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; _ j a b g : : < e Z ^ b f b j h \ < E > h j h r _ g d h G < J _ a m e v l Z l u Z \ b Z m q _ l g u o q b k e _ g g h k l b i h e y j g u o k _ j u o d b l h \ b [_ e m o - b \ H j] h k a l \ h f L f B G _ J H - 60 [Berzin A.A., Vladimirov V.L., Doroshenko N.V. 1990. Results of airborne research on distribution and habundance of bowhead, gray and beluga whales in the Sea of Okhotsk in 1979-1985. Proceedings of TINRO, vol. 112: 51-60]

Q _ e b g p G = \ 2010. F _ l h ^ b j d Z Z k q _ q Z k e _ g g h k e h (Delphinapterus leucas) i h ^ Z g g u Z f \ b Z m q _ K l h \ 609-615 \ F h j k d b f e _ d h i b l Z x s b e Z j d l b d K [h j g b d g Z m q g u o l j m ^ h \ D Z e b g b g] j Z ^ > & K H 2010c. The method of beluga (Delphinapterus leucas) number estimation on data of aerial survey. P. 615 in 609 Marine Mammals of the Holarctic. Collection of Scientific Papers. Kaliningrad

Q _ e b g p _ \ G . = e] h j b l f j Z k q _ l Z q b k e _ g g h [D e l p h i n a p t e r u s l e u c a s] i h ^ Z g g u f \ u [h j h q g h] h Z \ b Z m q < _ g Z k k [h j g b [C h e l i n t s e v N . G . 2012. Algorithm of white whales (Delphinapterus leucas) number estimation based on sample aerial survey data. This book]

Q _ j g h k B , < Z k b e v _ G , F _ e _ g l v < _ \ , = e Z a h F . 2008. H i u l b k i h e v a h \ Z g b y ^ e y v b g k l j m f _ g l Z g u o Z \ b Z m q _ l h \ f h j k d b o f e _ d h i b e Z k s j Z d h k - Z b h E < [l Z F Z l _ j b Z e u f _ ` ^ m g Z j h ^ g h c d h g n _ j _ g p b b © F h j k d b _ f e _ d h i b l Z x s b _ = h e Z j d - 137 [C h e r n o k V . k v a s i l y e k A j . , M e l e n t y e v V . , G l a z o v D . , 2008. Laboratory aircraft L-410 application for instrumental aerial surveys of the marine mammals. (In the C O L L E C T I O N O F S C I E N T I F I C P A P E R S O F T H E I N T E R N A T I O N A L C O N F E R E Odessa). Pp. 132-137]

= e Z a h F . , R i Z d H < , D m a g _ p h F \ Z B \ Z g h > \ B , F m o Z f _ E h F \ , J h ` g h > \ <

I j _ ^ \ Z j b l _ e v g u b _ l h] b j h k e _ ` b \ Z g b y j _ f _ s _ g b [c _ e m o (Delphinapterus leucas \ ; _ e h f f h j _ \ -]]

B g k l b l m l i j h [e _ f w d h e h] b b b w \ h e x p b b b f : G K _ \ _ j p h \ Z J : G F h k d \ Z J h k k b

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 leucas) movements in the White Sea in 2010-2011

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

; _ e m o D Z e l p h i n a p t e r u s l e u c a s) y \ e y _ l k y _ ^ b g l \ b ^ h f d b l h h [j Z a g u o i h k l h y g g h h [b f h j _ H [s Z y _ _ q b k e _ g g h k l v i h Z \ b Z m q _ l h - \ b h]] p _ g b \ Z _ l k y h l h k h [_ c [_ a m q _ l Z ` b \ h l g u o i h ^ ^ j Z * O D] R Y H W D O j b h ^ q Z k l v i h i m e y p b b g _ f _ g _ _ ; _ e h f f h j _ = e Z a h \ b ^ j [J Z g _ q l h h ^ g [Z H e v y Z q Z k l v [_ e h f h j k d b g o Z [\ _ a b f g b c i _ j b h ^ f b] j b j m _ l \ ; Z j _ g p _ \ h

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 5000 to 7500 individuals without correction for belugas underwater. (see Shpak et al. 2006, 2008, 2010; Glazov et al. 2007). In winter, a considerable part of population, at least 2000 individuals, remains in White Sea water area (see Shpak et al. 2010). Until now it has been suggested that in winter a big

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gby \lhf qbke_ \hafh`gh b aZ ij_
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^ey]_g_lbq_kdbo bkke_^h\Zgbc b
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bkihevah\Zeb kimlgbdh\u_ i_j_^Zlbq
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lhju_ dj_ibeb ijb ihfhsb ijbiZygguo
ba g_j`Z_xs_c klZeb d lj_f g_ceh
ff ijhims_gguf q_j_a ih^dh`guc `b
emo i_j_^ ^hjkZevguf]j_[g_f

<k_]h [ueh hleh\e_gh kZfph\ \
] gZ \k_o `b\hblgmkl\ghe\e_gu
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[ueb bkdexq_gu ba ZgZebaZ

l_j\u_ f_kypu h±dgZ[jZeh ^_dZ[jy d
ly[jv ±jhg_p yg\Zjy] ihkb
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\Z kh_jrZy g_agZqbl_evgu- \ df
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hleh\Z] \^hev Dhevkdh]h ih[_
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portion of the White Sea beluga migrates to the E
ents and Kara seas, while the smaller one resides in
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 females with calf units inhabit several
SHUPDQHQW UHJLRQV WKH
JUHJDW; LRQV 1995, 2004, Q_jg_pdbc
^j 2002). As for beluga distribution in winter pe
od, the reliable information is missing.

An attempt to study beluga movements and th
strategy forhabitat use in the White Sea has be
undertaken only once, in 2005K(_lhq_\^j
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 (B
sin) of the sea.

Our study aimed at tracking the adult beluga mo
ments 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 m
tor-boat along the coast in the lower part of the riv
Small groups of light-grey and white belugas tha
followed pink and Atlantic salmon running up the
river during the high tide were targeted. All proc
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\VWHP VDWHOOLW
VDU´ =$-23$36(5XVVLD 7KH
cables of the tags were attached to 3 nylon r
‘ PP WKDW ZHUH VXEGHUPD
back of a beluga whale in front of the dorsal 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.

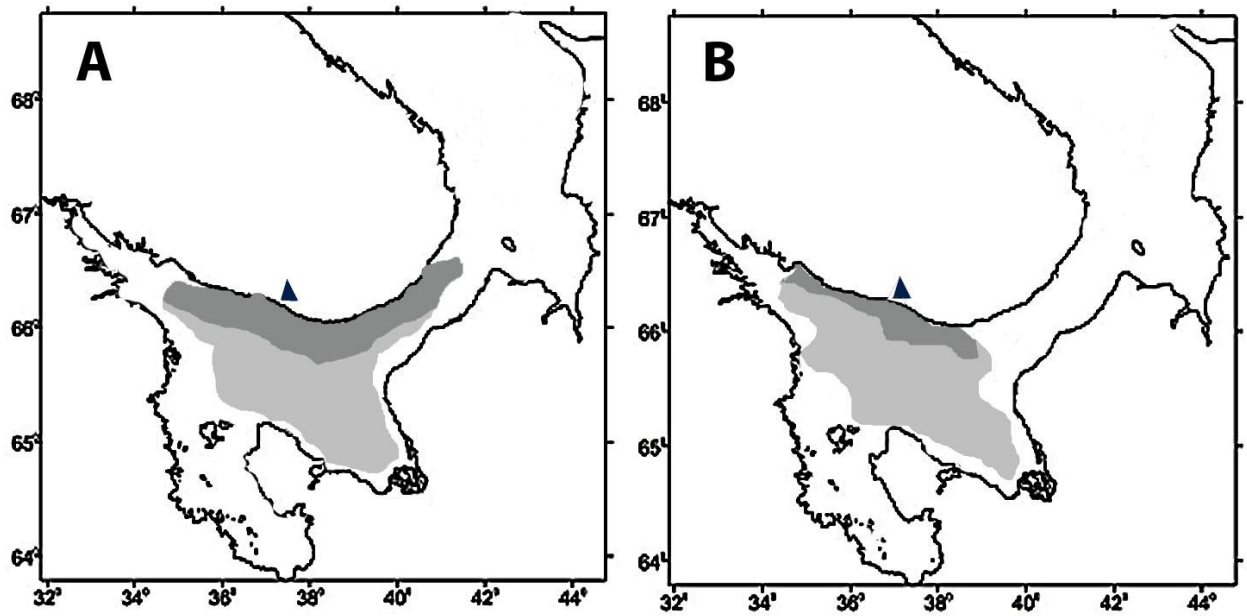
First months after tag deployment (October-early
December 2010, and October 2011-late January
2012), belugas either kept near the place of cap
performing local movements, within 70-100km,
along The Kola coast into the Gorlo or Kandalak
sky Bay (3 belugas captured in 2010, and 1 bel
captured in 2011), or travelled long distances (up
300 km) from the Varzuga mouth to the Gorlo of t

] moh^beb gZ agZqbl_evgh_ df hl mklvy j <Zjam]Z \ =hjeh ;_be \Zykv ijb[j_`ghc ahgu ^h bah[Zlu

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

LZ[e lZjZf_lju [_emo b ijh^he`bl_evghklv jZ[hlu i_j_^Zlqbdh\
Table. The parameters of tagged belugas and duration of tag transmission.

ID	The Sex	P_lColor	>ebgZ Length	l<ejZfy jZ[hlu i_j_^Z Tracking period		
			G Z q Z S Start	H d h.g q Stop	<k_]^hg_ Total days	
61743	f	;_eu/ White	378 kf	27.10.2010	29.05.2011	215
61808	f	;_eu/ White	332 kf	30.10.2010	29.05.2011	212
61740	f	;_eu/ White	373 kf	30.10.2010	02.05.2011	185
61739	f	;_eu/ White	322 kf	30.10.2010	26.05.2011	209
61746	f	;_eu/ White	332 kf	30.10.2010	24.06.2011	241*
61745	f	;_eu/ White	410 kf	01.10.2011	22.10.2011	21
112083	f	K_lekh_ju White-gray	380 kf	27.10.2011	is still ON**	>150
61742	f	K_lekh_ju White-gray	370 kf	29.10.2011	01.11.2011	3



Jbk Ko_fZ jZchgh\ Zd\Zlhjbb ;_eh]h fhjy ihk_sZ_fuo [_emoZfbZih ^Zgguf gby \i_jbhk dhgpZ hdly[jy] ^h k_j_^bgu kZdjhgy Zhdly[jy< _] ^h k j_^bgu Zij_ey] Lj_m]hevgbdhf hlf_q_gh f_klh mklZgh\-kb_jiu_j_^Zlqbdh p_l h[hagZqZ_l jZchg \ dhlhjhf gZoh^bebkv [_emob ^h gZqZeZ Zdlb\gh]h

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)

:dlb\gh_ ev^hh[jZah\Zgb_ \ National Ice Center KWWS ZZZ QDWLFH QRD dZjlZf ::GBB KWWS ZZZ DDUL UX ^_dZ[jy Z ke_^mxs_lbeadfhd dhgp_] K ihkl_i_gguf h[jZah\Zgb_f i_j_f_s_gby `b\hlguo klZ_ehfg_bgykllZkey

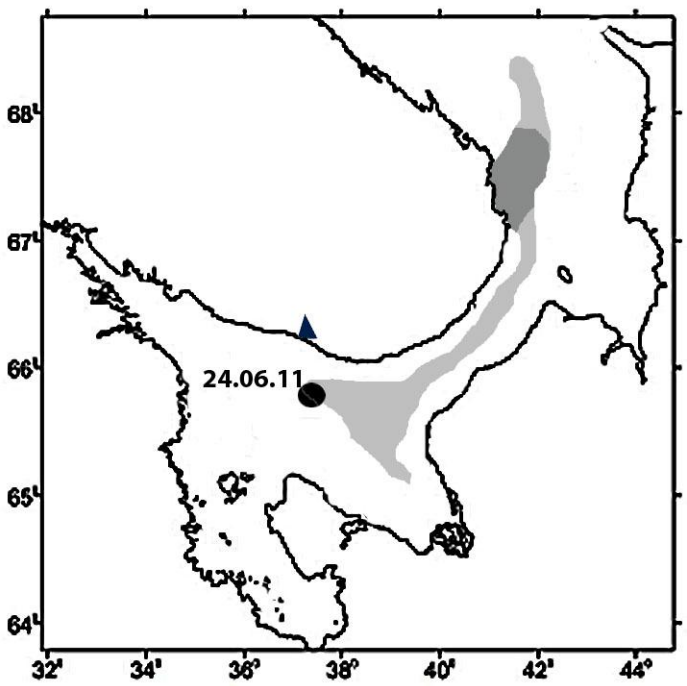
In 2010, according to the National Ice Center http://www.natice.noaa.gov and generalized maps from http://www.aari.ru, an active ice-formation started in mid-December, and the next winter - only in the end of January 2012. Along with a gradual land-floe formation, beluga movement pattern

oh^bl hl ijb[j_`ghc ihehku b ihkl_i_ hklZevgmx Zd\Zlhjbx fhjy hkh[_gg qZklv b =hjeh

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.

AZ \k_ \j_fy gZ[ex^_gby [_emob gh [hdh \ DZg^ZeZdrkdbc aZeb\ qlhuf khdhc kiehq_gghklvx ev^h\ _aZkfb\ gu aZoh^u [_emo \ f_edh\h^guc x`g__ Kheh_phd\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-watered Onezhsky Bay to the south of Solovetskie Islands.



Jbk Ko_fZ ihk_s_gby [_emoh lhjbb ;_eh]h fhjy ih ^Zgguf kim ijhke_`b\Zgby k k_j_^bgu Zij_ey hdhgqZgby jZ[hlu i_j_^Zlqbd hlf_q_gh djm`dhf gZ ko_f_ Lj hlf_q_gh klh_ mklZgh\db i_j_^Zlq [_emo Lkfjuc p_l h[hagZqZ_l j dhlhjhf gZoh^beZkv [_emoZ \ ^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.

H^bg kZf_p [_emob ghf_j i_j_i^Zl f_s_gby dhlhjh]h m^Zehkv hlke_^l] \ dhgp_ Zij_ey aZ ^g_dh jhgm <hjhgdb ;_eh]h fhjy gZ]jZg fhj_f WlZ [_emoZ hklZgh\beZkv \ lhghc b g_^_eb k ih`Z eZkv \ ij_^_eZo df hl mklvy <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 Sea. 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).

I_j_^Zlqbd mklZgh\e_gguc \ Z [hlZlv ^h gZklhys_]h \j_f_gb k_j_] [_emoZ kh ^gy f_q_gby g_ ihd fhjy ijb wlhf Zdlb\gh ih g_fm i_j_ <

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 Bassin of White Sea and is actively moving in this water area (Fig. 1B).

LZdbf h[jZahf gZrb ^Zggu_ ihdZ djZcg_c f_j_ qZklv [_emob\ kh_kg_g i_jbh^ g_ ihdb^Zxl Zd\Zlhjbx ;_eh gh i_j_f_sZxlky \ _]h ij_^_eZo W lhevdh d abfmxsbf ih fg_gbx g_

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 (evdh 2004), in the

;_evdh\bq \;_ehf fhj_ kZfkd euf iheh\haj_euf kZfpZf ljb wlh k\yav f_`^m gZqZehf Zdlb\guo i_j_ Zd\Zlhjbb h_ehjy b gZqZehf Zdlb[\ jZah\Zgby _]h Zd\Zlhjbb

JZ[hlZ \uiheg_gZ lhklhyggh ^_ckl pb_c J:G ljb nbgZgkh\hc ih^^_jhd]jZnbq_kdh]h h[s_kl\Z \ jZfdZo ljh jZkijhkljZg_gby b fb]jZpbc [_emo ljm^bgdh\ HHH ©Mljbrkdbc ^_evmhb fhsv \ hleh_ [_emo

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.

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;_evdh\bq < F ;_emoZ _\jhi_ckdh]h k__jZ gh_ohnby_ckdh]h k__^h\Zgby [Belkovich V.M. 2004. Beluga whale of the European North: modern research. Fishery, 34]: 32

=eZah\ F., Q_jghhd < B., ;helmg:hG, FmoZf_lhF., RiZdH<, GZaZj_gdh 2006. E_lgb_ Z\bZmq_lu Delphinapterus leucas \;_ehf fhj_ \ b C. 148]h^Z\oFhjkdb_ fe dhiblZxsb_ =heZjdlbdb K[hjgbd gZmqguo Glazov D.M., Chernook V.I., Boltunov A.N., MukhametovL.M., ShpakO.V., NazarenkoE.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. SP]b

=eZah\ > F Q_jghhd < B @Zjbdh\ D: GZaZj_gdh ?: FmoZf_lh\ EF [_emo Delphinapterus leucas \ bxe_-]] \;_ehf fhj_ jZkij_^_e_gb_ b- 198 ke_gghklv \ Fhjkdb_ fe_dhiblZxsb_ =heZjdlbdb qguo K[hjgbd gZmq Glazov D.M., Chernook V.I., Zharikov K.A., NazarenkoE.A., MukhametovL.M., Boltunov A.N. 2008. Aerial surveys of white whales (Delphinapterus leucas) in July in the White Sea (2007), distribution and abundance. Pp. 198 in Marine Mammals of the Holarctic. Collection of Scientific Papers. Odessa]

=eZah\ F., Q_jgh<hB, GZaZj_g:dh@ZbdhD:., RiZdH<, FmoZf_EhF. 2010Z E_lg_k jZ ij_^_e_gb_ b qbke_gghklb Delphinapterus leucas ih blh]Zf Z\bZbkke_^h\Zgby c Klj 134- \ Fhjkdb_ fe_dhiblZxsb_ =heZjdlbdb K[hjgbd gZmq Glazov D.M., Chernook V.I., NazarenkoE.A., Zharikov K.A., ShpakO.V., MukhametovL.M. 2010a. Summer distribution and abundance of belugas in the White Sea based on aerial survey data (2008). Pp. 134 140 in Marine mammals of the Holarctic. Collection of Scientific Papers, Kaliningrad]

=eZah\ > F GZaZj_gdh ?: Q_jghhd < B B\Zgh\ > B RiZd Hg< Kheh\v ghklb b hkh[_gghklb jZkij_ Delphinapterus leucas \;_ehf fhj_ \ fZjl_ -] Klj \ Fhjkdb_ fe_dhiblZxsb_ =heZjdlbdb K[hjgbd gZmqguo ljm^h GlazovD.M., Nazarenko E.A., Chernook V.I., Ivanov D.I., Shpak O.V., Solovyev B.A. 2010b. 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]

K_lhq<G, K_lhq_HZ, ;hg^Zj<\., Ijbs_fbob<gN, NjhehK;. 2007. Bamq_gb_ k_ahgguo fb]jZpbc [_ Delphinapterus leucas Pall ikhfhsvx ^Zlqbdh\ kimlgbdh\hc l_e_f_ljbb >KL fhj_ K- \ k[ljh[e_fu bamq_gby jZp bki b hojZgu ijbj-eukOmjkh\ ;_e f_`^mgZj dh-gn k_gly[jy] :joZvgf_chevK.N., SvetochevaO.N., BondarevV.A., PrischemikhinV.F., Frolov S.B. 2007. Study of seasonal migrations of belugas (Delphinapterus leucas Pall.) using satellite telemetry sensors in the White Sea. Pp. 350 in Problems of study, sustainable use and conservation of natural resources of the White Sea. Proceedings of the 10th International Conference. Arkhangelsk]

Q_jg_pd.b>c;_evdh\bFq, DjZkgh\<Z 2002. Gh\u_ ^Zggu_ h kljmdlmj_ ihimeypbb [_emo fhj_ K- \ Fhjkdb_ fe_dhiblZxsb_ =heZjdlbdb F > &cK V.M., Kharova L \ $ ' %

V.V. 2002. New data about population structure of white whales in the White Sea. Marine mammals of the Ho arctic, Moscow. Pp. 279-282]

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= h ^ y s _ X Z K[1], ; _ e y q _ g . k h : e l m o h . \ <[2], ; m j d Z g h G[2,3]

D h i m e y l h j g h _ i h \ _ ^ _ g b _ k Z f h E u m e t o p i a s j u b a t u s)

G Z p b h g Z e v g u c b k k e _ ^ h \ Z l _ e v k d b c K Z j Z l h \ k d b c] h k m ^ Z j k l \ _ g g u c m g b
K Z j Z l h \ J h k k b y

D Z f q Z l k d b c n b e b Z e L b o h h d _ Z g k d h] h b g k l b l m l Z] _ h] D Z Z f h q Z l k d h c J : G h k l

3. G Z p b h g Z e v g Z y e Z [h j Z l h j b y i h b a m q _ g b x f h j k d b o f e _ d h i b l Z x s b o : e y k
b k k e _ ^ h \ Z l _ e v k d h] h j u [h e h \ g h] h p _ g l j Z G Z p b h g Z e v g h c k e m ` [u f h j k d h
K R :

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Copulatory behaviour in female Steller sea lions (Eumetopias jubatus)

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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 male 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 as well as what triggers the beginning of mating. Therefore, elucidating the role of females in formation of sexual relationships is of particular interest (Belyachenko 2012). The purpose of this work was to analyse the characteristics of female sea lions' copulatory behaviour and to determine whether they have a possibility of active reproductive choices.