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## Legal regulation of the traditional (native) Pacific walrus harvest in Russia \*

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**Abstract.** The article briefly reviewed studies of the Pacific walrus. This information is necessary for the development of the Total Allowable Catch (TAC) since the native people of Chukotka annually harvest this subspecies of walrus. We have drawn attention to the long-term change in the habitat of the walrus, i.e., to the reduction of the ice period in the Bering and Chukchi Seas and possible consequences for the walrus (increased mortality and epizootics). Legal acts for the fisheries are regulating the traditional (native) walrus harvest on Chukotka, and the capture of walrus calves for educational and cultural purposes have been described. A scheme for the development of the TAC for walrus has been discussed as well. We have presented the latest data on allocated quotas and actual walrus harvest. The need for more detailed and versatile research of walrus in connection with climate change is discussed. The author suggests cooperation between the native people of Chukotka and various research institutions for the better-organized study of the walrus in relation to climate change, for conservation and rational use.

**Keywords:** *the Arctic, North, Chukotka, traditional (native) harvest, Pacific walrus, legal acts.*

### Introduction

The Pacific walrus area is on the territory of Russia and the US. Anciently, up to 3 thousand years ago [1, Bogoslovskaya L., Slugin I., Zagrebin I., Krupnik I., p. 15], the Pacific walrus was harvested by native peoples of Chukotka and Alaska, and now the walrus is still important for traditional economic activity.

Historically, traditional environmental management had no special permits or strict rationing. Currently, existing natural resource legislation contains general provisions on the customary use of natural resources by native peoples. Nevertheless, it requires obtaining special permits and licensing (incl. rationing) in respect of each of the natural resources [2, Zhuravel V.P., p. 84]. Therefore, the Pacific subspecies of walrus is in the list of aquatic biological resources<sup>1</sup> with an established total allowable catch (TAC). Every year, the rationale for TAC is developed and quotas for the walrus harvest are approved for the native people of Chukotka. On the US side, the Pacific walrus hunt is not subject to legislative quotas, but it is produced in enough quantities to meet the needs of Alaska's native people.

The average annual harvest levels of walrus in both countries in 1990–1999: 6,307 ( $\pm 707$ ) walruses; in 2000–2009: 5,410 ( $\pm 511$ ), incl. 42% of struck and lost walruses [3, MacCraken J.G., p.

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<sup>1</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 01.10.2013 № 365 (red. ot 16.11.2017) «Ob utverzhdenii perechnya vidov vodnykh biologicheskikh resursov, v otnoshenii kotorykh ustanavlivayetsya obshchiy dopustimyy ulov» [Order of the Ministry of agriculture of the Russian Federation dated 01.10.2013 No. 365 (ed. 16.11.2017) "On approval of the list of types of aquatic biological resources in respect of which the general allowable catch is established"].

2074], of which 49–51% were harvested in Alaska. Also, a decline in ice cover is observed in the Arctic over the past 20 years [4, Jay C.V., Fischbach A.S., Kochnev A.A., p. 9; U.S. National Ice Center]. It negatively impacts on walrus (increasing mortality) because their life is closely linked to the ice (the calves, molt, and rest in the feeding areas). To assess the current situation of the Pacific walrus harvest in the period of climate change, legislative and other official instruments governing its harvesting were analyzed, and a review of recent research was made.

### *Status of the Pacific Walrus and living conditions*

The Pacific Walrus is the slowest breeding species among the harvested pinniped animals in the Arctic. Walrus are polygamous. Their puberty is reached by 5–7 years, but males enter reproduction only by 13–14 years because of stiff competition for females [5, Kibalchich A.A., p. 178]. Breeding occurs in January — March, and the birthing season is between April and mid-June. Pregnancy lasts 15 months, with a latent stage of 4 months [5, Kibalchich A.A., p. 178]. Females usually have one calf once every three years, depending on the mother and feeds milk up to 2–2.5 years [6, Fay F.H., p. 138]. The mortality of calves in the first year of life reaches 40–45%, incl. stillbirths and abortion in the late stage of pregnancy [data from 1981–1987; 7, Kibalchich A.A., p. 28].

Since the late 1990s — early 2000s, there is a reduction in the ice area in the Bering and the Chukchi Seas in the summer-autumn period. Also, there is a rapid decay of ice in spring and its later formation in autumn. As result, the period of the ice cover in the Chukchi Sea is reduced [8, Dmitriev A.A., p. 116; 4, Jay C.V., Fischbach A.S., Kochnev A.A., p. 9; 9, Kryukova N.V., Kochnev A.A., Pereverzev A.A., p. 34]. Earlier, years with weak and robust ice cover of the Chukchi Sea alternated [8, Dmitriev A.A., p. 116]. Now there is a long (not less than ten years) period of weak ice cover of the Chukchi Sea [10, Stroeve J.C., Serreze M.C., Holland M.M., Kay J.E., Malanik J., Barrett A.P., p. 1006]. First-year ice in winter that rapidly melts in summer is beginning to prevail, and the general warming of the Arctic has reduced the likelihood of cold years, which could lead to a temporary restoration of the ice cover [10, Stroeve J.C., Serreze M.C., Holland M.M., Kay J.E., Malanik J., Barrett A.P., p. 1005].

Since the 2000s, changes have also begun on walrus haulouts: the number of animals in the Bering Sea significantly decreased, and in the Chukchi Sea increased. It indicates the displacement of animals in the northern part of the range [9, Kryukova N.V., Kochnev A.A., Pereverzev A.A., p. 34; 11, Kryukova N.V., p. 131]. At the same time, since 2010, walrus massively appear at the shores of Alaska and form vast mixed haulouts [12, Garlich-Miller J., MacCracken J.G., Snyder J., Meehan R., Myers M., Wilder J.M., Lance E., Matz A., p. 27; 13, MacCracken J.G., Beatty W.S., Garlich-Miller J.L., Kissling M.L., Snyder J.A., p. 22]. It had never been previously observed. Since the life of the walrus is closely linked to the ice, it is most susceptible to the changes in the ice situation. In this regard, a study has been carried out to estimate of the abundance by the method of mark-recapture using genetic markers. A preliminary estimate of the data for 2013–2015 is 283.2

thousand walrus [13, MacCracken J.G., Beatty W.S., Garlich-Miller J.L., Kissling M.L., Snyder J.A., p. 25].

### *Development of the rationale for the total allowable catch (TAC)*

Sea waters adjacent to Russia have zoning. The area of walrus in Russia covers the territory of two fishery basins<sup>2</sup> and four fishing zones<sup>3</sup>: Far East Fisheries Basin: 61.01 Western-Bering Sea Zone, 67.01 Chukchi Zone, 18 Region Arctic: Chukchi Sea. East Siberian Fisheries Basin: 18 — Arctic region: East Siberian Sea. The boundaries of these zones are described in the Order of the Ministry of Agriculture of the Russian Federation<sup>4, 5, 6</sup> and according to it, these zones are located on the map (Fig. 1).



Fig. 1. Location of the fishing zones and the villages where walrus is harvested, indicating the boundaries of the Chukotka Autonomous Okrug (picture of the author).

<sup>2</sup> Federal'nyy zakon Rossiyskoy Federatsii ot 20.12.2004 № 166-FZ (red. ot 06.03.2019) «O rybolovstve i sokhraneniі vodnykh biologicheskikh resursov» [Federal Law of the Russian Federation 20.12.2004 No. 166-FZ (ed. 06.03.2019) “On fishing and conservation of aquatic biological resources”]. URL: <http://www.consultant.ru/>; <http://fish.gov.ru/>; <http://mcx.ru/docs/> (accessed 16 August 2019).

<sup>3</sup> Prikaz Ministerstva Rybnogo khozyaystva SSSR ot 09.09.1980 № 408 «O razgranichenii Mirovogo okeana na promyslovyye rayony v novykh usloviyakh vedeniya promysla» [Order of the Ministry of Fisheries of the USSR from 09.09.1980 No. 408 “On delimitation of the world ocean on fishing areas in new conditions of fishing”].

<sup>4</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 21.10.2013 № 385 (red. ot 04.06.2018) «Ob utverzhdenii pravil rybolovstva dlya Dal'nevostochnogo rybokhozyaystvennogo basseyna» [Order of the Ministry of agriculture of the Russian Federation 21.10.2013 No. 385 (ed. 04.06.2018) “On approval of fishing rules for the Far Eastern fishery basin”].

<sup>5</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 23.05.2019 № 267 «Ob utverzhdenii pravil rybolovstva dlya Dal'nevostochnogo rybokhozyaystvennogo basseyna» [Order of the Ministry of agriculture of the Russian Federation 23.05.2019 No. 267 “On approval of fishing rules for the Far Eastern fishery basin”].

<sup>6</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 03.09.2014 № 348 (red. ot 05.07.2018) «Ob utverzhdenii pravil rybolovstva dlya Vostochno-Sibirskogo rybokhozyaystvennogo basseyna» [Order of the Ministry of agriculture of the Russian Federation 03.09.2014 No. 348 (ed. 05.07.2018) “On approval of fishing rules for the far East Siberian fishery basin”].

*Zone 61.01:* 1 — Egvekinot, 2 — Konergino, 3 — Uel'kal', 4 — Enmelen, 5 — Nunligran, *Zone 67.01:* 6 — Si-reniki, 7 — Novoe Chaplino, 8 — Yanrakynnot, 9 — Lorino, 10 — Lavrentia, 11 — Uelen, *Zone 18 (Chukchi Sea):* 12 — Inchoun, 13 — Enurmino, 14 — Neshkan, 15 — Nutepel'men, 16 — Vankarem.

Under Federal Agency for Fishery Order 09.03.2010, No. 158<sup>7</sup>, the development and approval of TAC are subject to a lengthy and complicated procedure. The latest data on the total number of subspecies, rate population growth, mortality, and harvest, as well as limiting factors (ice situation, diseases, etc.) is used for TAC development. Annual monitoring studies are carried out in the haulout and harvest areas to assess the changes in the walrus population. It is done by personnel of fisheries management institutions (ChukotTINRO, TINRO, VNIRO) [14, Smirnov G.P., Kochnev A.A., Litovka M.I., Kompantseva E.I., Grigorovich P.V., p. 229; 15, Kochnev A.A., p. 282; 16, Chakilev M.V., Kochnev A.A., p. 107; 11, Kryukova N.V., p. 59; 17, Pereverzev A.A., Kryukova N.V., p. 81] and other organizations — RPO “Marine Mammal Council” [18, Semenova V.S., Boltunov A.N., Nikiforov V.V., p. 522], Kamchatka Branch of the Pacific Institute of Geography, FEB RAS [19, Altukhov A.V., Skorobogatov D.O., Zagrebely S.V., Kryukova N.V., Kochnev A.A., Chakilev M.V., Burkanov V.N., p. 16; 20, Kryukova N.V., Kozlov M.S., Skorobogatov D.O., Pereverzev A.A., Krupin I.L., Shevelyov A.I., Burkanov V.N., p. 146], Institute of Biological Problems of the North RAS, National Park “Beringia”. Also, various institutes conduct applied research of walrus, e.g., toxicology, infection with trichinellosis, and behavior of walruses. It is conducted by the Pacific Ocean Institute named after V.I. Ilyichev FEB RAS [21, Trukhin A.M., Simokon M.V., p. 3365], Vyatka State Agricultural Academy [22, Bukina L.A., p. 13], Saint Petersburg State University [23, Giljov A., Karenina K., Kochnev A., p. 50].

The documents of the TAC rationale 2003–2019 were analyzed. To justify the TAC 2003–2011, 200 thousand walrus were used and for 2012–2019 — 129 thousand [24, Speckman S.G., Chernook V.I., Burn D.M., Udevitz M.S., Kochnev A.A., Vasilev A., Jay C.V., Lisovsky A., Fischbach A.S., Benter R.B., p. 546]. It is necessary to eliminate no more than half of the rate population growth to prevent the population decline. In the TAC 2003–2012 calculations, the rate growth of the Pacific walrus population was 9% [25, Fedoseev G.A., Goltsev V.N., p. 411], with a harvest level of 4–5 % for both countries, incl. 2% for Russia. Since 2013, the growth rate calculated by the ChukotTINRO employees based on coastal observations on the haulouts amounted to 4.6% [26, Chakilev M.V., p. 37]. In this case, walrus hunt together with unreported harvest (+ 20%) in Russia and harvest struck and lost animals (+ 42%) in Russia and Alaska fully covers population growth [26, Chakilev M.B., p.36].

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<sup>7</sup> Приказ Федераль'ного Агентства по Рыболовству от 09.03.2010 № 158 «Об утверждении Административного регламента Федераль'ного агентства по рыболовству по исполнению государственной функции по разработке и представлению на государственную экологическую экспертизу, а также определение и утверждение ежегодного обобщенного допустимых уловов водных биологических ресурсов во внутренних водах Российской Федерации, в том числе во внутренних морских водах Российской Федерации, а также в территориальном море Российской Федерации, на континентальном шельфе и в исключительной экономической зоне Российской Федерации, в Азовском и Каспийском морях» [Order of the Federal Agency for Fishery No. 158 of 09 March 2010 “On approval of the Administrative Regulations of the Federal Agency for Fishery for the performance of the state function to develop and submit for state environmental review, as well as to determine and approve annually the total allowable harvests of aquatic biological resources in the inland waters of the Russian Federation, including in the internal sea waters of the Russian Federation, as well as in the territorial sea of the Russian Federation, on the continental shelf and in the exclusive economic zone of the Russian Federation, in the Sea of Azov and the Caspian”].

Actual walrus harvest (produced and cut on the shore / ice does not include unreported harvest and struck and lost animals) as reported by the Department of Agriculture and Food of the Chukotka Autonomous Okrug (earlier, until October 19, 2018 — the Department of Industrial and Agricultural Policy of the ChAO) (hereinafter — the Department of the ChAO) is in Table. 1.

Table 1

*Quotas for the pacific walrus and the actual harvest*

Years	Western-Bering Sea Zone	Chukchi zone	Chukchi Sea Zone	East Siberian Sea	Total TAC (C) *	Total harvest by ISPN + C
2003	3000 (50)****				3000 <sup>8</sup>	1219
2004	2000				2000 (10) <sup>9, 10, 11</sup>	1118
2005	2000				2000 (40) <sup>12, 13</sup>	1436
2006	1500 (50)****				1500 (40) <sup>14, 15</sup>	1047
2007	1500				1500** <sup>16</sup>	1173
2008	305	900	675	20	1900** <sup>17</sup>	695
2009	300	430	750	0	1480** <sup>18</sup>	1035

<sup>8</sup> Rasporyazheniye Pravitel'stva Rossiyskoy Federatsii ot 31.12.2002 № 1863-r (red. 26.11.2003) [Order of the Government of the Russian Federation No. 1863 of 31 December 2002 (ed. 26.11.2003)].

<sup>9</sup> Rasporyazheniye Pravitel'stva Rossiyskoy Federatsii ot 12.11.2003 № 1644-r (Goskomrybolovstvu Rossii) [Order of the Government of the Russian Federation No. 1644-r of 12 November 2003 (to the State Fishery of Russia)].

<sup>10</sup> Rasporyazheniye Pravitel'stva Rossiyskoy Federatsii ot 30.12.2003 № 1947-r [Order of the Government of the Russian Federation dated No. 1947-r of 30 December 2003.].

<sup>11</sup> Prikaz Gosudarstvennogo komiteta Rossiyskoy Federatsii po rybolovstvu ot 13.02.2004 № 75 «O kvotakh na vylov (dobychu) vodnykh biologicheskikh resursov v nauchno-issledovatel'skikh, uchebnykh i kul'turno-prosvetitel'skikh tselyakh na 2004 god» [Order of the State Committee of the Russian Federation for Fisheries No. 75 of 13 February 2004 "On quotas for the harvest (harvesting) of aquatic biological resources for scientific, research, educational, cultural and educational purposes for 2004"].

<sup>12</sup> Rasporyazheniye Pravitel'stva Rossiyskoy Federatsii ot 17.11.2004 № 1482-r [Order of the Government of the Russian Federation No. 1482-r of 17 November 2004].

<sup>13</sup> Prikaz Federal'nogo agentstva po Rybolovstvu Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 31.12.2004 № 240 «O kvotakh na vylov (dobychu) vodnykh biologicheskikh resursov v nauchno-issledovatel'skikh, uchebnykh i kul'turno-prosvetitel'skikh tselyakh na 2005 god» [Order of the Federal Agency for Fishery of the Ministry of Agriculture of the Russian Federation No. 240 of 31 December 2004 "On quotas for fishing (hunting) of aquatic biological resources for research, training and cultural and educational purposes for 2005"].

<sup>14</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii (Minsel'khoz Rossii) ot 14.12.2005 № 209 «Ob utverzhdenii obshchikh dopustimyykh ulovov vodnykh biologicheskikh resursov na 2006 god» [Order of the Ministry of Agriculture of the Russian Federation (Ministry of Agriculture) No. 209 of 14 December 2005 "On approval of general allowable harvests of aquatic biological resources for 2006"].

<sup>15</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii (Minsel'khoz Rossii) ot 16.12.2005 № 220 «Ob utverzhdenii raspredeleniya obshchikh dopustimyykh ulovov vodnykh biologicheskikh resursov po Dal'nevostochnomu basseyanu primenitel'no k vidam kvot na 2006 god» [Order of the Ministry of Agriculture of the Russian Federation (Ministry of Agriculture of the Russian Federation) No. 220 of 16 December 2005 "On approval of the distribution of the total allowable harvests of aquatic biological resources in the Far Eastern Basin as applied to the types of quotas for 2006"].

<sup>16</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii (Minsel'khoz Rossii) ot 02.11.2006 № 409 «Ob utverzhdenii obshchikh dopustimyykh ulovov vodnykh biologicheskikh resursov na 2007 god» [Order of the Ministry of Agriculture of the Russian Federation (Ministry of Agriculture of the Russian Federation) No. 409 of 02 November 2006 "On approval of the total allowable harvests of aquatic biological resources for 2007"].

<sup>17</sup> Prikaz Goskomrybolovstva RF ot 28.11.2007 № 27 (red. ot 24.07.2008) «Ob utverzhdenii obshchikh dopustimyykh ulovov vodnykh biologicheskikh resursov na 2008 god» [Order of the State Fishery Committee of the Russian Federation No. 27 of November 28, 2007 (ed. 24.07.2008) "On the approval of the total allowable harvests of aquatic biological resources for 2008"].

<sup>18</sup> Prikaz Rosrybolovstva ot 05.12.2008 № 382 (red. ot 17.09.2009) «Ob utverzhdenii obshchikh dopustimyykh ulovov vodnykh biologicheskikh resursov na 2009 god» [Rosrybolovstvo order No. 382 of 05 December 2008 (ed. 17.09.2009) "On approval of the total permissible harvests of aquatic biological resources for 2009"].

<b>2010</b>	75	520	695	10	1300 (65) <sup>19, 20</sup>	1057
<b>2011</b>	150	610	730	10	1500** <sup>21</sup>	1032
<b>2012</b>	240	500	750	10	1500 (100) <sup>22, 23</sup>	1009+7***
<b>2013</b>	250	431	750	5	1436** <sup>24</sup>	1042+11***
<b>2014</b>	250	431	750	5	1436** <sup>25</sup>	819+13***
<b>2015</b>	203	536	746	4	1489** <sup>26</sup>	971
<b>2016</b>	195	539	758	4	1496** <sup>27</sup>	1020

<sup>19</sup> Prikaz Federal'nogo agentstva po rybolovstvu ot 30.09.2009 № 874 «Ob utverzhdenii obshchego dopustimogo ulova vodnykh biologicheskikh resursov na 2010 god» [Order of the Federal Agency for Fishery No. 874 30 September 2009 "On approval of the total allowable harvest of aquatic biological resources for 2010"].

<sup>20</sup> Prikaz Federal'nogo agentstva po Rybolovstvu ot 27.05.2010 № 504 «O raspredelenii mezhdru pol'zovatelyami, v otnoshenii kotorykh prinyato resheniye o predostavlenii vodnykh biologicheskikh resursov v pol'zovaniye, kvot dobychi (vylova) vodnykh biologicheskikh resursov Severnogo, Volzhsko-Kaspiyskogo i Dal'nevostochnogo rybokhozyaystvennykh basseynov dlya osushchestvleniya rybolovstva v uchebnykh i kul'turno-prosvetitel'skikh tselyakh v 2010 godu» [Order of the Federal Agency for Fishery No. 504 of 27 May 2010 "On the distribution between users for whom a decision was made to provide aquatic biological resources for use, quotas for the harvesting (harvest) of aquatic biological resources of the Northern, Volga-Caspian and Far Eastern fishery basins for fishing for educational, cultural and educational purposes in 2010"].

<sup>21</sup> Prikaz Federal'nogo agentstva po rybolovstvu ot 29.09.2010 № 825 «Ob utverzhdenii obshchego dopustimogo ulova vodnykh biologicheskikh resursov na 2011 god» [Order of the Federal Agency for Fishery No. 825 of 29 September 2010 "On approval of the total allowable harvest of aquatic biological resources for 2011"].

<sup>22</sup> Prikaz Federal'nogo agentstva po rybolovstvu ot 05.10.2011 № 983 «Ob utverzhdenii obshchego dopustimogo ulova vodnykh biologicheskikh resursov na 2012 god» [Order of the Federal Agency for Fishery No. 983 of 05 October 2011 "On approval of the total allowable harvest of aquatic biological resources for 2012"].

<sup>23</sup> Prikaz Federal'nogo agentstva po rybolovstvu ot 05.05.2012 № 395 «O raspredelenii mezhdru pol'zovatelyami, v otnoshenii kotorykh prinyato resheniye o predostavlenii vodnykh biologicheskikh resursov v pol'zovaniye, kvot dobychi (vylova) vodnykh biologicheskikh resursov Severnogo, Zapadno-Sibirskogo, Volzhsko-Kaspiyskogo i Dal'nevostochnogo rybokhozyaystvennykh basseynov dlya osushchestvleniya rybolovstva v uchebnykh i kul'turno-prosvetitel'skikh tselyakh v 2012 godu» [The order of the Federal Agency for Fishery No. 395 of 05 May 2012 "On the distribution between users for whom a decision was made to provide aquatic biological resources for use, quotas for the harvesting (harvest) of aquatic biological resources of the Northern, West Siberian, Volga-Caspian and Far Eastern fisheries pools for fishing for educational and cultural-educational purposes in 2012"].

<sup>24</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 31.10.2012 № 571 «Ob utverzhdenii obshchego dopustimogo ulova vodnykh biologicheskikh resursov vo vnutrennikh morskikh vodakh Rossiyskoy Federatsii, a takzhe territorial'nom more Rossiyskoy Federatsii, na kontinental'nom shel'fe Rossiyskoy Federatsii i v isklyuchitel'noy ekonomicheskoy zone Rossiyskoy Federatsii, v Azovskom i Kaspiyskom moryakh na 2013 god» [Order of the Ministry of Agriculture of the Russian Federation No. 571 of 31 October 2012 "On approval of the total allowable harvest of aquatic biological resources in the inland sea waters of the Russian Federation, as well as the territorial sea of the Russian Federation, on the continental shelf of the Russian Federation and in the exclusive economic zone of the Russian Federation, in the Azov and the Caspian Seas for 2013"].

<sup>25</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 05.11.2013 № 403 «Ob utverzhdenii obshchego dopustimogo ulova vodnykh biologicheskikh resursov na 2014 god» [Order of the Ministry of Agriculture of the Russian Federation No. 403 of 05 November 2013 "On approval of the total allowable harvest of aquatic biological resources for 2014"].

<sup>26</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 21.10.2014 № 399 «Ob utverzhdenii obshchego dopustimogo ulova vodnykh biologicheskikh resursov vo vnutrennikh morskikh vodah Rossiyskoy Federatsii, territorial'nom more Rossiyskoy Federatsii, na kontinental'nom shel'fe Rossiyskoy Federatsii i v isklyuchitel'noy ekonomicheskoy zone Rossiyskoy Federatsii, v Azovskom i Kaspiyskom moryah na 2015 god» [Order of the Ministry of Agriculture of the Russian Federation No. 399 of 21 October 2014 "On approval of the total allowable harvest of aquatic biological resources in the inland sea waters of the Russian Federation, the territorial sea of the Russian Federation, on the continental shelf of the Russian Federation and in the exclusive economic zone of the Russian Federation, in the Azov and Caspian seas for 2015"].

<sup>27</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii 07.10.2015 № 465 «Ob utverzhdenii obshchego dopustimogo ulova vodnykh biologicheskikh resursov vo vnutrennikh morskikh vodah Rossiyskoy Federatsii, territorial'nom more Rossiyskoy Federatsii, na kontinental'nom shel'fe Rossiyskoy Federatsii i v isklyuchitel'noy ekonomicheskoy zone Rossiyskoy Federatsii, v Azovskom i Kaspiyskom moryah na 2016 god» [Order of the Ministry of Agriculture of the Russian Federation No. 465 of 07 October 2015 "On approval of the total allowable harvest of aquatic biological resources in the inland sea waters of the Russian Federation, the territorial sea of the Russian Federation, on the continental shelf of the

<b>2017</b>	195	539	758	4	1496** <sup>28</sup>	1063
<b>2018</b>	195	539	758	4	1496 (30) <sup>29, 30</sup>	1234+6***

\* TAC is the total number of walrus allowed to be harvested, incl. the catching for educational and cultural purposes (C), the quota of the latter is in brackets; \*\* in these years, no quotas for the capture of walruses for educational and cultural (C) goals were granted; \*\*\* data on actual capture of walruses provided by the territorial bodies of the Federal Agency for Fishery. In 2013 and 2014, catching calves was carried out for cultural and educational purposes according to ISPN quotas, \*\*\*\* the number of walrus allocated to the Koryak Autonomous Okrug within the total quota is in brackets.

These figures are based on the reports of communities that received quotas for the harvesting of walruses. Individuals did not report on the number of animals hunted, thus falling into the category of the unreported harvest. Currently, no up-to-date data on the size of the unreported harvest is accounted for. We have only early data that show the information of the ChAO Department might be underreported up to 20% of the real [27, Smirnov G.P., Rinteymit V.M., Agagisyk M.D., Litovka M.I., p. 231]. It has been in the TAC rationale since 2013 but has not been used for the calculation of quotas. Since 2014, it is used for the allocation of quotas to communities and private hunters, who got about 20% of the total quotas. Up-to-date data on the proportion of struck and lost animals during harvest have not been available. Since 2013, the TAC calculation uses a previously obtained factor of 42% [28, Fay F.H., Kelly B.P., p. 368]. The TAC rationale is common to all types of catches — for indigenous small-numbered peoples of the North (ISPN) and educational and cultural purposes (C), but the latter is considered only when the needs of native peoples are met.

The TAC rationale is prepared by the Chukchi branch of the Pacific branch of VNIRO (ChukotTINRO), then it is agreed with TINRO and the head institute of VNIRO. Public hearings are tak-

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Russian Federation and in the exclusive economic zone of the Russian Federation, in the Azov and Caspian seas for 2016”].

<sup>28</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 10.10.2016 № 445 «Ob utverzhdenii obshchego dopustimogo ulova vodnykh biologicheskikh resursov vo vnutrennikh morskikh vodakh Rossiyskoy Federatsii, territorial'al'nom more Rossiyskoy Federatsii, na kontinental'nom shel'fe Rossiyskoy Federatsii i v isklyuchitel'noy ekonomicheskoy zone Rossiyskoy Federatsii, v Azovskom i Kaspiyskom moryakh na 2017 god» [Order of the Ministry of Agriculture of the Russian Federation No. 445 of 10 October 2016 “On approval of the total allowable harvest of aquatic biological resources in the inland sea waters of the Russian Federation, the territorial sea of the Russian Federation, on the continental shelf of the Russian Federation and in the exclusive economic zone of the Russian Federation, in the Azov and Caspian seas for 2017”].

<sup>29</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 27.10.2017 № 533 «Ob utverzhdenii obshchego dopustimogo ulova vodnykh biologicheskikh resursov vo vnutrennikh morskikh vodakh Rossiyskoy Federatsii, territorial'al'nom more Rossiyskoy Federatsii, na kontinental'nom shel'fe Rossiyskoy Federatsii i v isklyuchitel'noy ekonomicheskoy zone Rossiyskoy Federatsii, v Azovskom i Kaspiyskom moryakh na 2018 god» [Order of the Ministry of Agriculture of the Russian Federation No. 533 of 27 October 2017 “On approval of the total allowable harvest of aquatic biological resources in the inland sea waters of the Russian Federation, the territorial sea of the Russian Federation, on the continental shelf of the Russian Federation and in the exclusive economic zone of the Russian Federation, in the Azov and Caspian seas for 2018”].

<sup>30</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 26.12.2017 № 935 «O raspredelenii mezhdru pol'zovatelyami, v otnoshenii kotorykh prinyato resheniye o predostavlenii vodnykh biologicheskikh resursov v pol'zovaniye, kvot dobychi (vylova) vodnykh biologicheskikh resursov Volzhsko-Kaspiyskogo i Dal'nevostochnogo rybokhozyaystvennykh basseynov dlya osushchestvleniya rybolovstva v uchebnykh i kul'turno-prosvetitel'skikh tselyakh v 2018 godu» [Order of the Ministry of Agriculture of the Russian Federation No. 935 of 26 December 2017 “On the distribution between users, for whom a decision was made to provide aquatic biological resources for use, of quotas for the harvesting of aquatic biological resources of the Volga-Caspian and Far Eastern fishery basins for fishing in educational, cultural and educational purposes in 2018”].

ing place in the areas where the catch is planned. Before that, within a month, any person can get acquainted with the materials of the TAC development at the Institute (TINRO). Further, the materials are transferred to the independent environmental expertise in Federal Service for Supervision of Natural Resources, where the commission of experts considers the TAC materials within a month. It is followed by an order by the Federal Agency for Fishery to distribute quotas by zone. At different stages, there may be adjustments to the number of animals allowed to catch. The approved quotas are presented in Table 1.

The TAC justification 2003–2007 and quotas were given only for 61.01 — Western-Bering Sea zone. Since 2008, the quota has been given to 3 zones: Chukchi zone, Chukchi sea zone, and East Siberian sea zone.

### *Organization of harvest, its regulation and catch*

The quota for ChAO is distributed between communities and individuals (small native peoples) by the ChAO Department. At present, in Chukotka, walrus are hunted by brigades consisting of the “Territorial Neighborhood Communities of the Indigenous small-numbered peoples of the North” (TNC ISPN) and the “Territorial Neighborhood Communities of the Indigenous small-numbered peoples of the Chukotka” (TNC ISPCh). There are nine communities where walrus harvest is occurring. They are sited in three districts of ChAO, in 16 villages (data 2018)<sup>31</sup>:

#### *Iultinskiy District:*

1. TNC ISPN “Ankal'yt” (maritime people) (settlement Egvekinot, villages Konergino, Uel'kal', Nutepel'men, and Vankarem).

#### *Providenskiy District:*

2. TNC ISPN “Enmelen” (village Enmelen)
3. TNC ISPN “Nunligran” (village Nunligran).
4. TNC ISPN “Sireniki” (village Sireniki).
5. TNC ISPN “Chaplino” (Novoye Chaplino village)
6. TNC ISPN “Yanrakynnot” (Yanrakynnot village)

#### *Chukotskiy District:*

7. TNC ISPCh “Lavrentia” (village Lavrentia)
8. TNC ISPCh “Lorino” (Lorino village).
9. TNC ISPCh “Daurkin” (villages Lavrentia, Uelen, Inchoun, Enurmino, Neshkan).

The walrus are hunted for the benefit of the native population: food, winter stocks in the form of rolls (copalahen), food for the dogs, and arctic foxes at fur farms (Lorino and Inchoun villages). About 700 arctic foxes (with cubs from spring to autumn up to 1 300) live at fur farms. During the season, walrus are hunted due to the demand of the population for meat and economic needs. The walrus harvest is carried out in spring — late autumn, in ice-free time, when walrus appear near the village area (Fig. 2, 3).

<sup>31</sup> The names of the communities are presented as they are registered on the website of the Ministry of Justice of the Russian Federation. URL: <http://unro.minjust.ru/NKOs.aspx> (accessed 26 August 2019).



Fig. 2. Hunters are hauling walrus harvested ashore (the author's photo).

Usually, a more significant number of walrus are harvested in autumn — the preparation of a stock of meat for the winter, because there comes a cold season, contributing to its preservation. Private hunters (families) also harvest walrus and use them entirely for their own needs.

In the framework of traditional economic activities, marine mammals are hunted according to the List types of Traditional Economic Activities of the Indigenous small-numbered peoples of the Russian Federation<sup>32</sup>: Art.6 Fishing (incl. marine animal harvesting) and the sale of aquatic biological resources.

Previously, the hunting process was governed by Order No. 385 of the Ministry of Agriculture of the Russian Federation of 21 October 2013 (ed. 04.06.2018) and since 17 June 2019 — Order of the Ministry of Agriculture of the Russian Federation of 05.23.2019 No. 267 “On approval of fishing rules for the Far Eastern fisheries basin”. In this order, the Regulations for the harvesting of aquatic biological resources for ensuring the traditional way of life and economic activities of the small native peoples of the North, Siberia and the Far East of the Russian Federation are described in Chapter VII.

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<sup>32</sup> Rasporyazheniye Pravitel'stva RF ot 08.05.2009 № 631-r (red. ot 29.12.2017) «Ob utverzhdenii perechnya mest traditsionnogo prozhivaniya i traditsionnoy khozyaystvennoy deyatel'nosti korennykh malochislennykh narodov Rossiyskoy Federatsii i perechnya vidov traditsionnoy khozyaystvennoy deyatel'nosti korennykh malochislennykh narodov Rossiyskoy Federatsii» [Decree of the Government of the Russian Federation No. 631-r of 08 May 2009 (ed. 29.12.2017) “On approval of the list of places of traditional residence and traditional economic activity of small native peoples” and the list of traditional economic activities of the small native peoples of the Russian Federation”].



Fig. 3. Cutting walrus (the author's photo).

According to Art. 96 concerning traditional fishing, it is prohibited to harvest: “a) walrus with the use of all tools and methods of hunt, with the exception of authorized rifled weapons, in case of the onboard presence of means for immediate hauling of the harvested animal from the water; on coastal haulouts; lactating females with calves; c) alive marine mammals for the delivery to shores.”

According to Art. 32.21, during the harvesting of aquatic bioresources, it is prohibited to harvest walrus at haulouts and the distance less than 500 m from them. Art. 23.2.1. contains a list of areas (islands, capes, and coasts) where harvesting is prohibited in the 12-mile zone, all year round or in the period from July 1 to December 31.

Parties engaged in traditional fishing, according to Art. 89, are not entitled to discard the harvested (caught) aquatic bioresources permitted for harvesting. According to Art. 86—88.2 they must ensure the filling of a fishing log, provide data to the relevant territorial authority of the Federal Agency for Fishery, i.e., data on the harvesting of aquatic bioresources incl. marine mammals, and maintain, in proper order, places of the slaughter and cutting of marine mammals.

Information on the actual harvesting of walrus is transferred by head of brigades and lead communities to the Department of ChAO. According to the Department of ChAO, quotas are not whole taken [29, Boltnev A.I., Grachev A.I., Zharikov K.A. Zabavnikov V.B., Kornev S.I., Kuznetsov V.V., Litovka D.I., Myasnikov V.G., Shafikov I.N., p. 246; 26, Chakilev M.V., p. 36]. However, observations and researches (both own and completed by the other researchers) reveal the real harvest higher than the official data of the Department. This value varies in different villages and years from 10.4% to 20% [27, Smirnov G.P., Rinteimit V.M., Agnagisyak M.D., Litovka M.I., p. 231]. Besides, as noted earlier, the private harvest is not entirely regulated. Therefore, it appears that the quota has been taken completely.

In some years (Table 1), in addition to native harvest, quotas were allocated for educational and cultural purposes, i.e., harvesting walrus for captivity (e.g., oceanariums, etc.). Catching for educational and cultural purposes is in the Fisheries Rules<sup>33</sup>, Chapter VI. The harvest of cubs is prohibited on coastal haulouts and at less than 500 m from them. No restrictions established on age categories, but usually harvest for young walrus (4–6 months), occasionally yearling (1.5 years); both age groups are dependent calves drinking milk and accompanied by mother.

Also, if marine mammals are damaged in any type of harvesting, a fine will be charged<sup>34</sup>. E.g., for the Pacific walrus, it amounts to 57,540 rub.

### *Discussion*

Currently, seasonal mortality data are used to justify the TAC, i.e., the count of dead walrus on one or three haulouts within two months. But this does not reflect the real walrus mortality. The rest of the Chukotka coast and several other haulouts are not covered. It does not include for the deaths of young walrus from birth to the time that they are go out on the shore. They may die for various reasons, incl. the hunt of polar bears (author's observations 2017). The period of the first winter of calves is not accounted for as well. Also, stillborn and abortions are not considered. Therefore, seasonal local observations of walrus mortality give a somewhat relative estimate of mortality. A modern study on the reproductive system of walrus females is needed to answer these questions. The last time such studies were carried out 22-38 years ago [7, Kibalchich A.A., p. 28; 30, Garlich-Miller J., Pungowiyi C., p. 6]. After that, significant changes in the walrus habitat occurred, which could affect the survival of calves.

Unfortunately, there is also a lack of information on the sex and age composition of the harvested animals. Communities report only on the total number, and it does not allow for a clear assessment of elimination from the population. Information is available only if a biologist is pre-

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<sup>33</sup> Prikaz Ministerstva sel'skogo khozyaystva Rossiyskoy Federatsii ot 23.05.2019 № 267 «Ob utverzhdenii pravil rybolovstva dlya Dal'nevostochnogo rybokhozyaystvennogo basseyna» [Order of the Ministry of agriculture of the Russian Federation No. 267 of 23 May 2019 "On approval of fishing rules for the Far Eastern fishery basin"].

<sup>34</sup> Postanovleniye Pravitel'stva Rossiyskoy Federatsii ot 03.11.2018 № 1321 «Ob utverzhdenii taks dlya ischisleniya razmera ushcherba, prichinennogo vodnym biologicheskim resursam» [Decision of the Government of the Russian Federation No. 1321 of 03 November 2018 "On approval of the charges for calculating the damage caused to aquatic biological resources"].

sent at the harvest time, but it covers only a short period in one or two villages. According to earlier data, in several communities, a small preponderance in harvest was towards males [11, Kryukova N.V., p. 124]. However, we have no complete information.

Spearing (rus. "pokol") with spears is a traditional method of harvesting walrus on coastal haulouts [1, Bogoslovskaya L., Slugin I., Zagrebin I., Krupnik I., p. 307]. At the same time, it conflicts with Fisheries Regulations that prohibit harvest on coastal haulouts. However, well-organized spearing carried out on small haulouts allows harvesting several animals quickly without significant panic among walruses. The spearing is done late in the autumn when storms interfere with hunting from boats. At this time, a small snow cover is usually formed and snowmobiles or dog sledding are used for the delivery meat of walrus to the villages. At the same time, if the hunt is poorly organized, it causes panic and mass descent of walruses into the water, which is accompanied by trauma and death of animals [31, Chakilev M.V., Bayderin A.G., Kochnev A.A., p. 272].

Also, some areas referred to the walrus quiescent zones by the Fishing Rules. Hunters actively use them since it is possible to obtain the required number of walruses with little time, effort, and fuel. Usually, hunting is carried out on the water at walruses going from the sea to haulouts, without disturbing the ones on the shore. But in some cases, this causes disturbing [32, Pereverzev A.A., Kochnev A.A., p. 175].

At the same time, poaching is present (i.e., walrus is harvested, poachers cut tusks and throw carcasses), and it is not considered when substantiating TAC. The size of poaching is not precisely known; it appears to vary from one area to another, depending on the level of control.

Catching for educational and cultural purposes, despite the ban on catching of calves on the shore, according to the Fisheries Regulations, for many years, it was focused on haulouts, accompanied by massive panic and the descent of walruses from haulout into the water, thereby increasing the mortality of walruses [14, Smirnov G.P., Kochnev A.A., Litovka M.I., Kompantseva E.I. Grigorovich P.V., p. 229; 15, Kochnev A.A., p. 284].

Another problems associated with climate change are extended periods of open water [10, Stroeve J.C., Serreze M.C., Holland M.M., Kay J.E., Malanik J., Barrett A.P., p. 1006] and an increase in water temperature in the Arctic [33, Steele M., Ermold W., Zhang J., p. 1]. They lead to increased mixing/circulation of water with pollutants — in the horizontal direction with currents and the vertical direction during storms. Of concern is the contamination of radionuclides entering the water from radioactive waste sites [34, Nikitin A.I., p. 4] whose location may be unknown. The walrus diet is dominated by mollusks, which are biofilters and can accumulate up to 90% of radioactive strontium from the surrounding water [35, Belokon' A.S., Dvoretzkiy A.I., Novitskaya O.A., Lavrova T.V., p. 21]. Similar situation with heavy metals, such as mercury, which accumulates in tissues throughout the life of the animal [21, Trukhin A.M., Simokon M.V., p. 3363]. The meat of such animals may pose a danger to the health of the native population [21, Trukhin A.M., Simokon M.V., p. 3365].

Investigations have shown that walruses and the other pinnipeds (largha, bearded seal, and ringed seal), are infected with trichinosis [22, Bukina L.A., p. 13]. The native population uses the meat of these animals for food in raw and dried form. It is possible that walruses, due to the inaccessibility of food (long feed routes), will often eat dead animals and therefore, the number of walruses infected with trichinosis can increase. It is necessary to continue the research on the walruses for infection to resolve this question.

### Conclusion

The conservation of the Pacific walrus is vital for both the native people of Chukotka and the fisheries. In our view, this requires:

1. Conduct more detailed and relevant researches on the Pacific walrus, namely, to study the reproductive organs (the reproduction period, the mortality rate of calves in the first year of life, etc.); register the age and sex composition of harvested walruses; conduct toxicological, microbiological and other studies to assess animal health, because people use their meat for food raw.
2. To work out more precise and unambiguous formulations in the legislative documents regulating traditional harvest (areas, periods, and methods), since some points contradict the capabilities and interests of the native people. It is also necessary to inform the native people about changes in legislation that regulates traditional harvest, as the local population in villages often does not know either the Fishing Rules or the possible consequences of their violations.
3. Cooperation (not confrontation) between employees of different scientific institutions and the native peoples in the research of walrus. It will contribute to more extensive and full-scale research walruses on haulouts, and annual native harvest will help to collect a more substantial amount of material on the biology and health of walruses. It is also necessary to create an international walrus group for the rapid exchange of research results and relevant information in the case of epizootics since this resource is common for Russia and the US.

Communities that believe and are firmly convinced that their well-being and future depend on a hunt on walrus will be the best partners in management [36, Metcalf V., Robards M., p. 154].

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