

Federal Agency for Fisheries of the Russian Federation

**RESULTS OF ECHOINTEGRATION AND TRAWL SURVEYS IN THE
DONUT HOLE DURING NOVEMBER 2003
ABOARD THE SHIP “PIONER NIKOLAYEVA”**

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By

A.I.Glubokov, S.B.Popov

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An echointegration and midwater trawl surveys were made from the vessel “Pioner Nikolayeva” in the deepwater part of the Bering Sea on November 15-27, 2003. These surveys were part of trial fishing made under paragraph 6.7.3. of the Protocol of the Eight Bering Sea Pollock Conference.

The main objective of this work was to monitor the status of pollock stocks in the Aleutian Basin of the Bering Sea.

Description of the vessel, gear and equipment.

BATM “Pioner Nikolayeva” (Fig. 1) was built in 1981 according to Design 1288 (“Pulkovskiy Meridian” type of ship). The length is 103,7 m, maximum weight is 16 m. It has a 7000 h.p. engine (2x3500 h.p.)



Figure 1. BATM “Pioner Nikolayeva”

Fishery objects were caught with midwater trawls of 172/400 and 111/786 type with a horizontal opening of 86 m, vertical opening of 60 m. The codend mesh size is 110 mm. A small mesh was used in the codend (20 mm mesh/2 m opening in diameter) when the survey was conducted. This small-mesh insert was 6 m long. The vessel’s position was determined by Furuno satellite navigation equipment:

GPS plotter GP-3100 mark-2. The vessel was navigated using a TRANSAS videoplotter Navi-Sailor ver 3.2. The on-board fish-finding acoustic equipment (Figure 2) included a Furuno ecosounder FCV-1200 L. (28 khz) and a Simbiya trawl sound Si-1010 (50 khz).



Figure 2. The on-board fish-finding acoustic equipment.

There were measuring mechanical boards (up to 105 kg) and electronic scales (up to 30 kg, with rolling compensator) on board the vessel for conducting scientific research.

This study of hydrobionts included a trawl survey with a midwater trawl comprising 13 hauls of 60-70 minutes each, and an echointegration survey in the deepwater part of the Bering Sea (in total the duration of tacks in the Donut Hole was 1331,4 miles, in the Aleutian Basin within the Russian EEZ – 254,5 miles).

The surveys were made during twenty four hours.

The results of the midwater trawl and echointegration surveys in the Aleutian Basin of the Bering Sea.

“Pioner Nikolayeva” crossed the border of the EEZ of the Russian Federation on November 15 at 58°50’5 N, 178°00’5 E (Fig. 3). The operations in the Donut Hole ended at 56°26’7 N, 174°11’0 E on November 25.

On November 26-27 the echointegration survey was continued in the north-west of the Aleutian Basin within the EEZ of the Russian Federation.

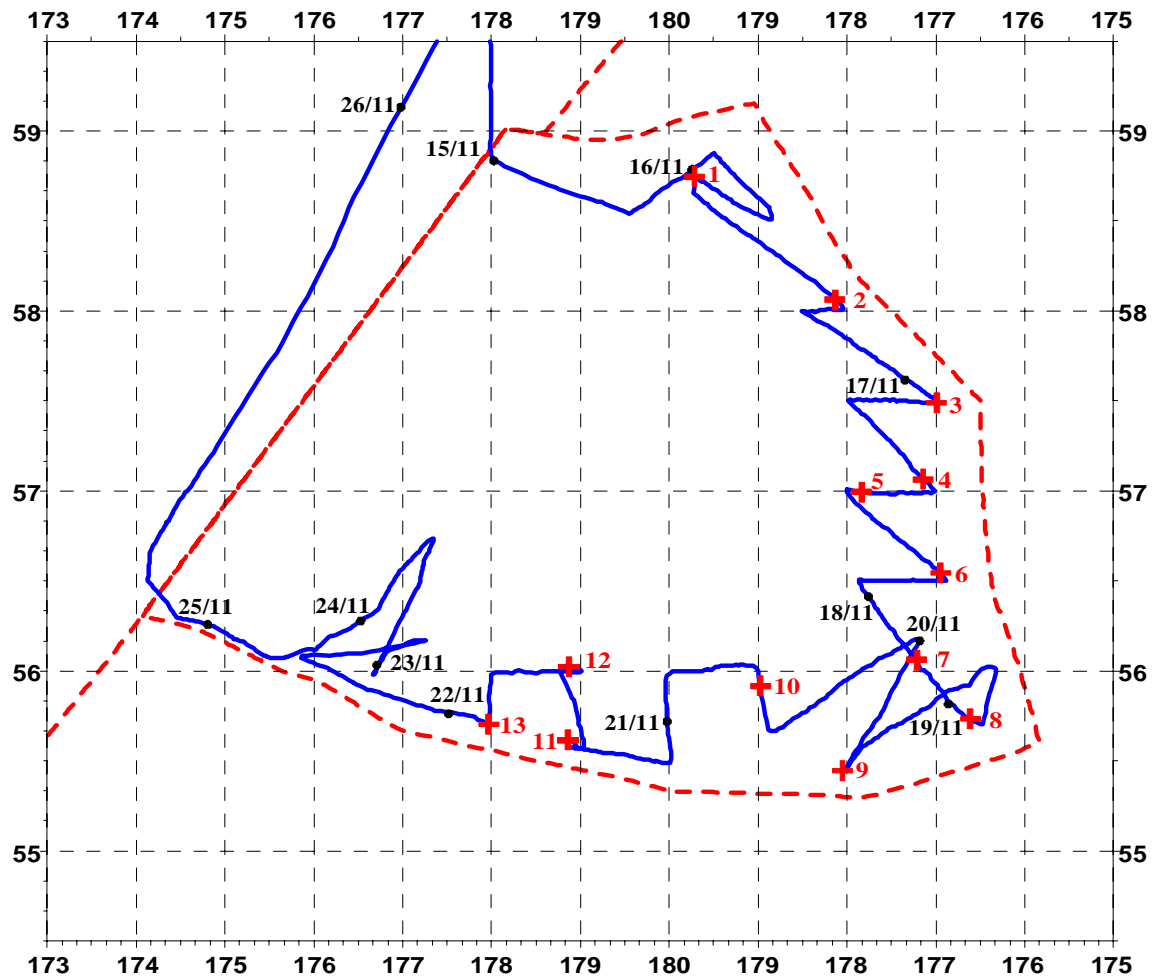


Figure 3. Map of tacks in the echointegration survey, and sites of trawlings in the Donut Hole and Aleutian Basin (haul sites marked red).

Initially in the course of survey the vessel moved south-east making tacks along the East Bering Sea shelf. Then it turned westwards and conducted research along the Aleutian Chain. “Pioner Nikolayeva” left the Donut Hole at its southwestern most point to continue the echointegration survey in the Aleutian Basin within the RF EEZ. Stormy weather on November 15, 19, 20, 22-25 made the vessel to take a winding course along the boundary inside the Donut Hole since it could not make hauls.

The layer between 0 and 500 m was examined during the echointegration survey. No pollock was recorded throughout all the tacks either on the Donut hole or within the 200-mile zone of RF. Figures 4 and 5 present the most typical echorecordings. They found some near-surface concentrations of jelly-fish and, probably, mesopelagic fish in all the tacks.



Figure 4. Morning time echogram (November 16, 2003, 11.18 a.m., 58°39’3 N, 179°43’7 W).

The hauls in the Donut Hole were within the surface to 310 m layer (position of the lower rope). Since in the late 1980-s and early 1990-s, i.e. the peak period for the number of pollock at the deepwater parts of the Bering Sea, it was exclusively fast-swimming adult pollock of 4+ years that occurred in catches, the

hauls of the 2003 survey were made at the highest possible speed of 4,5-5,1 knots. When the waves were over point 3 the towing speed had to be slower down to 3,2 knots.

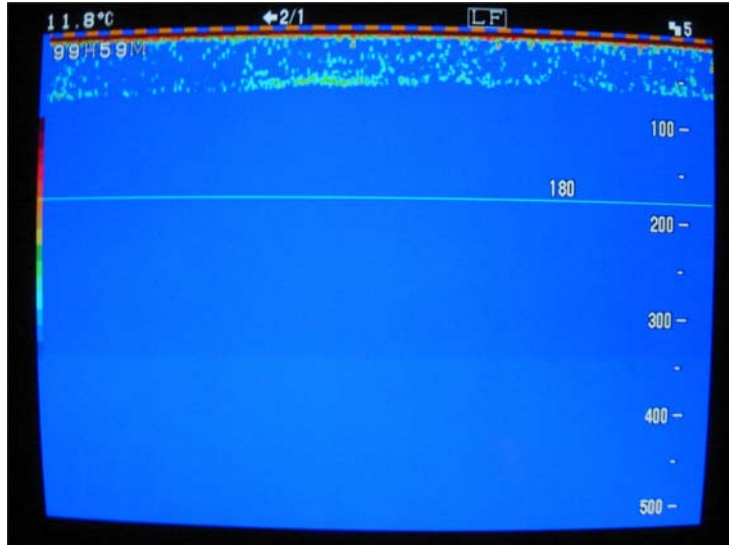


Figure 5. Night time echogram (November 18, 2003, 03.00 a.m., 56°03'7 N, 177°12'8 W).

Representatives of 10 fish species, as well as Commander squid and jellyfish were caught in 13 hauls (Table 1).

Pollock was recorded only in one haul near the central eastern part of the Donut Hole boundary at 56°59'6 N, 177°54'8 W within 120-180 m (tow 5). It was a mature female with gonades at maturity stage VI_{II-III}.

The results of studies made in 1998-2003 show that in all the recent years pollock was found exclusively in the east of the Aleutian Basin (Fig. 6, Table 2). The maximum catch of pollock in the Donut Hole taken throughout these years was recorded by chinese fishermen in May-June 2000: 43 individuals from 4 hauls (Table 2). Hence, there has been only sporadic occurrence of individual pollock in the Aleutian Basin in recent years. No mass concentrations were observed.

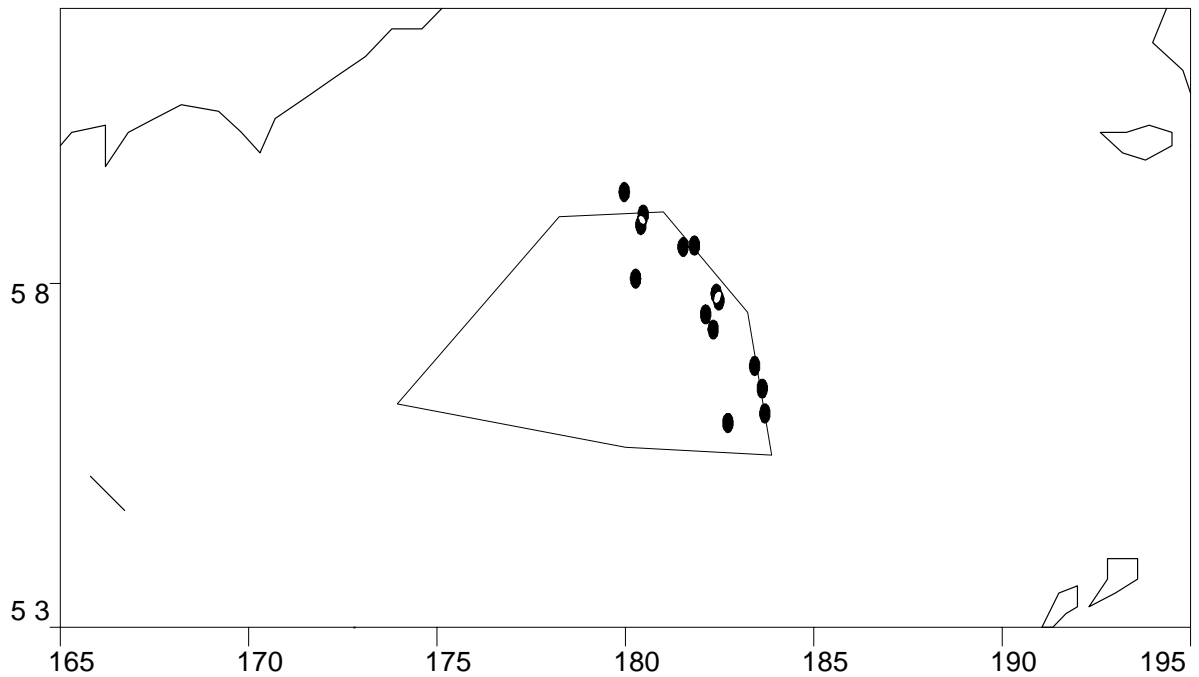


Figure 6. Capture location sites of pollock in the Donut Hole, 1998-2001.

Smooth lumpsucker was the most frequent fish species found in catches. Totally, 46 individuals of that species were taken. Two atka mackerel were found in the south of the Donut Hole at $55^{\circ}27'7''$ N $177^{\circ}59'2''$ W and $55^{\circ}36'3''$ N $178^{\circ}57'9''$ E.

Three species of mesopelagic fish were numerous in trawl wing meshes at night.

Table 1.

Species composition and characteristics of catches in the Donut Hole,
November 16-21, 2003.

Family	Species	Number of hauls with fish	Number of individual fish caught	Frequency of occurrence, %	Layer (m)	Time of the day	Length (cm) <u>min/max</u> average	Weight (g) <u>min/max</u> average
In trawl								
<i>Gadidae</i>	<i>Theragra chalcogramma</i> , pollock	1	1	7.7	120-180	day	65.1	1590
<i>Cyclopteridae</i>	<i>Aptocyclus ventricosus</i> , smooth lump sucker	10	46	76.9	50-260	24 h.	<u>11-34</u> 21.0	<u>110-3200</u> 1010
<i>Zaproridae</i>	<i>Zaprora silensis</i> , prowfish	4	7	30.8	50-170	24 h.	<u>19-30</u> 22.7	<u>105-305</u> 184
<i>Hexagrammidae</i>	<i>Pleurogrammus monopterigiis</i> , atka mackerel	2	2	15.4	120-225	day	<u>38-43</u> 40.5	<u>595-720</u> 658
<i>Petro-myzontidae</i>	<i>Lampetra japonica</i> , arctic lamprey	1	2	7.7	50-110	night	<u>45-47</u> 46	193
<i>Salmonidae</i>	<i>Oncorhynchus nerka</i> , sockeye	1	1	7.7	80-140	day	49	1220
	<i>Salvelinus sp.</i> , char	1	1	7.7	80-140	day	22	95
Commander squid		3	4	23.1	80-175	day	<u>25-38</u> 33.7	<u>300-660</u> 532
Jellifish		-	nx10	-	-	-	-	-
In mesh								
<i>Myctophidae</i>	<i>Stenobrachius leucopsarus</i> , lantern fish	6	nx100	100.0	-	night	3-10	1-8
<i>Bathylagidae</i>	<i>Leuroglossus schmidti</i> , smooth tongue	3	nx10	50.0	-	night	5-16	-
<i>Chauliodontidae</i>	<i>Chauliodus macouni</i> , pacific viperfish	2	nx100	33.3	-	night	9-20	-
Young commander squid		10	nx10, nx100	76.9	-	24 h.	3-16	-

Table 2.

Results of pollock researches in the Donut Hole, 1998-2001.

Year	Time	Country, Vessel	Type of work	Layer fished, m	Results	Area
1998	03.09- 08.09	Poland, Akamar	Echointegration survey; 820 miles tacks; 5 hauls	100- 230	No pollock recorded 2 ind. pollock (>60 cm)	Donut North part
1999	29.04- 03.05	Poland, Akamar	Echointegration survey; 744 miles tacks; 5 hauls	90-390	No pollock recorded 2 ind. pollock (59, 61 cm)	Donut Southeast, Northeast parts
1999	23.05- 17.06	Korea, Tamgu-1	Echointegration survey; 1 hauls		No pollock recorded or caught	Donut
1999	17.08- 30.08	Poland, Homar	Echointegration survey; 1700 miles tacks; 10 hauls	30-180	No pollock recorded 2 ind. pollock (47, 55 cm)	Donut Centraleast part
2000	20.03- 27.03	Korea, Tamgu-1	Echointegration survey		No pollock recorded	Donut
2000	20.05- 28.06	China, Kai Chuang	Echointegration survey; 4 hauls	40-190	No pollock recorded 43 ind. pollock (45-56 cm)	Donut North, Northeast parts
2001	07.06- 14.07	China, Kai Tuo	Echointegration survey; 7 hauls	50-250	No pollock recorded 16 ind. pollock (59-61 cm)	Donut North, Northeast parts