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F >%HUJLQ \$ \$ 9ODGLPLURY 9 Results of Airborne Research on Distribution and Abundance
of Cetaceans in the Sea of Okhotsk in 1985. Pp. 128 in Research work on marine mammals in the
North Pacific in 1984-1985. Moscow

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[Berzin A.A., Vladimirov V.L., Doroshenko N.V. 1990 Results of airborne research on distribution and abundance of bowhead, gray and beluga whales in the Sea of Okhotsk in 1985. Proceedings of TINRO, vol. 112: 51-60]

Q_ebgp = 2010. F_lh^bjZkq_dZke_gghkDelphinapterus leucas) ih^Zgguf \u[hjhqgh]h
609615 \ Fhjkdfe_dhiblZxsb_eZjdlbKfhjgbd gZmqguo ljm^h\ DZebgbg]jZ^ > & K
2010c. The method of beluga (Delphinapterus leucas) number estimation on data of aerial surveys of the Holarctic. Collection of Scientific Papers. Kaliningrad

Q_ebgp \ G. = e]hbjlf jZkq_lZ qbke_gDelphinapterus leucas ih^Zgguf \u[hjhqgh]h
Z\bZmq_gZkk[hjg bChelintsev N.G. 2012. Algorithm of white whales (Delphinapterus leucas) number estimation based on sample aerial survey data. This book]

Q_jghh B, <Zkbev_G, F_e_glv<A, =eZahF. 2008. Hiul bkihevah\Zgby ^ey vbgkljmf_glj
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dhgn_j_gpbb ©Fhjkd_bfe_dhiblZxsb_ =heZjd1971Chernobay V.k Vasilyuk Aj.,
Melentyev V., Glazov D., 2008. Laboratory aircraft L410 application for instrumental aerial surveys of the marine mammals. (In the G L W L R Q 3 0 D W H U L D O V R I W K H , Q W H U Q D W L R Q D O & R Q I H U H
Odessa). Pp. 13237]

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Glazov D.M, Shpak O.V., Kuznetsova D.M., Ivanov D.I., Mukhametov L.M., Rozhnov V.V.

Preliminary results of tracking the beluga whale (Delphinapterus leucac) movements in the White Sea in 20 10-2011

A.N. Severtsov Institute of Ecology and Evolution RAS, Moscow, Russia

:_emDelphinapterus leucas y\ey_lky _^bg
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The beluga whale (Delphinapterus leucas) is the only cetacean species that permanently resides in the White Sea. Based on summer aerial surveys in 2008 and 2010, the total abundance is estimated to be 5000 to 7500 individuals without correction for belugas underwater. (e Z a h ^ j 2006, 2008, 2010; Glazov et al. 2007). In winter, a considerable part of population, at least 2000 individuals, remains in the White Sea water area (e Z a h ^ j 2010). Until now it has been suggested that in winter a big

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portion of the White Sea beluga migrates to the E
ents and Kara seas, while the smaller ones
the White Sea throughout a year. Residential are
the females in the White Sea populations; the a
male groups migrate long distances, probably,
yond the White Sea water area (evdh 1995,
2004). In summer female units inhabit several
SHUPDQH QV UHJLRQV WKH
JUHJDW;L R QdH`1995, 2004, Q_jg_pdb
^j 2002). As for beluga distribution in winter per
od, the reliable information is missing.

An attempt to study beluga movements and th
strategy for habitat use in the White Sea has be
undertaken only once, in 2005K(_lhqb^aj
2007). A single transmitter was deployed on a bel
female in the region of Lopshenga village (Dvinsk
Bay) and transmitted from June 26 2005 to March
2006. During this period, the beluga had not left th
water area of the White Sea and moved betw
Dvinskoy, Onezhsky Bays and the central parts (E
sin) of the sea.

Our study aimed at tracking the adult beluga mo
vements in the winter period.

Satellite tagging was conducted in October 2010 an
2011 in the Varzuga river mouth (Murmansk regio
Belugas were captured by a net thrown from a r
tor-boat along the coast in the lower part of the riv
Small groups of light grey and white belugas th
followed pink and Atlantic salmon running up the
river during the high tide were targeted. All pec
dures (sex definition, morphometric measureme
skin biopsy sampling for genetic analysis and
deployment) were conducted near the shore at
depth of approx. 30cm. For beluga movement trac
ing we used Argos V\ V W H P V D W H O O L V
V D U ` = \$-2 \$36 5 X V V L D 7 K H
cables of the tags were attached to 3 nylon r
' PP WKDW ZHUH V X E G H U P I
back of a beluga whale in front of the dam ridge.

In total, 5 males were captured in 2010 and 3 mal
in 2011; all of them were tagged (Table). Due to
short period of transmission in 2011 (21 and 3 da
two tags were excluded from analysis.

First months after tag deployment (October
December 2010, and October 2011 to January
2012), belugas either kept near the place of cap
performing local movements, within 700km,
along The Kola coast into the Gorlo or Kandalak
sky Bay (3 belugas captured in 2010, and 1 bel
captured in 2011), or travelled long distances (up
300 km) from the Varzuga mouth to the Gorlo of t

White Sea following the coast line within a 100m isobath (2 belugas captured in 2010) (Fig. 1).

Table. The parameters of tagged belugas and duration of tag transmission.

ID	Sex	Color	Length	Transmission period		
				Start	Stop	Total days
61743	f	White	378 kf	27.10.2010	29.05.2011	215
61808	f	White	332 kf	30.10.2010	29.05.2011	212
61740	f	White	373 kf	30.10.2010	02.05.2011	185
61739	f	White	322 kf	30.10.2010	26.05.2011	209
61746	f	White	332 kf	30.10.2010	24.06.2011	241*
61745	f	White	410 kf	01.10.2011	22.10.2011	21
112083	f	Whitegray	380 kf	27.10.2011	is still ON**	>150
61742	f	Whitegray	370 kf	29.10.2011	01.11.2011	3

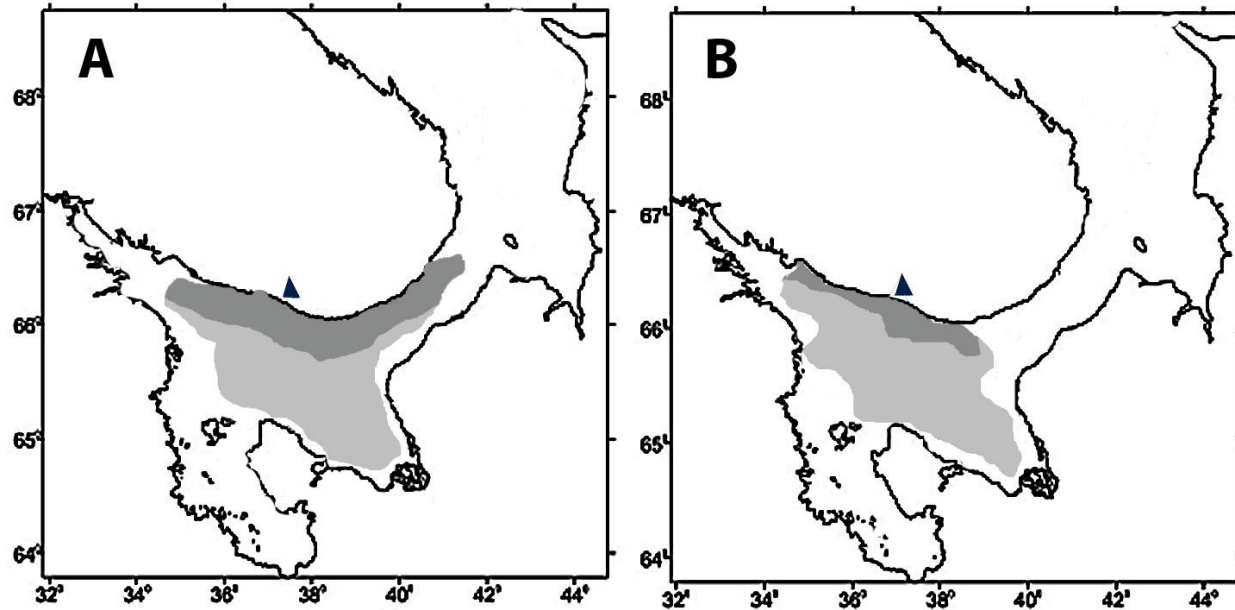


Fig. 1. The regions of the White Sea utilized by belugas according to satellite tracking data during the period of: A - from the end of October 2010 to mid-April 2011, B - from the end of October 2011 to mid-April 2012. Triangle marks the place of tagging. Dark-gray color indicates an area where the whales had been before the active ice formation began (see text)

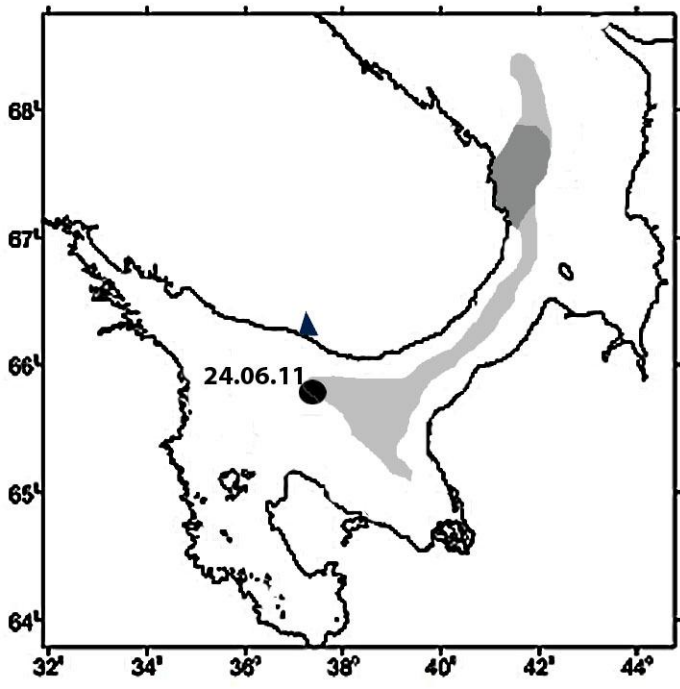
In 2010, according to the National Ice Center <http://www.natice.noaa.gov> and generalized maps from <http://www.aari.ru> an active ice formation started in mid-December, and the next winter only in the end of January 2012. Along with a gradual land-floe formation, beluga movement pattern

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changed: the whales left the coastal zone and began to utilize the rest of the sea water area, particularly its central part and the Gorlo.

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 x`g__ Kheh_-ph\bo h

During the entire period of tracking, belugas never travelled far into Kandalakshsky Bay, which may be explained with a high ice density in the Bay. Also, belugas were not observed entering shallow waters of Onezhsky Bay to the south of Solovetskie Islands.



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 ^h

Fig. 2. The regions of the White Sea utilized by the beluga 61746 according to the satellite tracking data mid April 2011 until the end of tag transmitting on June 24, 2011 (mapped as a black circle). Triangle mark the place of tagging. Dark-gray color indicates an area where the beluga whale was from May 2 to May 25, 2011.

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 fhj_f WIZ [_emoZ hklZgh\`beZkv
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 eZkv \ ij_`_eZo df hl mklvy d
 gh_ _jgmehkv \ ;Zkk_cg ;_eh]h
 lZf \iehlv ^h hdhgqZgby jZ[hlu i_j

One beluga male (tag number 61746), whose movements were tracked up to early June 2011, within days in the end of April had moved to the Voronka the White Sea on the border with the Barents. This whale stopped near the Ponoy river mouth, and during 3 weeks (May 02-25, 2011) stayed within 50km from the river mouth. Later, this individual returned to the Bassin of the White Sea and did not leave it until tag stopped transmitting (Fig..2)

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The tag deployed in 2011 is still transmitting at the time of paper submission (mid April 2012): from the day of tagging, the beluga has not left the Basin of White Sea and is actively moving in this water area (Fig. 1B).

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Our data show that at least part of beluga population does not leave the White Sea during autumn-winter-spring period, but actively moves within its water area. This is valid not only for the females wintering; according to some authors; (Levdh 2004), in the

White Sea, but also for adult males. A connection between the start of active beluga movements on the White Sea water area and the beginning of active-ice formation in the sea is traced.

The study was conducted by the Permanent expedition of RAS under the Program of the beluga whale distribution and migrations, financial support by Russian Geographic Society. The authors are thankful to the employees of Utrish Dolphinarium, Ltd for assistance in beluga captures.

Kibkhd bkihevah\ZgguoRbferhncps b dh\

Belkovich V.M. 2004. Beluga whale of the European North: modern research. Fisheries 34: 32

Glazov D.M., Chernook V.I., Boltunov A.N., Mukhametov L.M., Shpak O.V., Nazarenko E.A. 2006. Aerial survey of white whales (Delphinapterus leucas Pall.) in the White Sea in 2000, 2002 and 2005. Pp. 148 in Marine Mammals of the Holarctic. Collection of Scientific Papers. SPb

Glazov D.M., Chernook V.I., Boltunov A.N., Zharikov K.A., Nazarenko E.A., Mukhametov L.M. 2007. Aerial surveys of white whales (Delphinapterus leucas) in July in the White Sea (2005), distribution and abundance. Pp. 198 in Marine Mammals of the Holarctic. Collection of Scientific Papers. Odessa

Glazov D.M., Chernook V.I., Nazarenko E.A., Zharikov K.A., Shpak O.V., Mukhametov L.M. 2010. A Summer distribution and abundance of belugas in the White Sea based on aerial survey data (2005). Pp. 134-140 in Marine mammals of the Holarctic. Collection of Scientific Papers, Kaliningrad

Glazov D.M., Nazarenko E.A., Chernook V.I., Ivanov D.I., Shpak O.V., Solovyev B.A. 2010. Assessment of abundance and distribution peculiarities of beluga whales (Delphinapterus leucas) in the White Sea in 2010. Pp. 140-145 in Marine Mammals of the Holarctic, Collection of Scientific Papers. Kaliningrad

Glazov D.M., Chernook V.I., Svetocheva O.N., Bondarev V.A., Prischemikhin V.F., Frolov S.B. 2007. Study of seasonal migrations of belugas (Delphinapterus leucas Ball.) using satellite telemetry sensors in the White Sea. Pp. 350-355 in Problems of study, sustainable use and conservation of natural resources of the White Sea. Proceedings of the 10th International Conference. Arkhangel'sk

Glazov D.M., Chernook V.I., Boltunov A.N., Zharikov K.A., Nazarenko E.A., Mukhametov L.M. 2002. Study of population structure in the White Sea beluga whales. Int. conf. on reproduction of marine mammals. M. Pp. 10

V.V. 2002. New data about population structure of white whales in the White Sea. Marine mammals of the Arctic, Moscow. Pp. 272-282]

Glazov D.M., Chernook V.I., Boltunov A.N., Mukhametov L.M., Shpak O.V., Nazarenko E.A. 2007. Preliminary results of the White sea beluga (*Delphinapterus leucas* Pall.) aerial surveys (2005, 2006) Abstract book of the International Workshop on Beluga Whale Research, Husbandry and Management in wild and captive environment, 9-11 March, 2007, Valencia, Spain. p.6

= h^y s_X Z^1, ;_e y q_g d h : e l m o h . k ^2, ; m j d Z g h G ^2,3

Dhimeylhjgh ih \ ^ _ g b _ k Z f h Eumetopias jubatus)

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Godyashcheva Y.S., Belyachenko A.V.¹, Altukhov A.V.², Burkanov V.N.^{2,3}

Copulatory behaviour in female Steller sea lions (*Eumetopias jubatus*)

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3. National Marine Mammal Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Seattle, USA

K b \ m E u m e t o p i a s j u b a t u s) - d j m i g _ c r b c i j _ ^ k l
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 et al. 1987, Loughlin et al. 1992 Burkanov and Loughlin
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 (Amos et al. 2001, Hoffman et al h l f
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Steller sea lion (*Eumetopias jubatus*) is the largest representative of the family of eared seals, with relatively low natural reproductive potential. Population of this species has recently undergone a significant decline in numbers. The causes and influencing factors are not yet clear (Merrick et al. 1987, Loughlin et al. 1992, Burkanov and Loughlin 2005). In studying the causes of decline of sea lions' population, one of the key tasks is a detailed study of demography and reproduction of this species. An important role in this task is played by study of copulatory behaviour of Steller sea lions. Many authors (Amos et al. 2001, Hoffman et al. 2003, 2007) noted that in some species of eared seals the role of males in breeding organization is overstated. At the moment it is not clear whether females are able to influence the choice of a partner, and to what extent well as what triggers the beginning of mating. Therefore, elucidating the role of females in formation of sexual relationships is of particular interest (Glazov et al. 2012). The purpose of this work was to analyse characteristics of female sea lions' copulatory behaviour and to determine whether they have a possibility of active reproductive choices.