Investigations on Eastern Gray Whales *Eschrichtius robustus* (*Lilljeborg, 1861)*, taken in Mechigmensky Bay, 2007-2008

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ABSTRACT
Key words: Gray whale, distribution, number, harvest, sex-age and size structure, physiological state, fatness index, prey structure

In 2007-2008**,** significant variation**s** in number of Gray whales present in Mechigmen Bay as well as their irregular distribution were found.
Aboriginal harvest data analysis has shown irregular distribution of whales in different physiological state: in the western part of the Bay small immature animals were feeding, in the eastern part – mature whales mostly.
Information on Gray Whale biology coming annually from harvests in Mechigmen Bay can not answer all questions about population parameters such as abundance and distribution. However**,** nutritional state and prey analysis of examined animals evidence stable feeding conditions for Gray Whales along the Chukotka Peninsula in the recent years.

Результаты исследования серого кита (*Eschrichtius robustus*) восточной популяции у берегов Чукотского полуострова в 2007-2008 гг.

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РЕФЕРАТ
СЕРЫЙ КИТ, РАСПРЕДЕЛЕНИЕ, ЧИСЛЕННОСТЬ, ВСТРЕЧАЕМОСТЬ, ПРОМЫСЕЛ, ПОЛОВОЗРАСТНОЙ И РАЗМЕРНЫЙ СОСТАВ, ФИЗИОЛОГИЧЕСКОЕ СОСТОЯНИЕ, ПИТАНИЕ, УПИТАННОСТЬ
Проведенные в 2007-2008 гг. исследования подтвердили факт существенного колебания числа серых китов и неравномерность их распределения в Мечигменском заливе.
Анализ промысловых данных 2007-2008 гг. показал неравномерное распределение китов разного физиологического состояния по акватории залива: в западной части кормятся преимущественно молодые животные, в восточной части – половозрелые киты.
Собираемая ежегодно информация по биологической характеристике китов, добываемых в Мечигменском заливе, не позволяет делать какие-либо выводы по состоянию численности и другим параметрам популяции серого кита. Однако характер упитанности добытых и осмотренных нами животных может свидетельствовать о стабильных условиях нагула серого кита у берегов Чукотского полуострова на протяжении последних лет.

Many of ecology aspects, such as distribution and feeding of Gray whale in the Russian Far East waters are well studied. It is known also that the majority of them spend summer and fall seasons in the northern Bering Sea and southern Chukchi Sea (Rice a. Wolman, 1971), travelling between regions looking for abundant prey. The water area of constant presence of Gray whales off Chukotka Peninsula is Mechigmensky Bay, where they appear in June after ice melting and stay up to ice consolidation in November. Our researches conducted from 1984 have shown that the number Gray whales present in the coastal waters of the bay varies significantly not only throughout a season, but also between years (Blokhin, 1986a,b; 1996). In 2007-2008**,** we continued Gray whale investigations in the area that were interrupted in 2001. Unfortunately,

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only small part of the bay close to Lorino Village was covered by coastal observations. Therefore, it is not possible to learn of the distribution and numbers of animals in the whole area of the bay. And by this reason in 2008 we made the first experimental vessel survey of Gray whales in Mechigmensky Bay to check out a possibility to receive appropriate data on marine mammals' distribution and numbers at whole water area of the bay using aluminum whaling boat.

Since 1969, Gray whales off Chukotka Peninsula were harvested on the whaling vessel "Zviozdniy". Annually the biggest number of animals was harvested for Lorino village at Mechigmensky Bay coast (Blokhin, 1984, 1999). Considering this, we chose Lorino as the main point to collect harvest monitoring data. After shifting the harvest from commercial to traditional in 1994 (Blokhin, 1999), the areas where whales were harvested and monitored significantly converged.

The main goal of our investigation was to collect data on sex, age and size structure and to estimate the physiological state of animals summering in Mechigmensky Bay. It was also important to determine conditions of Gray whale foraging in the bay and to collect data on unknown biological aspects. Results of this study can help to determine possible changes in structure and numbers of Gray whales that summers off Chukotka Peninsula.

MATERIAL AND METHODIC

Visual surveys on Gray whales were conducted in Mechigmensky Bay coastal waters from July to October (Fig. 1). We observed the animals from the coast that was 25 meters (82 ft) high above the sea. From that view point in normal weather conditions, a whale blow could be seen at the distance up to 10 km (5.4 nautical miles). Thus, only small part of Mechigmensky Bay coastal waters within a radius about 10 km (5.4 miles) was covered by observation. The research area was divided into 5 sectors (Fig. 1). The sea was scanned in the morning and only when the weather was perfect (waves up to 1-2 balls and full visibility). Observations were made with Steiner Skipper 7x50 binoculars with HD stabilized compass and lasted for 40-50 minutes.

The vessel survey of marine mammals took place on 24th of July, 2008 and covered the whole area of Mechigmensky Bay (Fig. 2). We used the aluminum whaling boat rented in the agricultural State Farm "Keper" (Lorino village) with Yamaha 150 HP outboard engine (Fig. 3).

The boat was navigated in Mechigmensky Bay with the help of GPS Garmin 12 according to the worked out scheme of transects (Fig. 2). We maintained the speed of 23 km/hour (12.4 naut.miles/hour). The distance between fore-and-aft transects was about 8-9 km (4.3-4.9 naut.miles). The observation team included one marine biologist and two experienced whalers from Lorino village.

The weather during the vessel survey was perfect, with waves under 1 ball and 100% visibility. Water surface was scanned by naked eye. The observer who had noticed whales determined their approximate number, distance to them and position towards the boat, while the course of the boat following a transect was maintained. Animal's location in GPS coordinates and other data were recorded to a dictaphone and then downloaded on a portable computer and analyzed. The survey lasted for about 7 hours (from 7:15 am to 2:15 pm) and was funded by ChukotTINRO.

Examination of harvested Gray whales was conducted in Lorino village (Chukotsky District of Chukotka Autonomous Okrug, Russia; Fig. 1). The majority of landed whales were hunted in 3 separate areas of the bay: eastern (E), central (C) and western (W) (Fig. 1). All whales were investigated when cut in vicinity of Lorino village.

We collected the following data from each animal:

1. Sex;
2. Zoological length (from the snout to fluke crotch by projection);
3. Weight and size of ovaries and testes;
4. Physiological state (males with the body length ≥ 11.1 m (36.4 ft) and females 11.5 m (37.7 ft) and longer were regarded as mature);

5. Stomach fullness (full, half-full, with few food remains, empty);
6. Blubber thickness (without skin) at the level of fin;
7. Chin patches' number;
8. Presence and size of a "Sebaceous gland";
9. Morphometry measurements "Snout-eye" and "Fin girth and length";
10. Presence of unusual smell and taste of blubber and meat.

In 2007 we investigated 39, and in 2008 - 29 landed Gray whales. Besides in 2007**,** whale stomach content was sampled (150-200 ml from the content of each stomach in formalin).

In 2007, body parts of 3 immature Gray whales were weighed on 500 kg scales with a minimum scaling factor 1 kg.

One of important parameters to characterize the feeding conditions on the Gray whale foraging grounds is fatness index, i.e. blubber thickness related to whale length. Gray whale yearlings are known to have the highest fatness index (Blokhin, 1999b) if compare to the whales of other ages and body conditions (except pregnant females). Sufficient variations in the body length of young animals cause difficulties in telling yearling from the others on the basis of their size only. We have suggested the way to make distinguishing more reliable. We regarded as yearlings the whales less than 9 meters (29.5 ft) long and without light oval/round skin spots after ectoparasites. We also took into account the fatness index, which often exceeds 1% for yearlings (Blokhin, 1999b).

RESULTS AND DISCUSSION

Gray whale numbers and distribution

Coastal counts

In Mechigmensky Bay coastal waters Gray whales were constantly present in 2007-2008. However, their number varied throughout the surveys. Thus, the average number of whales per count was almost equal in July and September, 2008 (8 and 7, respectively); while in August it decreased to 4.2 animals (Table 1). In 2007**,** the minimum of Gray whales was observed in September (Table 1). Although small number of whales in the bay, the sightings' number changed significantly during several days. For instance, on 27th of July, 2007 we recorded 15 animals, on 30th – 3, and on 17th and 18th of August – 18 and 1 whale correspondingly. The increase in Gray whales numbers was noticed in October both in 2007 and 2008 (Table 1). The average number of whales per one count was almost equal in 2007 and 2008 (6.9 and 6.6, respectively).

Gray whale distribution in Mechigmensky Bay coastal waters was also uneven and varied in different months: the majority of whales stayed in 4th and 5th sectors in July, 2008 (70.8%) and in 3rd sector in October, 2008 (71.4-86.7%).

Analyzing the general pattern of Gray whale distribution in Mechigmensky Bay, we can conclude that in July-October, 2007-2008 the animals were more regularly observed in 2nd and 3rd sectors (80 and 74%%, respectively, Fig. 4). Besides the majority of them stayed further than 5-6 km offshore.

Gray whales in the bay followed some general pattern of behavior. They did not travel on long distances staying in one site, were diving periodically showing flukes and feeding.

Thus**,** our coastal surveys in 2007-2008 proved significant variations in Gray whale numbers and their irregular distribution in Mechigmensky Bay coastal waters (Blokhin, 1984b, 1996). Slight increase of animals number in October, 2007 and the significant growth of their number in October, 2008 might be connected with the beginning of Gray whales migration from northern summering grounds through Mechigmensky Bay. In general, the number of whales' sightings in Mechigmensky Bay coastal waters was almost equal in 2007 and 2008. Though a smaller number of whales in immediate proximity to the coast of Lorino village in the years of 1994-1996, 2000 and 2007-2008 was found (Table 1).

The behavior of Gray whales in 2007-2008 was typical for feeding animals and similar to that, observed in the previous seasons. To all appearances, this water area is an important

foraging ground for Gray whales.

Vessel survey

During the vessel survey in Mechigmensky Bay**,** 123 Gray whales, 4 Minke whales (*Balaenoptera acutorostrata*) and one seal (unknown species) were counted (Fig. 2).

Gray whales were found almost everywhere in the bay, but their highest concentration was registered in the north-eastern and south-western parts, to the south from CC. Kriguygun and Holiuskin (Fig. 2). The fluke showings have evidenced whales' feeding in this area. Vessel survey data analysis has proved the effectiveness of animal counts from an aluminum whaling boat. Besides, such surveys are relatively cheap. Therefore, we suppose that it is possible and important to conduct the vessel counts several times during the whaling season. The data collected in such way can be used for Gray whale number, distribution and behavior assessment in Mechigmensky Bay.

Investigation of landed whales

Morphophysiological features

Physiological features of Gray whales harvested in Mechigmensky Bay varied a lot. For example, in 2007 females dominated (61.5%); the majority of them (87.5 %) were immature and about half of them were yearlings (Table 2). In 2008**,** sex ratio was almost equal; immature animals made up 42.9 % from the total of caught whales. The percentage of female yearlings (14.3%) in 2008 was lower than in 2007 (Table 2). The average size of females varied between years: it was 9.3 m in 2007 and 11.0 m in 2008. Subadults dominated among males too; their percentage increased in 2008 (Table 2).

Bigger whales from size group 12.1-13.0 m were more often harvested in 2008 (27.5%) in comparison with 2007 (10.3%, Table. 3).

In 2007**,** Gray whales were hunted mainly in the western part of the bay, while in 2008 they were harvested throughout the whole area (Fig. 5). The smallest whales were caught in the western part and therefore there was the highest percentage of subadults and yearlings among them (Fig. 5).

Harvest monitoring data (Fig. 5, IV-V) also confirmed the uneven distribution of different-sized whales in Mechigmensky Bay. Domination of immature animals in the western part of the bay is determined, first of all, by its shallow waters. The first months and years of their life benthophages Gray whales may favor areas with small depths and better feeding conditions.

Among 11 examined mature females 4 were pregnant; the sex and size of their embryos were as follows: 2007 - female 150 cm (16th of August), male 190 cm (5th of September); 2008 - female 234 cm (4th of September) and female 270 cm (16th of September).

Stomach fullness and fatness index

The number of Gray whales with full stomachs decreased significantly in 2008 and the total frequency of such stomach states as 'empty' and 'few' grew respectively from 2.7% to 42.8% (Fig. 6).

As subadults made the majority of whales in the harvests we discuss the fatness index data of only this age category. Yearlings are known to have the highest fatness index in summer in comparison with the other age groups (Blokhin, 1999a) and this was confirmed by 2007-2008 monitoring data (Fig. 5). The fatness of yearlings and subadult whales varied between years; however, those variations did not show any directed trend in the last 10 years (Fig. 7). This can also evidence relatively stable feeding conditions for the discussed age group of Gray whales in the Chukotka Peninsula coastal waters.

"Stinky" whales

Recently**, the** problem of "stinky" Gray whales harvested in Chukotka Peninsula sea waters has been discussed actively, because their blubber and meat have specific medicine scent and taste (Ilyashenko, 2007; Rowles, Ilyashenko, 2007) and eating them causes poisoning. "Stinky" Gray whales were documented in previous years, however not much attention was paid to this phenomenon. Since 2004**,** data on "stinky" Gray whales from harvests were collected

annually.

Analysis of available data cannot provide any information on correlation between the presence of unusual scent/taste on the one side and the sex, size of whale and the time of whaling on the other (Table 4). Besides there is a noteworthy data of "stinky" Gray whale yearlings, harvested in 2007-2008, as they got unusual scent/taste with mother's milk or with soil and food consumed from the bottom exactly in the Chukotka Peninsula coastal waters.

It is also worth mentioning that the number of "stinky" Gray whales (8) harvested in Mechigmensky Bay in 2008 is relatively high (Table 4). If compare to the "stinky" whales examined in the previous years, the meat and blubber of animals in 2008 had no such strong smell; however, their unusual taste became evident after their consumption.

Data on different organic compounds in "stinky" Gray whales, as well as suggestions concerning the reasons of unusual smell were published in 2 papers in 2007 and presented to SC IWC (Ilyashenko, 2007; Rowles, Ilyashenko, 2007). This problem has not been completely resolved, but the authors emphasized the importance of such investigations and we absolutely agree with them.

Prey structure

In the samples from Gray whale stomach content 12 taxonomic groups of animals were found. The first place, both by biomass and frequency of occurrence, took Amphipods (52.5 and 77.3%%), the second – Polychaeta (36.3 and 72.7%%). The percentage of other groups was much lower (Table 5).

Amphipods fauna from stomachs of Gray whales, harvested in Mechigmensky bay was presented by 49 species from 2 suborders Gammaridea and Caprellidea, from 12 families and 22 genuses (Table 6). Among all species only 4 from Lysianassidae and Ampeliscidae had specific biomass in the sample more than 10%. The biggest portion in Gray whale feeding in Mechigmensky bay had 2 species Anonyx nugax (biomass and frequency – 34.5 and 66.7%%) and Ampelisca macrocephala (20.1 and 69.1%%); two other species - Hippomedon denticulatus orientalis (11.1 and 21.4%%) and Ampelisca eschrichti (10.5 and 42.7%%) – were less significant.

Such species as Psammonyx kurilicus (52.4%), Photis fischmanni (28.6%), Pontoporeia femorata (26.2%), Atylus bruggeni (23.8%), Boecosimus derugini (23.8%) were frequently met in Gray whale prey structure, but their specific biomass was less than 10% (Table 6).

Weight-dimensional parameters of organs and body parts of Gray whale

Weighing of 3 Gray whales has shown that blubber and skin make up about 30%, a skeleton – 24-28% and meat – about 17-26% of body mass (Table 7). The weight of the male 8.05 m long was larger (5476 kg) than the weight of the bigger female 8.5 m long (5301 kg).

From weighted male (8.05 m) was produced the whole skeleton with a total weight of 354 kg. An axial skeleton from 56 vertebrates (neck section – 7, chest – 14, waist – 12 and tail section – 23) occupied about 38% of total weight.

CONCLUSION

Investigations conducted in 2007-2008 confirmed that Mechigmensky Bay is a very important feeding area for Gray whales in the Russian Far East waters. Harvest monitoring data has shown that immature Gray whales (7.5-9.5 meters long) forage predominantly in the western part and mature – in the eastern part of Mechigmensky Bay.

Annually collected data on biology of Gray whales harvested in Mechigmensky Bay are not sufficient to assess numbers and some other parameters of the Eastern stock. However**,** the fatness index evidences stable feeding conditions for whales in Chukotka Peninsula sea waters in recent years. Study of Gray whales in Mechigmensky Bay fill in the gaps in our knowledge about their biology and provide data that can support scientifically based decisions on whale resources conservation. However, it is very important to note that the modern aboriginal Gray whale harvest, although based on subadult animals, does not negatively affect the modern state of the Eastern Gray whale stock in Russia.

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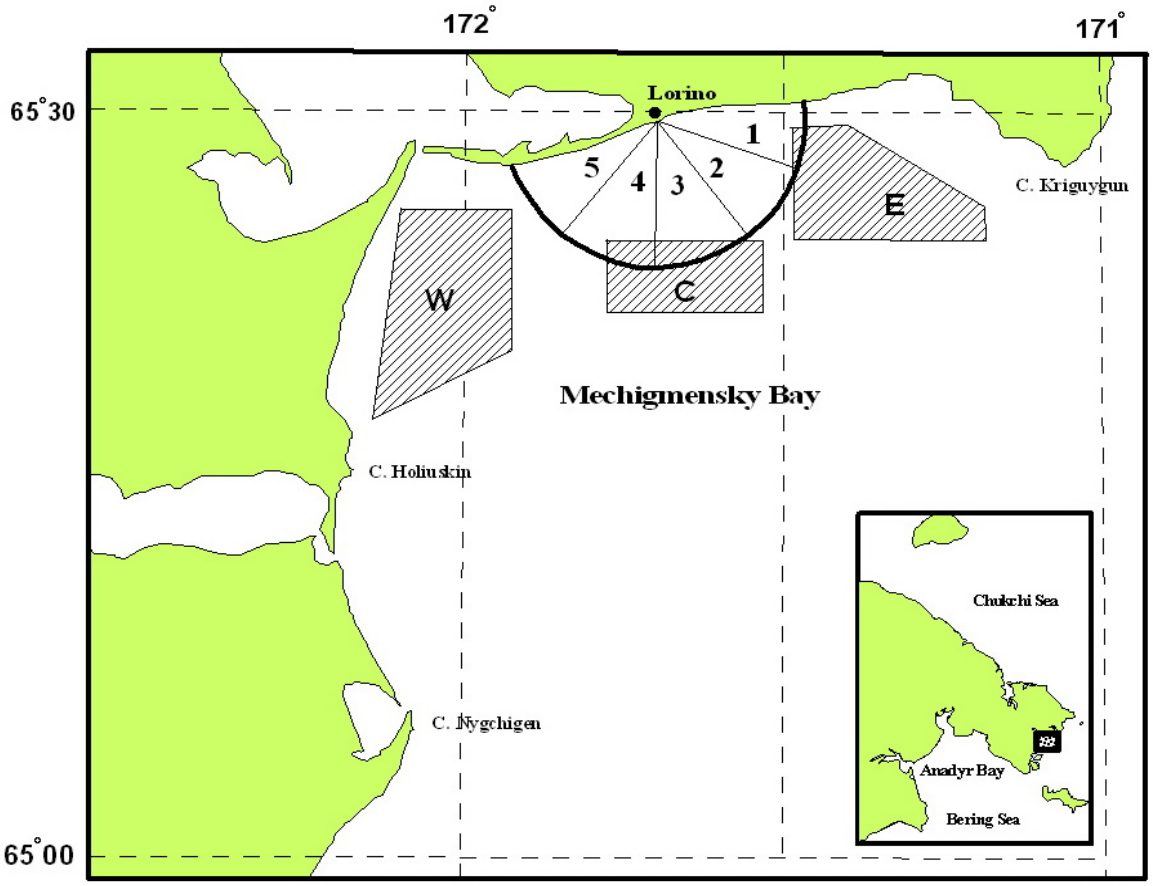

Fig. 1 - Main regions of Gray whale harvest in Mechigmensky Bay and observation water area covered from the coastal observation point in Lorino, 2007-2008: **1-5** – sectors of counts; **E** – eastern; **C** – central and **W** – western regions of harvest

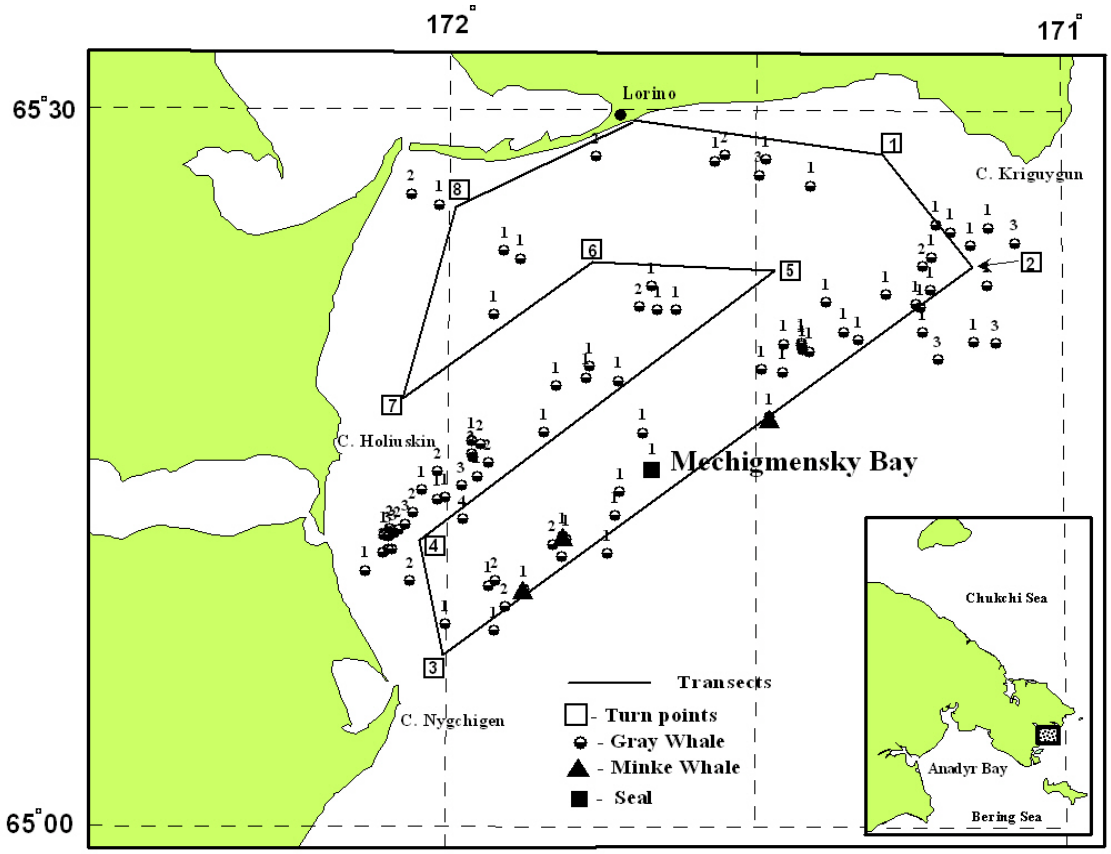

Fig. 2 - A scheme of marine mammals sightings and vessel survey transects in Mechigmensky Bay, 24th of July, 2008

Fig. 3 – The aluminum whaling boat, used for the vessel survey of marine mammals in Mechigmensky Bay, 24th of July, 2008

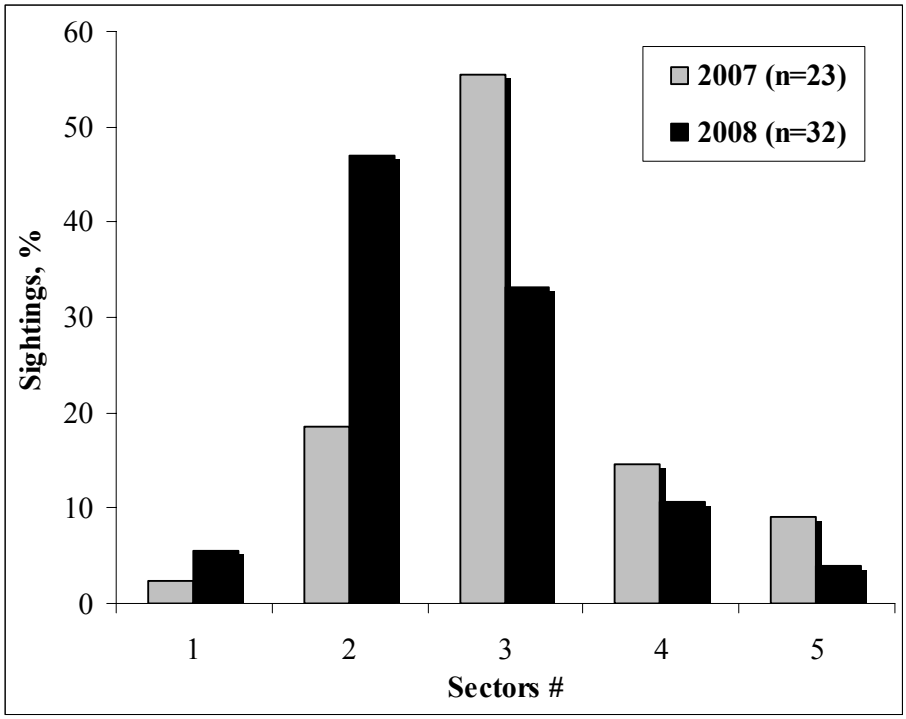

Fig. 4 - Sightings of Gray whales in different sectors of observation in Mechigmensky Bay (Fig. 1), 2007-2008 (*days of counts in brackets)*

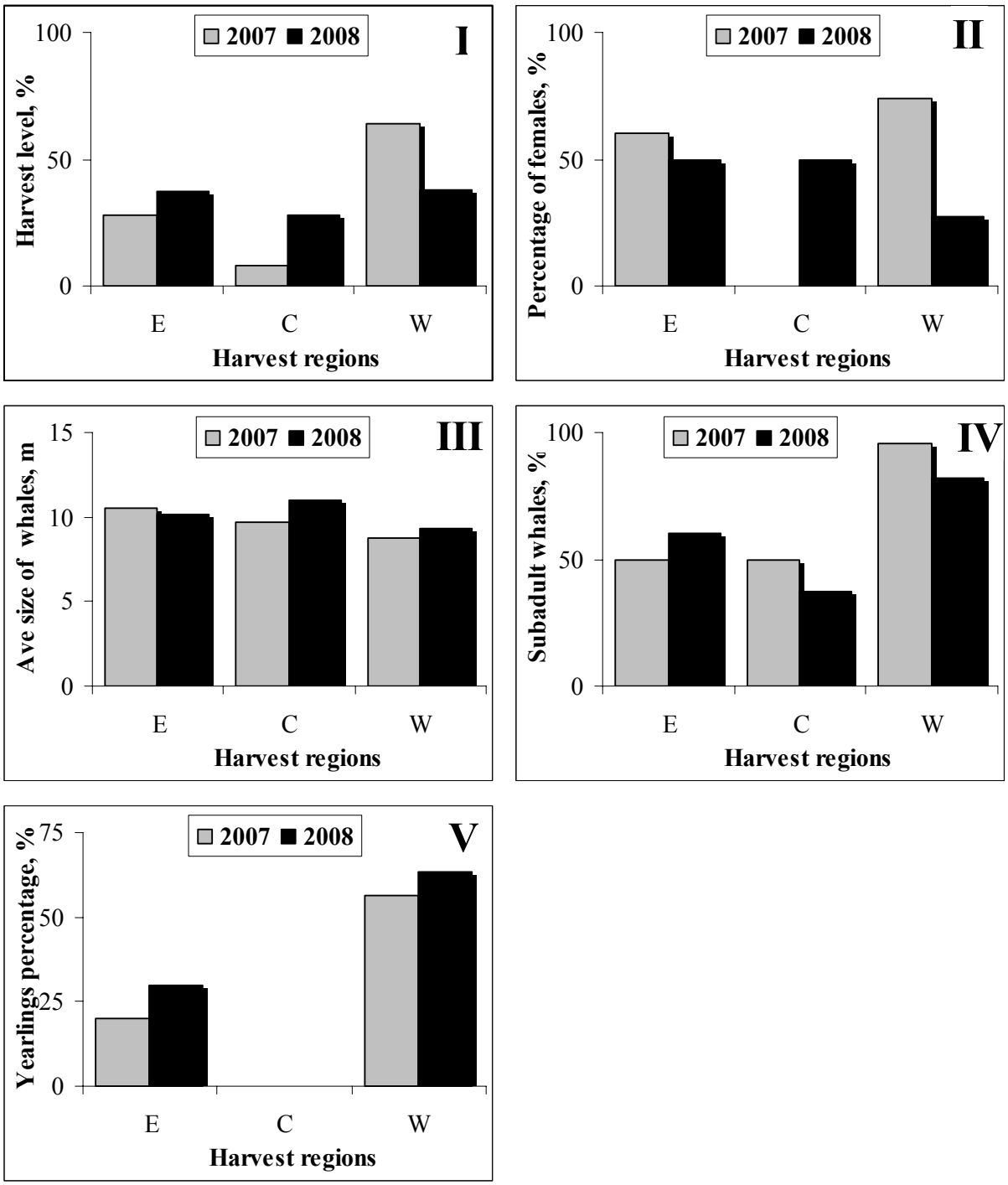

Fig. 5 – Parameters of Gray whale harvest in different regions of Mechigmensky Bay (Fig. 1) in 2007 (n=39) и 2008 (n=29):
I – harvest level; II – percentage of females; III – average size of harvested whales; IV – percentage of subadult whales; V – percentage of yearlings

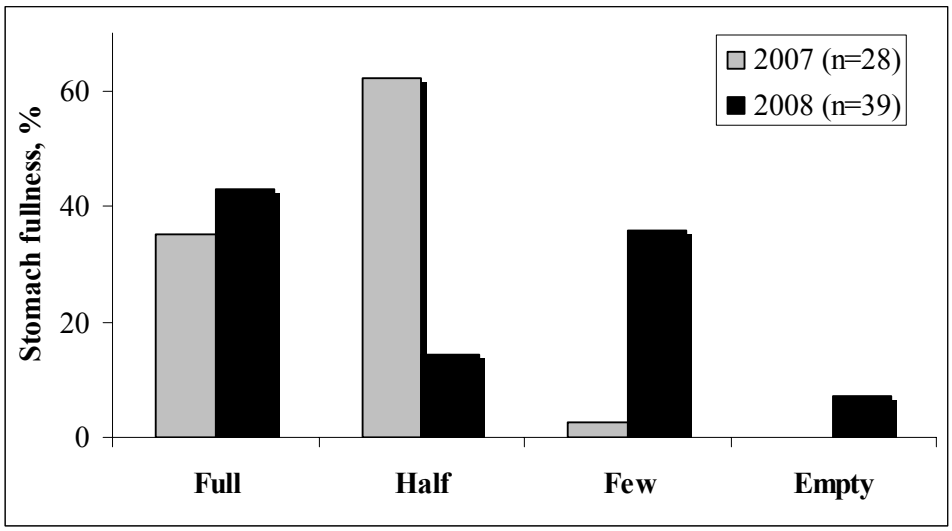

Fig. 6 – A stomach fullness level of Gray whales, landed in Mechigmensky Bay in 2007-2008

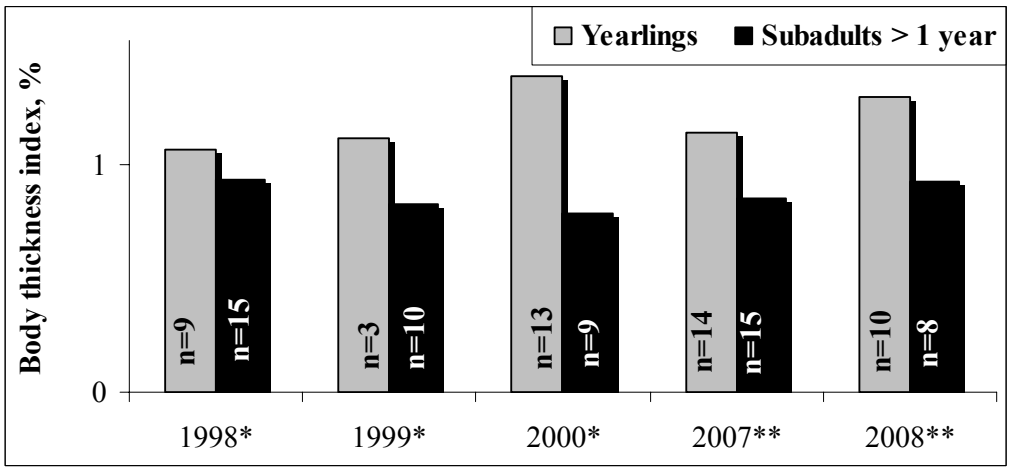

Fig. 7 – Body thickness index of Gray whales, investigated in Mechigmensky Bay, 1998-2000 and 2007-2008 гг. (* - *August,* ** - *July-September)*

Table 1

An average monthly number (per a count) of Gray whales in Mechigmensky Bay coastal waters, 1984-2000, 2007, 2008

Год	1984	1985	1987	1988	1989	1990	1994-96	1998	1999	2000	2007	2008
June	nd	nd	nd	nd	nd	nd	10(1)*	nd	nd	nd	nd	nd
July	nd	nd	nd	nd	nd	nd	4(6)	35(4)	nd	6 (13)	7.4(8)	8.0(3)
August	52(10)	nd	nd	nd	nd	nd	5(1)	55(4)	33(6)	5 (9)	7.6(9)	4.2(14)
September	41(2)	58(6)	57(6)	65(2)	56(5)	31(2)	nd	nd	25(2)	nd	0.7(3)	7.0(14)
October	36(8)	37(3)	48(2)	60(2)	45(2)	7(1)	4(8)	nd	nd	nd	9.7(3)	30(1)
November	1(1)	10(1)	nd	2(1)	nd	nd	2(1)	nd	nd	nd	nd	nd
Ave year**	**44(20)**	**51(9)**	**55(8)**	**63(4)**	**48(7)**	**25(3)**	**4(16)**	**46(8)**	**31(8)**	**5.7(22)**	**6.9(23)**	**6.6(32)**

*Note: * - days of counts in brackets; ** - without November; nd – no data*

Table 2

Sex, size and physiological conditions of Gray whales, landed in Mechigmensky Bay 2007-2008

	2007	2008	2007-2008
Landed whales	126	127	253
Observed whales	39	29	68
Females			
% in harvest	61.5	48.3	55.9
% subadults	87.5	42.9	68.4
% yearlings	41.7	14.3	31.6
% pregnant*	67.0	25.0	36.4
% barren*	33.0	75.0	63.6
Ave length, m	9.3	11.0	9.9
Males			
% in harvest	38.5	51.7	44.1
% subadults	60.0	80.0	70.0
% yearlings	33.3	53.3	43.3
Ave length, m	9.8	9.3	9.5

*Note: *- from adults*

Table 3

Size structure of Gray whales, landed in Mechigmensky Bay 2007-2008, %

Size groups, m	**2007 n=39**	**2008 n=29**
7.6-8.0	12.8	10.3
8.1-8.5	28.2	24.1
8.6-9.0	17.9	13.8
9.1-9.5	10.3	3.4
9.6-10.0	2.6	6.9
10.1-10.5	5.1	0
10.6-11.0	0	0
11.1-11.5	2.6	3.4
11.6-12.0	7.7	6.9
12.1-12.5	7.7	17.2
12.6-13.0	2.6	10.3
13.1-13.5	2.6	3.4

Table 4

Statistics of “Stinky whale” sightings in the Gray whale harvest in Lorino village, 1998-2008

Year	Date	Sex	Length, m	Year	Date	Sex	Length, m
1998*	August, 16	male	8.8	2006**	July, 9	female	8.1
	August, 18	female	7.35		July, 9	male	9.1
	August, 21	male	10.8		July, 11	female	12.9
	August, 24	female	8.3		24 ноября	male	10.0
1999*	August, 9	female	8.15	2007***	August, 15	female	10.4
	August, 9	female	9.9		August, 16	female	13.0
2004*	June, 18	male	12.2	2008***	July, 31	male	8.1
	July, 20	male	10.5		August, 6	male	8.05
	July, 20	male	11.6		August, 7	male	8.9
	August, 27	female	11.8		August, 12	female	12.4
	September, 4	female	10.8		August, 29	female	12
	September, 10	female	13.5		September, 3	female	9.7
2005**	August, 15	female	9.0		September, 3	male	11.05
	August, 19	female	11.1		September, 4	female	12.3
	19 октября	female	11.0				
	29 октября	female	13.1				

Note: * - data T. Rowles, V. Ilyashenko, 2007; ** - Alexei Ottoy’s verbal note; *** - our data

Table 5

Different bottom organisms’ specific biomass and frequency of occurrence in the samples from Gray whales’ stomachs (n=39), investigated in Mechigmensky Bay, July-September 2007, %

##	**Bottom species**	Specific biomass	Frequency of occurrence
1	Amphipoda	52.47	77.27
2	Polyehaeta	36.3	72.73
3	Izopoda	3.9	38.64
4	Algae	3.7	25.00
5	Bivalvia	2.8	40.91
6	Ascidiacea	2.4	43.18
7	Cumacea	1.3	40.91
8	Clam layings	1.3	18.18
9	Gastropoda	0.3	4.55
10	Hydroidea	0.1	2.27
11	Decapoda	0.8	6.82
12	Paguridae	0.4	2.27

Table 6

Amphipods' specific biomass and frequency of occurrence in the samples from Gray whales' stomachs (n=39), landed in Mechigmensky Bay, July-September 2007 (alphabetical order), %

##	Вид	Specific biomass	Frequency of occurrence
1	Ampelisca macrocephala	20.1088	69.05
2	Ampelisca eschrihti	10.5349	42.86
3	Ampelisca birulai	0.1648	2.38
4	Anonyx nugax	34.5436	66.67
5	Anonyx lilljeborgi	0.2640	11.90
6	Anonyx epistomicus	0.3042	9.52
7	Anonyx magnus	0.6353	4.76
8	Anonyx ochoticus	0.0183	2.38
9	Atylus bruggeni	2.9512	23.81
10	Atylus collingi	0.0027	4.76
11	Pontoporeia femorata	3.8409	26.19
12	Pontoporeia ekmani	0.1498	2.38
13	Byblis erithrops	0.4450	11.90
14	Byblis sp.	0.0015	2.38
15	Psammonyx kurilicus	8.3021	52.38
16	Ischyrocesus sp.	0.6907	7.14
17	Ischyrocesus anguipes	0.0057	4.76
18	Ischyrocesus latipes	0.0054	2.38
19	Orchomenella minuta	0.3485	14.29
20	Orchomenella pinguis	0.1361	2.38
21	Orchomenella japonica	0.0276	4.76
22	Orchomenella sp.	0.0470	7.14
23	Pleustes panoplus	0.0138	4.76
24	Paroediceros lynceus	0.1088	11.90
25	Photis fischmanni	1.7360	28.57
26	Bathymedon langsdorfi	0.0039	2.38
27	Bathymedon tilesii	0.0497	2.38
28	Bathymedon sp.	0.0060	2.38
29	Protomedeia epimerata	0.0024	2.38
30	Protomedeia fasciata	0.1480	2.38
31	Protome. stephenseni ochotensa	0.0348	2.38
32	Protomedeia coeca	0.0989	2.38
33	Protomedeia sp.	0.0030	7.14
34	Boeckosimus derjugini	1.1423	23.81
35	Boeckosimus plautus	0.0225	2.38
36	Caprella carina	0.0081	2.38
37	Acanthostepheia behringiensis	0.2775	7.14
38	Metacaprella horrida	0.0219	4.76
39	Hippomedon denticulatus orientalis	11.0728	21.43
40	Hippomedon pacificus	0.0749	2.38
41	Hippomedon granulosus	0.1618	2.38
42	Hippomedon punctatus	0.7791	2.38
43	Arctolembos arcticus	1.8780	4.76
44	Phoxocephalidae gen. sp.	0.0030	2.38
45	Grandifoxus longirosris	0.0060	2.38
46	Grandifoxus nasuta	0.0015	2.38
47	Grandifoxus sp.	0.0018	2.38
48	Priscillina armata	0.0036	2.38
49	Onisimus krassini	0.0024	2.38

Table 7

Weighing of Gray whales, landed in Mechigmensky Bay in August, 2007

Sex and size / Body parts	Female 8.9 m			Female 8.5 m			Male 8.05 m		
	kg	%		kg	%		kg	%	
		α	β		α	β		α	β
Blubber with skin	**1824**	**31.1**	**28.9**	**1607**	**30.3**	**28.2**	**1609**	**29.4**	**27.4**
Muscles	**1004**	**17.1**	**15.9**	**1137**	**21.4**	**19.9**	**1440**	**26.3**	**24.5**
Skeleton (with muscles)	**1568**	**26.7**	**24.9**	**1484**	**28.0**	**26.0**	**1364**	**24.9**	**23.2**
Vertebrates with muscles	*577*	*9.8*	*9.2*	*483*	*9.1*	*8.5*	*405*	*7.4*	*6.9*
Ribs with muscles	*349*	*6.0*	*5.5*	*420*	*7.9*	*7.4*	*370*	*6.8*	*6.3*
Scull	*309*	*5.3*	*4.9*	*262*	*4.9*	*4.6*	*302*	*5.5*	*5.1*
Jaws	*120*	*2.0*	*1.9*	*122*	*2.3*	*2.1*	*115*	*2.1*	*2.0*
Fins	*164*	*2.8*	*2.6*	*157*	*3.0*	*2.8*	*136*	*2.5*	*2.3*
Shoulder-blades	*49*	*0.8*	*0.8*	*40*	*0.8*	*0.7*	*36*	*0.7*	*0.6*
Internals	**1313**	**22.4**	**20.8**	**897**	**16.9**	**15.7**	**902**	**16.5**	**15.3**
Tongue	*168*	*2.9*	*2.7*	*107*	*2.0*	*1.9*	*82*	*1.5*	*1.4*
Liver	*142*	*2.4*	*2.3*	*145*	*2.7*	*2.5*	*115*	*2.1*	*2.0*
Heart	*56*	*1.0*	*0.9*	*33*	*0.6*	*0.6*	*28*	*0.5*	*0.5*
Lungs	*62*	*1.1*	*1.0*	*73*	*1.4*	*1.3*	*66*	*1.2*	*1.1*
Kidneys	*37*	*0.6*	*0.6*	*23*	*0.4*	*0.4*	*35*	*0.6*	*0.6*
*Intestines**	*826*	*14.1*	*13.1*	*453*	*8.5*	*7.9*	*268*	*4.9*	*4.6*
*Other entrails***	***22***	*0.4*	*0.3*	*63*	*1.2*	*1.1*	*308*	*5.6*	*5.2*
Baleens	**16**	**0.3**	**0.3**	**33**	**0.6**	**0.6**	**20**	**0.4**	**0.3**
Flukes	**138**	**2.4**	**2.2**	**143**	**2.7**	**2.5**	**135**	**2.5**	**2.3**
Total mass without blood	**5863**	**100**	**93.0**	**5301**	**100**	**93.0**	**5470**	**100.0**	**93.0**
Total mass with blood	**6304**			**5700**			**5882**		

Note: α - without blood, β – including blood (about 7% of body mass)

* - has shown only intestines weight; weight of females has shown with other entrails

** - entrails blubber, trachea, stomach etc.

REFERENCES

Blokhin S.A. 1984. Investigations of Gray Whales taken in the Chukchi coastal waters, USSR // In: M.L. Jones, S.L. Swarts and S. Leatherwood (eds.) The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc., Orlando, Florida. P. 487–509.

Blokhin S.A. 1986a. Data on coastal counts of Gray whales off Chukotka Peninsula // Bulletin 'Scientific Researches on Northern Pacific Marine Mammals in 1984-85', VNIRO, Moscow, Soviet Union - P. 28–35 (in Russian).

Blokhin S.A. 1986b. Observation of gray whales in their foraging areas in the Bering sea, 1984 // Rep. Int. Whale. Commn. № 36. P. 283–285.

Blokhin S.A. 1996. Distributions, abundance and behavior of Gray whales *Eschrichtius robustus* of Western and Eastern stocks in Russian Far Eastern summer grounds // 'Izvestija TINRO' Journal, Vladivostok, Vol. 121 - P. 36–53 (in Russian).

Blokhin S.A. 1999a. Linear growth of Gray whales *Eschrichtius robustus* in the first year of life // 'Izvestija TINRO' Journal, Vladivostok, Vol. 126 – P . 434–437 (in Russian).

Blokhin S.A. 1999b. The harvest of Eastern Gray Whales stock off Chukotka Peninsula // 'Izvestija TINRO' Journal, Vladivostok, Vol. 126 - P. 438–441 (in Russian).

Blokhin S.A. 2001. History and modern harvest of Eastern Gray Whales *Eschrichtius robustus* // A Human in the coastal zone, The Centuries Experience: Materials of Conference, Petropavlovsk-Kamchatsky, Russia - P. 78–91 (in Russian).

Jones M.L., Swartz S.L. 2002. Gray whale *Eschrichtius robustus* / In W. Perin, B. Wursig and J.G.M. Thewisenn (eds) / Encyclopedia of Marine Mammals. Editors. Academic Press. New York, NY. P. 524–536.

Rice D.W. and Wolman A. A. 1971. The life history and ecology of the gray whales (*Eschrichtius robustus*) // Am. Soc. Mamml. Spec. Publ. № 3. P. 1–142.

Rowles T. and Ilyashenko V. 2007. Summary of finding on investigation of the stinky whale condition in eastern north pacific gray whales. Paper IWC/59/CC15 presented to the International Whaling Commission (unpublished). (p. 12).

Ilyashenko V. Consideration of management implications "Stinky" Gray Whales for the eastern North Pacific stock. Paper IWC/59/ASW7 presented to the International Whaling Commission (unpublished). 2007 (p. 2).