephala melas*, were observed taken in the Bay of Biscay pair trawl fishery on one 15 day trip (Collet[3]). No sea turtles or sea birds were observed in the 1992 catches.

Discussion

Since the nine pelagic pair trawl trips observed in 1992 covered only 20% (about 1 month) of the 5-month fishing season, these observations provide a partial spatial and temporal characterization of the pelagic pair trawl fishery. Extrapolation of these data is not possible since the total number of 1992 pelagic pair trawl trips is unknown. However, the fishery was reclassified to a Category I fishery under the Marine Mammal Protection Act Exemption Program in mid 1993 based on preliminary 1992 observer data. This classification mandated specific marine mammal reporting and observer coverage. Additional vessels participated in the

[3] A. Collet, Musée Oceanographique, Port des Minimes, 17000 La Rochelle, France. Personal commun.

Table 2.—Marine mammals caught incidentally in observed pelagic pair trawl tows, Oct.–Nov. 1992.

Species	Number caught	Status		
		Alive	Dead	Unknown
Bottlenose dolphin	4		4	
Risso's dolphin	1		1	
Saddleback dolphin	3		3	
Unidentified dolphin	4	1	1	2
Totals	12	1	9	2

fishery in 1993 when word of the fishery spread throughout the fishing fleets.

Acknowledgments

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Literature Cited

Anonymous. 1991. Pair mid-water trawling for tuna. Fish. News Int. 30(5):92.

Prado, J. 1988. Trawling for albacore. Infofish Int. 4/88:50.

Venturo, G. 1993. Pair trawling threat. The Fisherman 1 April:18–19.