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GRAY WHALE RESEARCH IN 2022 OFF NORTHEASTERN SAKHALIN ISLAND AND SOUTHEASTERN KAMCHATKA, RUSSIA

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ABSTRACT

In 2022, research on western gray whales was conducted by the Russian Gray Whale Project and Kronotsky State Preserve in two study areas: (a) northeastern Sakhalin Island off Piltun Lagoon and (b) southeastern Kamchatka in Kronotsky Gulf, specifically Olga Bay. In Sakhalin, work was conducted from 27 July to 8 September and 13 boat surveys were completed. A total of 31 whale groups were encountered (with repeated sightings) but, strikingly and of concern, only 7 whales were identified. One mother-calf pair and four new non-calf whales previously not seen in the study area were observed. The Sakhalin photo-identification catalog collected between 1994-2022 now includes 336 individuals. In Olga Bay, research was conducted from 6 June to 7 September. The total number of gray whales using this study area in 2022 was 97 including 7 mother-calf pairs. Of the 97 whales recorded, 43 individuals had known sighting histories off Sakhalin in earlier years. These data, in combination, again confirm the regular use of the study areas off both Sakhalin and Olga Bay by some whales. Interesting, the number of mother-calf pairs was higher in Olga Bay in 2022 than in the Piltun area, reflecting a notable change from the more typical pattern of more mother-calf pairs being recorded off Sakhalin as documented in earlier years. Overall, the results of the 2022 research program indicate a dramatic decrease in the number of gray whales feeding in the nearshore waters off northeastern Sakhalin near Piltun Lagoon, a finding that raises great concern about the population and calls for deeper investigation regarding the reasons for this trend in declining numbers.

KEYWORDS: WESTERN GRAY WHALE; RUSSIA; POPULATION BIOLOGY; BEHAVIOR; CONSERVATION

INTRODUCTION

In 2020 the western gray whale was officially designated as a priority Category 1 (endangered) population in the Red Book of the Russian Federation and is recognized as a priority category (I) according to the "Degree and Priority of Conservation Measures Adopted and Planned" (Order of the Ministry of Natural Resources of Russia No. 162 of 24.03.2020). Every year gray whales come to Sakhalin Island near Piltun Lagoon (Fig. 1) for summer feeding and they are observed in this area from late May to the end of November during the ice-free period. The gray whale population off Sakhalin and Kamchatka has been increasing at a rate of 3.4-4.8% per year, albeit with some fluctuations, over the period 2006-2016 and in 2016 was estimated at 271-311 whales, excluding calves, of which 175-192 whales were considered predominantly whales associated with the Sakhalin area (Cooke et al. 2018). The number of breeding females was estimated at 51-72.

The research objective of the Russian Gray Whale Project (RGWP) is to monitor the population ecology of western gray whales through the identification of individuals combined with biopsy sampling when possible. The long-term monitoring of gray whales conducted by the RGWP summering off northeastern Sakhalin Island (Fig. 1) began in 1997 (as the "Russia-US Program") and photo-identification surveys have been conducted annually (1997-2022) during the summer feeding season. Data collected in the area near Piltun Lagoon, the primary nearshore feeding area for western gray whales, has served as the basis for understanding the life history parameters, current population status, ecology, and human related impacts on these whales and their environment.

The 2022 field season was very difficult for the RGWP due to poor weather conditions (fog and wind) and uncertainty with project funding. Nevertheless, we did accomplish some research and thereby continued the long-term data time-series. In this report, we present summary results of our research on western gray whales off northeastern Sakhalin Island (Fig. 1) and southeastern Kamchatka (Fig. 2).

METHODS

In 2022 we maintained the overall consistency in research design, data collection techniques and data analysis used since 1997 to allow for directly compatible inter-annual comparisons.

Study area

Our Sakhalin study area has remained the same since the beginning of the time-series in 1997 and is located off Piltun Lagoon on the northeastern coast of Sakhalin Island, Russia and covers about 60 km along the coast (Fig. 1). A single channel connecting the inner lagoon with the Okhotsk Sea occurs at 52° 50' N and 143° 20' E, and has considerable biological influence on the surrounding marine environment. The nearshore marine environment of the study site is mostly sand substrate, characterized by a gradually sloping and broad continental shelf. Water depths within 5 km of shore are mostly shallow and less than 25 m deep. Whales do not enter this lagoon but sometimes can be observed in the deeper waters at the lagoon mouth.

In 2022, we also continued our research efforts off southeastern Kamchatka, where gray whales have been reported since the mid-1990s. The main gray whale concentration was in the area of 3 nm under protection of Kronotsky State Preserve (Kronotsky Gulf) in Olga Bay (Fig. 2).

Photo-identification surveys

Photographic surveys involved slow travel in a 5.2 m inflatable boat powered by a Yamaha 40 hp outboard motor. Nikon D7000 digital camera with a 100-400 mm Nikon lens was used to photograph whales. Measures of environmental conditions, water depth, geographic position, and group size were recorded for each group photographed.

For gray whale identification we used the common photo ID distinctive body markings, such as natural coloration and pigmentation patterns, as well as scars, that are unique to an individual and can be used for individual recognition. Boat-based photo-identification surveys were conducted on all good weather days during the 2022 study period. Previous photo-identification data gathered in the Piltun area between 1995 and 2021 used right-side dorsal flank markings for identification (Brownell et al., 1997; Weller et al., 1999, 2006), and for the sake of intra- and inter-annual reliability, we continued this methodological approach. Since May 2006, the western gray whale photo-identification catalogue compiled by the Russia-U.S. research program, renamed the Russian Gray Whale Project (RGWP) in 2015, is available on request to all interested parties (Weller et al. 2006). In continuance of this good faith gesture the 1994-2021 catalogue maintained by the RGWP (Dr. Alexander Burdin, PI) was made available via the IWC Secretariat following SC68D in 2022. It is the intent of the western gray whale catalogue authors to follow the guidelines set out in Olson *et al.* (2017), including a data availability agreement that facilitates access to the catalogue for Scientific Committee members. As an initial step, the catalogue was provided to the IWC Secretariat in PDF form; this will be followed in time with more complete sighting information and related digital type-specimen images.

The majority of whales identified to date now have images of right and left flanks as well as ventral fluke surface in the photo-identification catalog allowing for useful identification images to be collected from nearly any body region captured.

RESULTS

Survey effort and photo-identification Sakhalin 2022

Small boat surveys were carried out from July 27 to September 8 (Table 1). Compared with previous years, in 2022 the weather conditions were extremely poor which presented serious limitations to survey effort because of fog and strong wind. The groups of whale researchers contracted by the oil companies experienced the same difficulties for their field season from June to September. Despite these limitations we were able to conduct 13 photo-identification surveys between 27 July and 08 September with a total of 48.5 hrs spent in direct observation of 31 whale groups (Table 1) and only 7 individual whales were identified. Between 1994 and 2022, 336 western gray whales have been identified during 565 boat-based surveys off northeastern Sakhalin (Table 1). One hundred eighty one of the whales in the photo-catalog were animals first identified as calves, while the remaining 155 whales were considered non-calves (i.e. adults or subadults). However, not all of these 336 individuals are considered to be alive (Table 2; Fig. 3).

Mother-calf pairs Sakhalin 2022

During August to early September 2022, only one mother-calf pair was identified in the study area (Table 3). Four whales new to the catalog were encountered without mothers but is not yet possible to say whether they were already weaned calves of the year. Due to logistical problems, our field work started later than usual (in late July) and the only sighting of a mother-calf pair occurred on 8 August and this pair was seen for the last together on 25 August (Table 3). As usual for mothers with their dependent calves, the pair identified in 2022 was observed in proximity to the entrance of Piltun Lagoon more often than in other parts of our study.

Survey effort and photo-identification Kamchatka 2022

In Olga Bay, research was conducted from 6 June to 7 September. The total number of gray whales using this study area in 2022 was 97 including 7 mother-calf pairs. Of the 97 whales recorded, 43 individuals had known sighting histories off Sakhalin in earlier years. The length of stay of whales in Olga Bay varied significantly and ranged from 1 to 93 days. In all, 21 whales were sighted once, 29 whales spent 2-10 days in the area, 10 whales spent 11-20 days, 19 whales spent 21-60 days and 18 whales spent more than 60 days. Some whales were sighted regularly, others were resighted at long intervals.

In most cases, the whales were feeding (71.5% of records), traveling (23.5%) and resting (5%). The approximate area where whales were encountered was 95 km². The distribution of whales was confined to the coastal zone with depths from 3 to 18 m. In June, whales often fed in the coastal waters from the mouth of the rivers Olga and Tatyana. In July, whales began to feed more frequently in the eastern part of the Olga Bay (i.e. the "deep area"), and still at the mouth of the rivers Olga and Tatiana. In August-September, the whales fed in the "deep area" of the bay, and along the coast closer to the Kronotsky Estuary. A significant portion of the whales observed during their stay in Olga Bay improved their physical condition. However, in August and September, 9 individuals were emaciated, including 4 lactating females.

Mother-calf pairs Kamchatka 2022

During the observation period, 7 mother-calf pairs were recorded. The duration of their stay in the study area varied significantly. Of these 7 mothers, 5 of them had previous sighting histories in the Sakhalin study area. Female no. 224 stayed in the Olga Bay study area almost the entire season, from June to September. All 7 calves observed in Olga Bay were in good physical condition from the moment we met them the first time. From mid-August the calves were starting to be observed separately from their mothers. These observations of reproductive females previously known from Sakhalin attending their calves of the year in Olga Bay in 2022 may explain the low number of mother-calf pairs off Sakhalin, and emphasizes the importance of both the Piltun (Sakhalin) and Olga Bay (Kamchatka) areas.

DISCUSSION

Despite our efforts to survey gray whales in the Piltun study area, during our 2022 field effort we did not observe any changes in whale distribution, as in the recent past number of years, because of extremely small whale numbers observed. In all 27 years we have conducted our monitoring of western gray whales in their feeding ground off Sakhalin, 2022 was by far the year where the smallest number of whales and mom-calf pairs were observed. We do not know the reason for this dramatic change, but it coincides with the 2019-2023 UME occurring in the eastern North Pacific (ENP) and the overall decline in abundance of ENP gray whales reported since 2016 (Eguchi et al. 2022).

An additional reason for gray whale absence in the Sakhalin feeding area in 2022 could be related to the intensive anthropogenic activities of oil development occurring on the Sakhalin shelf. A number of biological parameters, including changes in habitat/prey, in concert with a variety of human-related impacts as identified during the current long-term study, raise concern about the ability of the western gray whale population to continue to recover and highlights the importance of continuing our long-term research and monitoring program.

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Table 1. Annual survey effort, groups encountered, and whales identified in 1994-2020.

Year	Sampling Period	Number of Surveys	Observation Hours	Groups Encountered	Whales Identified
1994	09/07 - 09/12	1			9
1995	08/15 - 08/19	5	10:1	23	28
1997	07/09 - 09/08	22	33:4	114	47
1998	07/06 - 09/29	35	50:5	125	54
1999	06/29 - 10/13	56	122	434	69
2000	06/25 - 09/16	40	56:5	365	58
2001	06/25 - 09/25	49	101:8	448	72
2002	07/01 - 09/25	36	75:6	411	76
2003	07/15 - 09/13	22	41:7	219	75
2004	07/29 - 09/12	21	33:8	194	94
2005	07/04 - 09/09	20	40:9	160	93
2006	07/23 - 08/25	10	24:1	96	79
2007	07/26 - 09/09	20	32:2	187	83
2008	07/08 - 08/21	12	47:0	38	45
2009	06/24 - 08/26	17	67:0	126	82
2010	08/09 - 08/26	4	11:5	40	42
2011	06/28 - 08/26	14	32:7	83	82
2012	06/24 - 08/30	11	48:8	78	88
2013	07/07 - 08/24	16	54:4	148	94
2014	07/08 - 08/23	20	41:7	203	78
2015	07/02 - 08/14	16	38:8	114	60
2016	07/06 - 08/21	15	15:2	135	56
2017	07/04 - 08/25	15	18:3	118	49
2018	07/08 - 09/08	8	34:2	42	25
2019	07/04 - 09/08	30	114:5	251	49
2020	07/27 - 09/08	17	62:5	122	32
2021	07/10 - 09/03	20	91:0	146	42
2022	07/28 - 09/05	13	48:5	31	7
Overall	1994-2022	565	1380:4	4451	336

* The number of whales identified annually includes resightings of individuals from previous years, resulting in a total of 336 identified individuals. The number of whales identified does not correspond to the size of the population.

Table 2. Annual sighting trends and resighting percentages, 1994-2022

Year	Whales Identified	Number of Calves	New Non-Calves	% Non-Calves Previously Identified
1994	9			
1995	28	2	20	23.1%
1997	47	2	25	44.4%
1998	54	8	5	89.1%
1999	69	3	12	81.8%
2000	58	3	3	94.5%
2001	72	6	6	90.9%
2002	76	9	3	95.5%
2003	75	11	2	96.9%
2004	94	8	3	96.5%
2005	93	6	4	95.4%
2006	79	4	3	96.0%
2007	83	9	2	97.3%
2008	45	3	0	100.0%
2009	82	7	2	97.6%
2010	42	3	1	97.4%
2011	82	12	1	98.6%
2012	88	5	6	92.7 %
2013	94	9	3	96.5 %
2014	78	9	3	84.6 %
2015	60	8	2	96.1 %
2016	56	6	7	86.0%
2017	46	7	5	80.0 %
2018	23	5	6	66.7%
2019	49	20	1	96.5%
2020	32	8	4	84.6%
2021	42	14	3	89.3%
2022	7	1	4	33.3%

* Data from 1994 and 1995 were opportunistic and pilot in nature (respectively) and are thereby viewed as incomplete for some of the reported values.

Table 3. Dates of first sightings of mother-calf pairs in summer 2022

Female ID	Calf ID	First Time Seen Together	Last Time Seen Together	Female ID
018	333	12.08.2022	25.08.2022	018

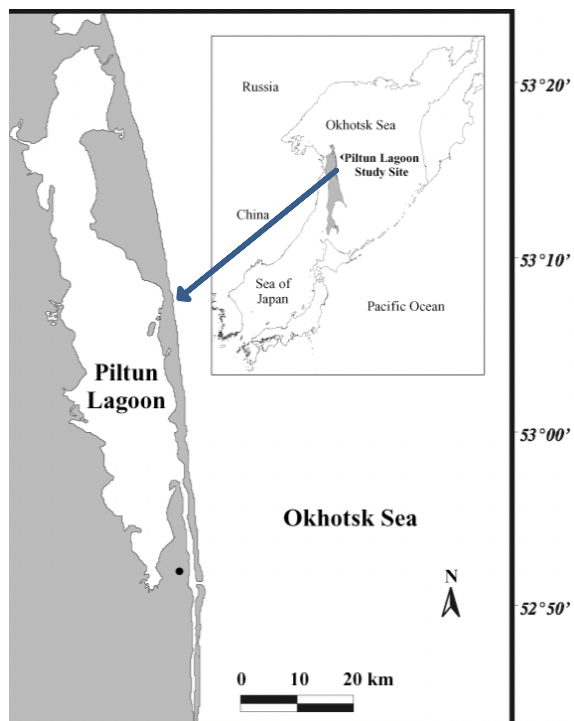


Fig.1 Study area. Black dot is the RGWP base camp at the Piltun lighthouse.

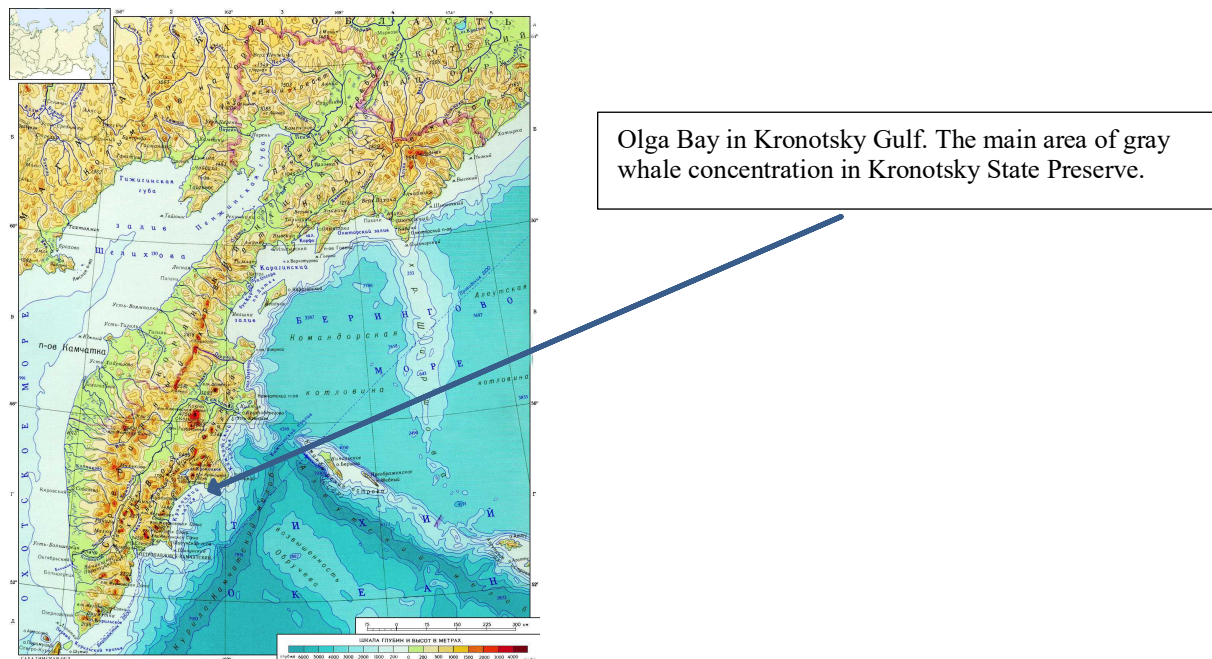


Fig. 3. Gray whale survey in southeastern Kamchatka in 2022.

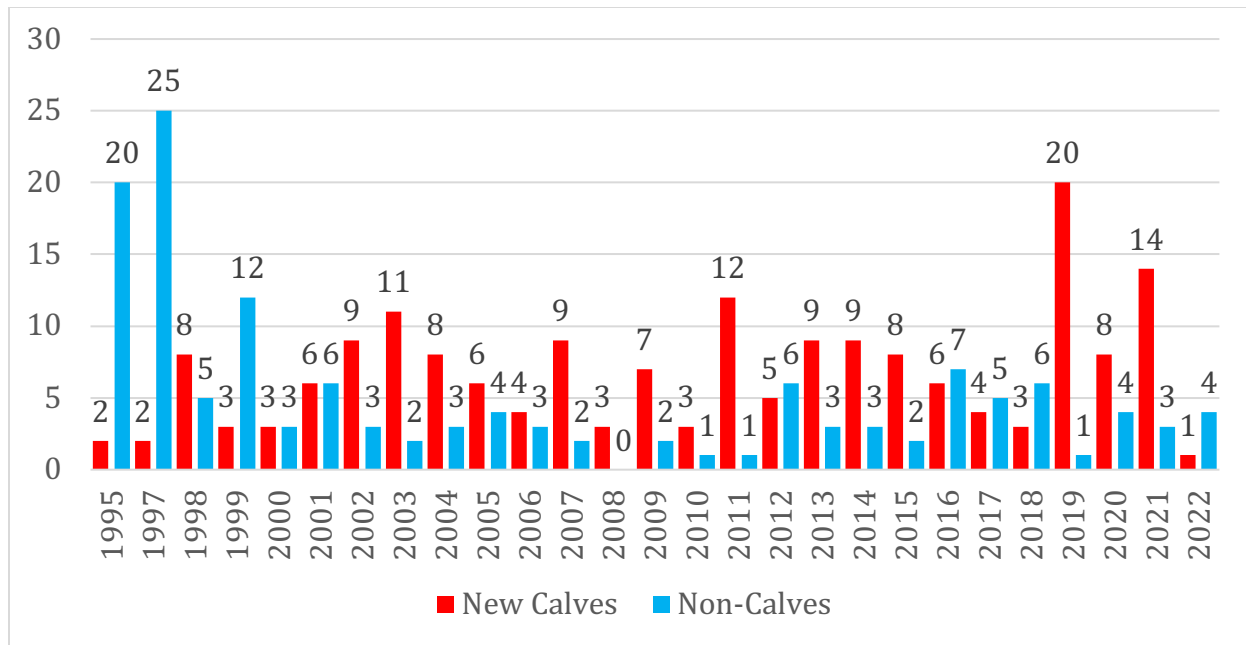


Fig. 3. New gray whale non-calves and calves observed in Piltun lagoon area in 1995-2022