International Commission for the Northwest Atlantic Fisheries

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On specific composition and size of by-catch obtained while conducting the specialized searching and fishing for silver hake, herring and mackerel in Subareas 4, 5 and Statistical Area 6

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To analyse specific composition and size of by-catch there
are used data obtained by research-scouting and fishing vessels
which searched and fished for hake, herring and mackerel in 1970-
-76. Hake was catched by a bottom trawl and mackerel and herring -
by pelagic otter-trawls.

Captains and biologists on board the research-scouting vessels
estimate data on specific composition and size of catches and re-
gularly put down them separately for each trawling in cards of
trawl fishery. Such data obtained by fishing vessels are put down
by captains in fish-registered books. In all 8 cruises by research-
scouting vessels and 15 trips by fishing vessels were analysed.
During the cruises mentioned 815 trawlings were made by a bottom
trawl in Subarea 4 catching hake, 514 ones by pelagic trawls in
Subarea 5 fishing for herring, 629 hauls by pelagic trawls in Sub-
area 5 and Statistical Area 6 while harvesting mackerel and in
these subareas there were made 109 trawlings by bottom trawls
catching hake. All the data were summarized by Squares 30° x 30°
recommended by ICNAF. In the cases when one or another fish species
was noted in trawl cards or in fish-registered books only singly,
they were also marked by plus sign. Results of analyses are given
in Tables 1, 2, 3, 4.

Hake in Subarea 4. In the course of the specialized hake fi-
shery the by-catch of the other species in the whole Subarea 4 is
not over 4% (Table 1). The information given covers more than 80%

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of the area where fishing hake concentrations usually distribute.
In some squares (43°30' - 44°00'N, 63°00'- 63°30'W; 43°30' -
44°00'N, 59°00' - 59°30'W; 43°00' - 43°30'N, 61°00' - 61°30'W)
a basis of by-catch is made up by herring, mackerel, argentine.
These species are more often observed while fishing for hake.
Gadidae are usually registered singly and only in squares 43°30'-
44°00'N, 63°00'-63°30'W; 43°00'-43°30'N, 62°30'-63°00'W; 43°00'-
43°30'N, 63°00'-63°30'W and 42°30'-43°00'N, 63°00'-63°30'W a share
of them in catches was 3.5-4.6%. Insignificant by-catch of Gadidae
and the other species in the course of specialized hake fishery
is probably due to different distribution of them by depths. In
the column "Other" are put down skates, anglers, sand eel, gobies.
By-catch of them is not over 3%.

Herring in Subarea 5. Herring fishery is conducted by pelagic
trawls. Moreover, herring schools differ from those of another
species by their configuration. Due to this a specific composition
and size of by-catch in the course of specialized herring fishery
are minimum, not more than 1%. The main part of by-catch is consti-
tuted by mackerel and spiny dogfish; hake, argentine and Gadidae
are seldom occurred. The column "Other" includes lumpsucker, sand
eel, Atlantic saury. The data given in Table 2 do not characterize
the whole area where herring fishery takes place. In some years
herring fishery occurs also on eastern and southern slopes of the
Georges Bank. In these areas the by-catch is also insignificant
and its main part is presented by mackerel and lobsters.

Mackerel in Subarea 5 and Statistical Area 6. Mackerel fishery,
due to their frequent and fast migrations, is observed over a great
area. In the northern part of the fishing area in the course of
the specialized mackerel fishery herring, hake, burbot and eelpout
make up the main part of the by-catch; in the southern part -
spiny dogfish, lobsters, sea robins (the latter species together
with lobsters and Atlantic saury are given in column "Other").
On the whole the size of by-catch in the whole fishing area is
not more than 2% while harvesting mackerel by pelagic trawls
(Table 3).

Hake in Subarea 5 and Statistical Area 6. Data on specific
composition of the by-catch while harvesting the hake indicate
that in its main part there are prevailed mackerel, burbot,
lobsters, herring and spiny dogs. The by-catch size is not over
9.4% (Table 4). Negligible by-catch of Gadidae is observed only
in northern parts of the fishing area. In southern areas, together
with mackerel, lobsters, burbot, spiny dogfish, there are also
occurred sea robins, butterfish which are given in the column
"Other".

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Table 1. Change in specific composition of catches in the course of the specialized fishery of silver hake by Squares 30°L x 30°L in Subarea 4

Positions of Squares 30°Lx30°L	No. of trawl-ings	Total catch in t	Catch per trawl-ing, t	hake	herring	macke-rel	redfish	burbot	argen-tine	Ga-didae	Other
44°00 - 44°30 N / 61°30 - 62°00 W	29	108	3,7	99,8/92,4	7,1/6,6	0,1/0,1	1,0/0,9	-	-	-	-
44°00 - 44°30 N / 62°00 - 62°30 W	13	46	3,5	46,0/100,0	-	-	-	-	-	+	+
44°00 - 44°30 N / 62°30 - 63°00 W	18	52,3	2,9	50,8/97,1	-	+	-	1,1/2,1	0,4/0,8	+	+
44°00 - 44°30 N / 63°00 - 63°30 W	2	1	0,5	1,0/100,0	-	-	-	-	-	+	+
43°30 - 44°00 N / 64°00 - 64°30 W	15	78	5,2	73,2/93,7	-	+	0,8/1,2	-	4,0/5,1	-	+
43°30 - 44°00 N / 63°00 - 64°00 W	1	3	3,0	3,0/100,0	-	-	-	-	-	-	+
43°30 - 44°00 N / 63°00 - 63°30 W	10	17,3	1,7	14,9/86,1	1,8/10,4	-	-	-	-	0,6/3,5	+
43°30 - 44°00 N / 62°30 - 63°00 W	76	228,6	3,0	227,8/99,7	0,2/0,1	+	0,3/0,1	-	-	0,3/0,1	+
43°30 - 44°00 N / 62°00 - 62°30 W	24	61,0	2,5	53,8/88,0	5,0/8,3	+	2,0/3,3	-	-	-	0,2/0,4
43°30 - 44°00 N / 61°30 - 62°00 W	7	21	3,0	20,5/97,6	0,5/2,4	+	-	-	-	+	-
43°30 - 44°00 N / 61°00 - 61°30 W	3	8,5	2,8	8,3/97,2	0,2/2,8	-	-	-	-	-	+
43°30 - 44°00 N / 60°30 - 61°00 W	2	1	0,5	1,0/100,0	-	+	-	-	-	+	-
43°30 - 44°00 N / 60°00 - 60°30 W	13	39,5	3,0	37,9/96,0	1,6/4,0	-	-	-	-	-	+
43°30 - 44°00 N / 59°30 - 60°00 W	25	141	5,6	139,5/98,9	-	-	1,4/1,0	-	0,1/0,1	-	+
43°30 - 44°00 N / 59°00 - 59°30 W	4	32	8,0	24,3/76,0	-	-	2,8/8,7	-	4,9/15,3	+	+
43°00 - 43°30 N / 59°30 - 60°00 W	13	66	5,1	63,0/95,5	3,0/4,5	-	+	-	-	-	-
43°00 - 43°30 N / 60°00 - 60°30 W	31	111	3,6	110,8/99,8	-	-	-	0,2/0,2	-	-	-
43°00 - 43°30 N / 60°30 - 61°00 W	32	90,9	2,8	90,3/99,9	0,3/+	0,3/+	-	-	-	-	+
43°00 - 43°30 N / 61°00 - 61°30 W	30	126,8	4,2	91,5/72,2	10,0/7,8	20,5/16,2	4,8/3,8	-	-	-	-
43°00 - 43°30 N / 61°30 - 62°00 W	24	102,6	4,3	95,5/93,1	-	-	4,0/3,9	-	-	-	3,1/3,0
43°00 - 43°30 N / 62°00 - 62°30 W	13	48,5	3,7	46,5/95,8	-	-	-	-	-	1,0/2,1	1,0/2,1
43°00 - 43°30 N / 62°30 - 63°00 W	6	32,5	5,4	30,0/92,3	-	1,0/3,1	-	-	-	1,5/4,6	-
43°00 - 43°30 N / 63°00 - 63°30 W	6	13,5	2,3	13,0/96,3	-	-	-	-	-	0,5/3,7	+
42°30 - 43°00 N / 61°00 - 61°30 W	1	7	7,0	7,0/100,0	-	+	-	-	-	-	-
42°30 - 43°00 N / 61°30 - 62°00 W	41	147,0	3,6	145,0/98,6	0,8/0,5	+	0,2/0,2	-	-	+	1,0/0,7
42°30 - 43°00 N / 62°00 - 62°30 W	125	643,7	5,2	631,0/98,0	1,7/0,3	-	1,0/0,2	-	9,5/1,4	+	0,5/0,1
42°30 - 43°00 N / 62°30 - 63°00 W	234	987,0	4,2	986,8/99,9	-	-	-	-	-	-	0,2/+
42°30 - 43°00 N / 63°00 - 63°30 W	27	81,5	3,0	68,3/83,8	1,2/1,5	-	0,9/1,1	-	8,1/9,9	3,0/3,7	-
TOTAL in %	825	3296,2/100	3,9	3180,5/96,3	33,4/1,1	21,9/0,6	19,2/0,6	1,3/0,1	27,0/0,8	6,9/0,2	6,0/0,3

x) - in all tables the numerator indicates a catch of each species in t, the dominator indicates that in % of the total catch in Square 30°L x 30°L.

Table 2. Change in specific composition of catches in the course of the specialized fishery of herring by Squares 30°L x 30°L in Subarea 5

Positions of Squares 30°L x 30°L	No. of trawlings	Total catch in t	Catch per trawling t	s p e c i e s						
				herring	macke-rel	spiny dogfish	argen-tine	hake	Gadidae	Other
42°00 - 42°30 N / 66°30 - 67°00 W	15	218,0	14,5	205,0/94,0	1,0/0,5	11,0/5,0	1,0/0,5	-	-	+
42°00 - 42°30 N / 67°00 - 67°30 W	18	195,5	10,9	193,5/99,0	2,0/1,0	+	-	-	-	-
42°00 - 42°30 N / 68°30 - 69°00 W	10	56,0	5,6	55,0/98,2	-	-	-	-	-	1,0/1,8
42°00 - 42°30 N / 69°00 - 69°30 W	4	60,0	15,0	60,0/100,0	-	-	-	-	-	-
41°30 - 42°00 N / 69°30 - 70°00 W	45	542,0	12,0	540,0/99,6	0,5/0,1	0,5/0,1	-	1,0/0,2	-	+
41°30 - 42°00 N / 69°00 - 69°30 W	53	465,0	8,8	456,0/98,1	3,0/0,6	4,0/0,9	-	2,0/0,4	-	+
41°30 - 42°00 N / 68°30 - 69°00 W	284	2560,0	9,0	2546,0/99,4	4,0/0,2	7,0/0,3	-	3,0/0,1	-	+
41°30 - 42°00 N / 68°00 - 68°30 W	7	48,0	6,9	46,0/95,8	1,0/2,1	+	-	1,0/2,1	+	+
41°30 - 42°00 N / 67°30 - 68°00 W	1	7,0	7,0	7,0/100,0	+	-	-	-	+	-
41°30 - 42°00 N / 66°30 - 67°00 W	3	14,0	4,7	13,0/92,9	1,0/7,1	-	-	-	-	-
41°30 - 42°00 N / 66°00 - 66°30 W	3	17,0	5,7	16,0/94,1	1,0/5,9	-	-	-	-	+
41°00 - 41°30 N / 68°30 - 69°00 W	48	453,0	9,5	450,0/99,4	1,0/0,2	2,0/0,4	-	-	-	-
41°00 - 41°30 N / 69°00 - 69°30 W	23	217,0	9,4	217,0/100,0	+	+	-	-	-	-
T O T A L	514	4852,5	9,4	4804,5	14,5	24,5	I	7	+	I
in %%		100		99,I	0,3	0,5	+	0,I	+	+

Table 3. Change in specific composition of catches in the course of the specialized fishery of mackerel by Squares 30°L x 30°L in Subarea 5 and Statistical Area 6

Positions of Squares 30°L x 30°L	No.of trawl-ings	Total catch in t	Catch per traw.t	mackerel	herring	hake	burbot	spiny dogfish	eelpout	Other
41°00 - 41°30 N / 66°00 - 66°30 W	2	5	2,5	4,5 / 90,0	+	+	0,5 / 10,0	+	-	-
41°00 - 41°30 N / 66°30 - 67°00 W	8	32	4,0	31,0 / 96,8	0,5 / 1,6	0,5 / 1,6	-	-	-	-
41°00 - 41°30 N / 67°00 - 67°30 W	3	12	4,0	10,0 / 83,2	2,0 / 16,8	+	-	+	-	-
41°00 - 41°30 N / 69°30 - 70°00 W	12	135	11,2	128,0 / 94,8	4,0 / 3,0	2,0 / 1,5	-	1,0 / 0,7	-	-
41°00 - 41°30 N / 70°00 - 70°30 W	7	65	9,3	65,0 / 100,0	+	-	-	-	-	-
40°30 - 41°00 N / 71°30 - 72°00 W	19	150	7,9	148,0 / 98,6	2,0 / 1,4	-	-	-	-	-
40°30 - 41°00 N / 71°00 - 71°30 W	17	71	4,2	69,0 / 97,2	-	-	-	1,5 / 2,1	0,5 / 0,7	+
40°30 - 41°00 N / 70°30 - 71°00 W	9	95,5	10,6	95,5 / 100,0	-	-	-	-	-	-
40°30 - 41°00 N / 70°00 - 70°30 W	11	53	4,8	48,0 / 90,6	1,5 / 2,8	0,5 / 0,9	-	2,0 / 3,8	-	1,0 / 1,9
40°30 - 41°00 N / 69°30 - 70°00 W	6	68	11,3	67,0 / 98,6	-	-	+	0,5 / 0,7	0,5 / 0,7	+
40°30 - 41°00 N / 69°00 - 69°30 W	30	289	7,6	289,0 / 100,0	-	-	-	+	-	+
40°30 - 41°00 N / 68°30 - 69°00 W	83	664	8,0	664,0 / 100,0	+	-	-	-	-	-
40°30 - 41°00 N / 68°00 - 68°30 W	66	830	12,6	830,0 / 100,0	-	-	-	-	-	-
40°30 - 41°00 N / 67°30 - 68°00 W	36	628	17,4	624,0 / 99,2	-	3,0 / 0,6	+	1,0 / 0,2	-	-
40°30 - 41°00 N / 67°00 - 67°30 W	8	162,5	20,3	155,0 / 95,4	0,5 / 0,3	7,0 / 4,5	-	+	-	+
40°30 - 41°00 N / 66°30 - 67°00 W	5	25	5,0	24,5 / 98,0	-	-	-	+	0,5 / 2,0	+
40°00 - 40°30 N / 68°30 - 69°00 W	50	451	9,0	439,0 / 97,3	12,0 / 2,7	-	-	-	-	-
40°00 - 40°30 N / 69°00 - 69°30 W	35	252,3	7,2	247,0 / 97,9	1,0 / 0,4	1,8 / 0,7	-	2,5 / 1,0	-	+
40°00 - 40°30 N / 69°30 - 70°00 W	31	195,0	6,3	194,0 / 99,5	1,0 / 0,5	+	-	+	-	-
40°00 - 40°30 N / 70°00 - 70°30 W	37	199,0	5,4	199,0 / 100,0	-	-	-	-	-	+
40°00 - 40°30 N / 70°30 - 71°00 W	29	280,5	9,8	279,2 / 99,5	1,3 / 0,5	-	-	+	-	+
40°00 - 40°30 N / 71°00 - 71°30 W	45	484,0	10,7	481,0 / 99,4	1,0 / 0,2	-	-	2,0 / 0,4	-	-
40°00 - 40°30 N / 71°30 - 72°00 W	1	3,0	3,0	2,5 / 83,4	-	-	-	0,5 / 16,6	-	-
40°00 - 40°30 N / 72°00 - 72°30 W	5	66,0	13,2	65,0 / 98,5	-	-	-	1,0 / 1,5	-	+
40°00 - 40°30 N / 72°30 - 73°00 W	26	161,0	6,2	155,0 / 97,2	-	-	-	5,0 / 2,8	-	1,0 / 0,6
40°00 - 40°30 N / 73°00 - 73°30 W	15	55,0	3,7	49,0 / 89,1	-	1,0 / 1,8	-	4,0 / 7,3	-	1,0 / 1,8
39°30 - 40°00 N / 73°30 - 74°00 W	2	32,0	16,0	32,0 / 100,0	-	-	-	+	-	-
39°30 - 40°00 N / 73°00 - 73°30 W	3	27,0	9,0	26,0 / 96,3	-	-	-	1,0 / 3,7	-	-
39°30 - 40°00 N / 72°30 - 73°00 W	4	43,0	10,8	43,0 / 100,0	+	-	-	-	-	-
39°30 - 40°00 N / 72°00 - 72°30 W	2	8,0	4,0	8,0 / 100,0	-	-	-	-	-	+
39°00 - 39°30 N / 73°00 - 73°30 W	4	28,0	7,0	28,0 / 100,0	-	-	-	+	-	-
39°00 - 39°30 N / 73°30 - 74°00 W	6	50,0	8,3	50,0 / 100,0	+	-	-	+	-	-
39°00 - 39°30 N / 74°00 - 74°30 W	2	33,0	16,5	32,0 / 97,0	-	+	-	1,0 / 3,0	-	-
38°30 - 39°00 N / 74°30 - 75°00 W	3	12,0	4,0	9,0 / 75,0	-	-	-	3,0 / 25,0	-	-
38°30 - 39°00 N / 74°00 - 74°30 W	1	1	1	1,0 / 100,0	-	-	-	-	-	+
38°00 - 38°30 N / 74°30 - 75°00 W	3	37	12,3	36,0 / 97,3	-	-	-	-	-	1,0 / 2,7
37°30 - 38°00 N / 75°00 - 75°30 W	2	30	15,0	27,0 / 90,0	-	-	-	-	3,0 / 10,0	-
37°30 - 38°00 N / 74°30 - 75°00 W	1	3	3,0	3,0 / 100,0	-	-	-	+	-	+
T O T A L	629	5735,8	9,12	5658,2	26,8	15,8	0,5	29	1,5	4,0
in %%	-	100	-	98,6	0,5	0,3	+	0,5	+	0,1

Table 4. Change in specific composition of catches in the course of the specialized fishery of silver hake by Squares 30°L x 30°L in Subarea 5 and Statistical Area 6

Positions of Squares 30°L x 30°L	No.of trawlings	Total catch in t	Catch per trawl. in t	hake	mackerel	herring	burbot	Gadidae	eel-pout	spiny dogfish	lobsters	Other
42°00 - 42°30 N / 65°30 - 66°00 W	2	7,5	3,7	7,3/97,3	-	-	-	0,2/2,7	-	-	-	-
42°00 - 42°30 N / 66°00 - 66°30 W	13	69,0	5,3	66,0/95,7	-	-	-	1,0/1,4	-	-	-	2,0/2,9
42°00 - 42°30 N / 66°30 - 67°00 W	7	42,7	6,1	39,0/91,4	-	1,7/4,0	1,0/2,3	+	-	-	1,0/2,3	-
42°00 - 42°30 N / 67°00 - 67°30 W	3	5,0	1,7	3,8/76,0	-	1,0/20,0	-	0,2/4,0	-	-	-	-
42°00 - 42°30 N / 67°30 - 68°00 W	1	2,2	2,2	1,8/81,8	-	-	0,2/9,1	-	-	-	-	0,2/9,1
41°30 - 42°00 N / 68°00 - 68°30 W	2	3,0	1,5	2,1/70,0	-	-	0,6/20,0	+	-	-	-	0,3/10,0
41°00 - 41°30 N / 65°30 - 66°00 W	1	4,0	4,0	4,0/100,0	-	-	-	-	-	-	-	-
41°00 - 41°30 N / 66°00 - 66°30 W	3	10,0	3,3	9,2/92,0	0,8/8,0	-	-	-	-	-	-	-
41°00 - 41°30 N / 66°30 - 67°00 W	5	12,0	2,4	10,0/83,4	1,0/8,3	1,0/8,3	-	-	-	-	-	+
41°00 - 41°30 N / 69°30 - 70°00 W	1	1,0	1,0	1,0/100,0	-	-	-	-	-	-	-	-
40°30 - 41°00 N / 66°30 - 67°00 W	5	25,0	5,0	24,4/97,6	-	-	0,6/2,4	-	-	-	-	-
40°30 - 41°00 N / 67°00 - 67°30 W	8	21,0	2,6	18,0/85,7	1,0/4,8	-	-	-	-	-	2,0/9,5	+
40°30 - 41°00 N / 67°30 - 68°00 W	2	5,0	2,5	4,0/80,0	-	-	0,5/10,0	-	+	-	0,5/10,0	-
40°00 - 40°30 N / 67°00 - 67°30 W	10	55,4	5,5	49,0/88,4	5,7/10,3	-	0,7/1,3	-	-	-	+	+
40°00 - 40°30 N / 67°30 - 68°00 W	4	38,0	9,5	34,0/89,5	3,0/7,9	-	+	-	0,5/1,3	0,5/1,3	+	+
40°00 - 40°30 N / 68°00 - 68°30 W	8	45,0	5,6	40,0/89,0	2,0/4,4	-	+	-	-	2,0/4,4	+	1,0/2,2
40°00 - 40°30 N / 68°30 - 69°00 W	3	8,0	2,7	7,0/87,4	0,5/6,3	-	+	-	-	0,5/6,3	+	-
40°00 - 40°30 N / 69°00 - 69°30 W	5	21,0	4,2	19,0/90,4	1,0/4,8	-	+	-	0,5/2,4	0,5/2,4	+	+
40°00 - 40°30 N / 69°30 - 70°00 W	2	7,0	3,5	6,0/85,6	0,5/7,2	-	0,5/7,2	-	-	-	+	+
39°30 - 40°00 N / 71°30 - 72°00 W	7	32,0	4,6	30,0/93,8	1,0/3,1	-	1,0/3,1	-	+	-	+	+
39°30 - 40°00 N / 72°00 - 72°30 W	12	60,0	5,0	54,0/90,0	2,0/3,3	-	3,0/5,0	-	-	+	1,0/1,7	+
39°00 - 39°30 N / 72°00 - 72°30 W	5	27,0	5,4	24,0/88,9	1,0/3,7	-	1,0/3,7	-	-	+	+	1,0/3,7
TOTAL	109	500,8	4,6	453,6	19,5	3,7	9,1	1,4	1	3,5	4,5	4,5
in %%		100		90,6	3,9	0,7	1,8	0,3	0,2	0,7	0,9	0,9