WESTERN GRAY WHALE ADVISORY PANEL
22nd meeting

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REPORT OF THE WESTERN GRAY WHALE ADVISORY PANEL AT ITS 22ND MEETING

CONVENED BY THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE

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ACRONYMS

AUAR	Autonomous Underwater Acoustic Recorder
BAP	Biodiversity Action Plan
CMP	Conservation Management Plan
Company	Sakhalin Energy Investment Company Ltd.
ENL	Exxon Neftegas Limited
FAB	Feeding Area Boundary
IFC PS	International Finance Corporation's Performance Standards
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
MMC	Marine Mammal Council (Russia)
MMO	Marine Mammal Observer
MMP	Monitoring and Mitigation Programme/Plan
MMPP	Marine Mammal Protection Plan
Minprirody	Ministry of Natural Resources and Environment of the Russian Federation
NTF	Noise Task Force
OBN	Ocean Bottom Nodes
Panel	Western Gray Whale Advisory Panel
Photo-ID	Photo identification
PML	Perimeter Monitoring Line
POI	Pacific Oceanological Institute
PS6	IFC Performance Standard 6 for Biodiversity Conservation and Sustainable Management of Living Natural Resources
Sakhalin Energy	Sakhalin Energy Investment Company Ltd.
SECMP	Sakhalin Energy's Conservation Management Plan
SRT	Source Reduction Test
SSTF	Seismic Survey Task Force
UAV	Unoccupied Aerial Vehicle
UAS	Unoccupied Aerial System
WGWAP	Western Gray Whale Advisory Panel

EXECUTIVE SUMMARY

The 22nd (and final) meeting of the Western Gray Whale Advisory Panel (WGWAP-22) was held on 9-10 November 2022 at the head office of IUCN in Gland, Switzerland, with a video link to accommodate participants who were unable to attend in-person. In opening the meeting, the Panel chair (Reeves) welcomed representatives of NGOs, Russian Government agencies and institutions, and the Lenders' representatives. He noted that only one of the ten current Panel members, David Weller, was missing due to travel restrictions. Also, for one final time, Reeves acknowledged and thanked IUCN for the steadfast support provided to the western gray whale panels over the past 17 years.

Two meetings of the Noise Task Force (NTF) were held by videoconference between WGWAP-21 (NTF-19, 24 March–8 June 2022) and WGWAP-22 (NTF-20, 12-13 October 2022). Both focussed on development of a Monitoring and Mitigation Plan (MMP) for Sakhalin Energy's next large-scale seismic survey which is planned for 2022. The Panel **endorsed** the MMP as presented but also encouraged the Company to reconsider its decision to not incorporate an Independent Observer into the MMP as had been done for its large-scale seismic surveys in 2010 and 2018. The Panel welcomed Sakhalin Energy's willingness to include another source reduction experiment in its 2022 seismic survey planning and stressed once again the importance of minimising the amount of acoustic energy used in seismic surveys whilst still allowing adequate business results to be obtained. The Panel also welcomed the Company's decision to undertake its own very limited acoustic monitoring programme again in 2021 and encouraged that a similar program, at a minimum, be continued into the future to help the Company meet the commitments made in its Marine Mammal Protection Plan.

The scope of the joint Exxon Neftegas Limited–Sakhalin Energy Programme for Gray Whale Monitoring (Joint Programme) off the North-East Coast of Sakhalin Island was again limited in 2021 to only photo-identification (photo-ID) and distribution surveys; there was no monitoring of the benthos even though the programme's stated purpose is to monitor the feeding aggregation of gray whales *and their habitat*. No meaningful habitat monitoring has been carried out under the Joint Programme or by Sakhalin Energy independently for the last five years despite the Panel's repeated calls for a resumption of sampling the benthos, a key habitat feature attracting gray whales to the Piltun feeding area. In this regard, the Joint Programme is not fulfilling its own objectives with respect to the whales' habitat or contributing to a proper understanding of the recent changes in their general distribution from the nearshore feeding area to the offshore feeding area.

Regarding the future of the Joint Programme (or independent Sakhalin Energy efforts), the Panel advised that not only should the lost programme components that were discontinued be restored, but also that (i) UAV/drone technology be used for photogrammetry to better understand demographic parameters, body condition and health of the whales, (ii) continuation of at least some acoustic and visual/photo-ID monitoring effort throughout the season to assess and inform mitigation measures and changes in habitat use and (iii) satellite tagging be conducted late in the feeding season to further determine individual whale movements and the risks to which they are exposed outside the Sakhalin feeding areas.

Justin Cooke's updated annual population assessment concluded that by 2020 the number of whales regularly using the Sakhalin feeding grounds was 220-270 individuals, with an increasing trend since the early 2000s.

Western gray whales have been designated as a Russian national conservation priority. The Cetacean Experts Section of Minprirody's Working Group on the Conservation and Restoration of Selected Rare and Endangered Species of Wildlife is responsible for developing conservation strategies for the Okhotsk Sea (i.e. western) gray whale population and the Okhotsk Sea bowhead whale population. IUCN and the Panel have collaborated with the Marine Mammal Council to produce the draft strategy for western gray whales, which is in the final stages of review and revision. IUCN staff along with several Panel members were expected to continue serving on the Cetacean Experts Section post-WGWAP.

Although no new recommendations were made at this, its last meeting, the Panel identified a number of key actions that Sakhalin Energy and other companies operating on the Sakhalin Shelf should take, or continue to take, into the future, including:

(a) collection of data using methods intended to facilitate assessment of 'resilience' by pairing benthic prey sampling and stress hormone levels with assessments of individual body condition (via photogrammetry);
(b) applying improved methodologies for within-season density and abundance estimation;
(c) tagging to better understand movements, diving, acoustic behaviour and habitat use;
(d) assessment of the entire underwater soundscape experienced by gray whales in the Sakhalin feeding areas through time, both long-term and intra-seasonal;
(e) maintaining regular interactions between all research teams collecting data in the field to ensure data reliability and comparability;
(f) rigorous evaluation of the effectiveness of mitigation measures in the short and long term;
(g) finding ways to integrate new technology without compromising the value of data series derived from 'traditional' methods;
(h) commitment to annual acoustic monitoring;
(i) continuation of annual (or at least regular) population dynamics modelling, preferably drawing on a common integrated photo-ID and genetics data set under a unified management framework;
(j) resumption of habitat monitoring in the truest sense of regularly sampling gray whale prey;
(k) ensuring transparency, independence and regular (mandatory) reporting of fieldwork results not only to regulators but also to the public.

The Panel stressed the need for government-mandated co-operation and sharing of both the costs of acquiring and analysing data and sharing of the data under a fair and secure process focussing on agreed conservation and management needs and objectives. Individual members expressed their great interest in and ongoing commitment to the conservation of western gray whales in Russia and range wide.

1 WELCOME AND OPENING REMARKS

The meeting was held at IUCN Headquarters in Gland Switzerland from 10-11 November 2021. A number of participants joined via video-conferencing. The full list of participants is given as Annex A.

1.1 IUCN

Boris Erg (Director, IUCN Regional Office for Eastern Europe and Central Asia) opened the 22nd and final WGWAP meeting, which he hoped would help IUCN consolidate the Panel's legacy in the coming months. He anticipated that the 'next chapter' in conservation of western gray whales in Russia would be led by the Ministry of Natural Resources and Environment of the Russian Federation (Minprirody), other government bodies and non-governmental organizations. Several Resolutions of IUCN's recent World Conservation Congress (September 2021, Marseille, France) were relevant to the conservation of western gray whales.[1] Erg concluded by wishing all participants a productive meeting which would mark the establishment of a strong legacy for WGWAP.

1.2 Minprirody

Olga Krever (Deputy Head, Russian Federal State Budgetary Institution "Information and Analytical Centre for Protected Areas Support" (Roszapovedtsentr) of Minprirody; Member of the Bureau of Minprirody Working Group on Rare Species; Deputy Chair of the Cetacean Expert Section of the Minprirody Working Group on Rare Species) welcomed all participants. She considered it an honour to participate in the final meeting of WGWAP. IUCN and the Panel, in collaboration with Sakhalin Energy, had produced an impressive body of work that would contribute to environmental conservation, which is a priority for many Russian federal organizations. The first phase of the Convention on Biodiversity's Conference of the Parties 15 (CBD COP15) had recently finished, and the United Nations Framework Convention on Climate Change Conference of the Parties 26 (UNFCCC COP26) was currently under way. Their outcomes are expected to have major implications for conservation of the offshore environment, including gray whales. Krever hoped to see the Panel's efforts continue in some form, and assured the meeting that Russian authorities would make every effort to support gray whale conservation as part of their vital international commitments and activities. She also expressed hope that all colleagues who have been involved in the WGWAP process would continue to work together in future. She ended by thanking the Panel for results achieved to date and hoping for a successful final meeting.

1.3 Chair

Reeves expressed particular thanks and appreciation for the support received from IUCN at all levels, and most particularly to Carbone Khodabakhsh and Berzina-Rodrigo, whose commitment to the cause had been consistently inspiring and reassuring. More generally, the Secretariat in Gland had done heroic work to organize the current meeting. He also thanked Sakhalin Energy staff members and contractors for giving their time to participate in the meeting and for negotiating considerable obstacles to attend in person. Finally, he expressed appreciation for the

[1] See for example, WCC 2020 Rec 126 – Reinforcing the protection of marine mammals through regional cooperation, WCC 2020 Res 113 - Restoring a peaceful and quiet ocean, WCC 2020 Rec 112 – Planning of maritime areas and biodiversity and geodiversity conservation. These and other resolutions (also earlier) ones can be found at https://portals.iucn.org/library/resrec/search.

efforts made by participants who were joining the meeting online, often at inconvenient hours in distant time zones.

1.4 Agenda

The agenda is given as Annex B.

1.5 Documents

The list of documents is given as Annex C.

1.6 Meeting report drafting procedures and timeline

Reeves said that a report of the 22nd and final WGWAP meeting would be produced in the normal fashion – as quickly and efficiently as possible.

2 GRAY WHALE RESEARCH AND MONITORING IN 2020 AND 2021, PLANS FOR 2022 AND BEYOND

2.1 Russia Gray Whale Project (RGWP)

2.1.1 Presentation

Document WGWAP-22/10 summarized preliminary results of the 2021 field season conducted by the RGWP (formerly the Russia-US Programme). This work began in 1995 and has been ongoing annually since 1997, representing a consecutive 25-year time-series that has served as the foundation for *inter alia* western gray whale population assessments.

The 2021 season in the Nearshore (Piltun) feeding area was conducted between 7 July and 8 September, during which time 20 'surveys' were carried out and 146 whale groups encountered. This effort resulted in the photo-identification of 42 individuals, including 14 calves. The number of calves observed is notable in that it is the second highest reported in the data time-series. Three previously unidentified non-calves were documented. The total number of individual whales in the RGWP photo-ID catalogue is now 331.

The total number of gray whales photo-identified in the study area was higher than in 2020 (42 and 32 respectively). In comparison to 2020, the general distribution of whales was similar, but more individuals were observed: (i) north of the entrance to Piltun Lagoon and (ii) feeding in deeper waters than usual.

In 2021, the RGWP also conducted a survey for gray whales off the Kamchatka Peninsula (Olga Bay, Kronotsky Gulf) on 23 August. During that effort, 9 whales were encountered of which 3 were previously known from the Sakhalin catalogue. None of these whales were observed in 2021 by the RGWP off Sakhalin either because they did not visit the nearshore Piltun area or they were present but were missed by the RGWP sampling efforts. A comparison of the 2021 Kamchatka whales to the Joint Programme photo-catalogue has not yet taken place but would be valuable.

2.1.2 Discussion

In response to a question from the Panel about the use of new technologies by the RGWP, Burdin stated that photo-identification and biopsy sampling have remained the core elements of the RGWP research but that new laboratory work on fatty acid signatures was being undertaken by a member of the RGWP as part of a doctoral study. With regard to planning for 2022, Burdin noted that funding remained uncertain (as it has been the past few years) but his tentative plan is for continued photo-identification and sampling off Sakhalin and southeast Kamchatka to support ongoing research related to population assessment, genetic structure and diet/trophic relationships via fatty acid and stable isotope analyses.

In conclusion, the Panel reiterated its appreciation of the extraordinary dedication and commitment of Burdin and his RGWP team. The results of their summer surveys at Sakhalin have contributed to the International Whaling Commission's (IWC) regional and rangewide assessments and have helped scientists and conservationists to document the return of gray whales to the Russian Far East, where they were either absent or unnoticed for many decades. Burdin stated that a full report of 2021 field operations and results would be provided to the meeting of the IWC Scientific Committee in spring 2022. He further thanked the WGWAP and IWC for their unwavering encouragement and support for the project.

2.2 Exxon Neftegas Limited (ENL)/Sakhalin Energy Joint Programme

2.2.1 Presentation by Sakhalin Energy

Starodymov stated that the purpose of the Joint Programme was to monitor the feeding aggregation of gray whales and their habitat in the coastal waters of northeastern Sakhalin Island in order to assist in the development, implementation and tracking of protective measures by the companies in accordance with the requirements of Russian legislation.

2.2.1.1 DISTRIBUTION AND RELATIVE ABUNDANCE

In 2020, as in previous years, onshore and vessel-based teams conducted studies of the distribution and photo-identification of gray whales. The onshore teams worked on both spits (Piltun and Chayvo) from 28 July to 28 September. Six complete synchronous and 30 asynchronous surveys were conducted. During these surveys, 316 gray whales were counted in 281 sightings. Vessel-based surveys were conducted from Sakhalin Energy's supply vessel and from a crew change vessel but there were only two complete surveys (on 22 August and 28 September). During these surveys, 147 gray whales were counted in 84 sightings.

The maximum number of whales recorded in a single onshore survey was 14 (on 30 August). In general, the number of gray whales was at a low level (<10 per survey) throughout the 2020 study period. The main area of concentration was near the entrance of Piltun Lagoon with only sporadic sightings to the north and south. These data were used to develop location maps as in previous years.

In the Morskoy (offshore) feeding area, the maximum number of whales was recorded on 28 September (111 animals). The sightings from the two surveys showed the main concentration of whales to be along the western border of the survey area.

Starodymov noted that comparison of the sighting location maps (which do not account for survey effort) from 2002-2020 showed fluctuations in the number of gray whales in both feeding areas. Fewer whales were sighted in the Piltun area in recent years, with a simultaneous increase in the number of whales observed in the Morskoy area. In the early 2000s, there had been two areas of concentration near shore, one centred near the entrance of Piltun Lagoon and one to the north. By 2013-2015, the numbers of whales in the northern area had declined as noted above, and in 2020 only the area near the lagoon entrance was occupied by whales regularly. Changes in the distribution of whales within the Morskoy area have also been observed over the 20-year monitoring period, with the greatest concentration of whales shifting from the shallow western part to the deeper eastern part of this feeding area, although in 2020 most animals were in the west.

Starodymov suggested that the 2020 Joint Programme results were in agreement with Cooke's modelling results showing a continued increase in overall numbers of gray whales off Sakhalin. He speculated that the continuing redistribution of whales from nearshore waters to the Morskoy offshore feeding area was attributable to natural changes in the ecosystem rather than to any impact from Company activities.

2.2.1.2 PHOTO-IDENTIFICATION

Photo-identification surveys in 2020 were carried out as planned by land- and vessel-based teams from the end of July to the end of September. Two onshore teams worked in the Piltun area and the vessel-based team worked from platform supply vessels during voyages through the Morskoy area. Over the two-month period, the onshore and offshore teams photo-identified 175 individuals, of which 11 were 'new' or previously unidentified whales (9 calves and 2 adults), bringing the overall number of different individuals in the Joint Programme catalogue (2002-2020) to 332.

Seven of the nine calves were seen with their mothers in the Piltun area. The first mother-calf pair was recorded on 28 July and the last on 9 September. Six mothers that apparently had weaned their calves were later observed in the Morskoy feeding area, the first of them on 4 August. In 2020, 85% of all identified whales were sighted in the Morskoy area. In the Piltun area, 32 individual gray whales were identified, including the six mothers that later moved to Morskoy. Overall, 26 whales were photo-identified only in the Piltun area, six in both the Piltun and Morskoy areas and 143 only in the Morskoy area. These data further confirm the increased use of the Morskoy feeding area by higher numbers of whales.

All of the whales for which it was possible to track changes in body condition from photographs demonstrated improved condition over the course of the feeding season.

2.2.1.3 CONCLUSIONS

Starodymov summarized Sakhalin Energy's conclusions regarding the results of the monitoring programme that began in 2002. The Company believed its activities had not had any significant impact on benthic communities in the Sakhalin 2 license area. Genetic analyses, combined with the results of photo-id catalogue comparisons and satellite tagging of gray whales, had opened new questions regarding migration routes and population structure of gray whales in the North Pacific Ocean. Starodymov further asserted that the Company's acoustic monitoring programme in 2020-2021 confirmed that noise levels at the border of the Piltun feeding area from Sakhalin Energy's own routine production operations decreased and complied with safe levels as prescribed in the Marine Mammal Protection Plan (MMPP).

The monitoring results, from the Company's perspective, confirmed that the implementation of mitigation measures had allowed its development and production activities to successfully 'co-exist' with gray whales over the past 20 years.

2.2.1.4 THE FUTURE

Starodymov stated that in the future the Joint Programme would focus on interdisciplinary analyses of the multi-year data set and continued monitoring to support analyses of trends in the gray whale population. Sakhalin Energy planned to conduct annual distribution surveys and photo-identification work on gray whales in areas adjacent to its own license areas. The Joint Programme was being reviewed by participating companies and if necessary, the frequency at which individual research programme components are conducted would be revised (e.g. conducting acoustic monitoring annually rather than only in years with seismic survey activity). Sakhalin Energy planned to continue introducing into its own monitoring programmes new equipment and fieldwork methods (e.g. using UAV/drones for photogrammetry) as well as new methods of data analysis and other technologies (e.g. using 'artificial intelligence' approaches to identify whales individually).

2.2.2 Discussion and Panel conclusions

The Panel thanked Starodymov and other Company personnel for the 2020 fieldwork summaries and the retrospective overview of the Joint Programme's results, as well as the comments on future plans.

The Panel saw no reason to elaborate on its previous advice on how analyses of the whale count data could and should account for survey effort when estimating trends in distribution and abundance (e.g. WGWAP-20 report, item 3.1 and Appendix 1 in that report; WGWAP-21 report, item 3.1; also see recommendations WGWAP-20/03 and WGWAP-21/03).

With regard to the major change in habitat use apparent in the RGWP and Joint Programme data (more whales spending more time in the Morskoy area and fewer whales spending less time in the Piltun area), Starodymov stated that the true reason(s) for this change remained unknown but since the Joint Programme partners had concluded that their operations had had no significant measurable impacts on the whales (a conclusion apparently accepted by the Russian authorities), the only alternative was that the change had 'natural' causes.

In this regard, the Panel **reiterates** the following conclusions from its last report (WGWAP-21, item 3.2.2):

(1) The Joint Programme reports 'do not contain analyses that support the rather sweeping assertions often made [by Sakhalin Energy] about the conservation status of the population. The Panel considers that such assertions should be justified by scientifically rigorous analyses.'
(2) 'The Panel reiterated its perspective that while the Company reports seemingly meet regulatory requirements, the potential of the datasets collected by the Joint Programme are under-used and, as a result, lead to conclusions that are often unsupported and speculative.'

The Panel also noted that Company presentations and documents (including those at this meeting) state that the purpose of the Joint Programme is to monitor the feeding aggregation of gray whales *and their habitat* (our italics). Although the Joint Programme had included annual benthic monitoring through 2016, this component then ceased and has not been reinstated, despite an apparent (recent, at that time) downward trend in nearshore amphipod biomass (e.g. see WGWAP-18 report, item 2.1.2). Thus, no meaningful habitat monitoring has been carried out under the Joint Programme or by Sakhalin Energy independently for the last five years whilst the Panel has made a formal recommendation that sampling of the benthos, the key habitat feature attracting the whales to the Piltun feeding area, be reinstated (recommendation WGWAP-19/17; also see WGWAP-20 report, items 3.2.2 and 5, and the Panel's July 2019 'Open Statement of Concern' about the decline of the amphipod prey base in the nearshore feeding area[2]). The Panel **reiterates** this recommendation and its concern, noting that at present the Joint Programme is not fulfilling its own objectives with respect to the whales' habitat or contributing to a proper understanding of the change in the whales' distribution from nearshore to offshore.

Tyurneva reiterated that the Joint Programme's photo-ID data revealed that after calves are weaned, the mothers move offshore, presumably in search of better feeding opportunities whilst the newly weaned calves remain in the nearshore (Piltun) area until the end of the season. She reported that gray whales (mainly calves and young adults, apparently in good condition) were sighted near Piltun as late as the end of November and early December in 2015 and 2016 when photo-ID effort continued later into the season than usual. Samatov stated that the latest sighting at Piltun had been on 1 December 2015 when ice was already developing and 4 individual gray whales were observed.

In closing, the Panel acknowledged the enormous long-term data sets compiled by the Joint Programme and expressed support for the companies' planned multi-disciplinary analyses of those data sets, whilst referring them to the Panel's comments on previous such analyses. Several Panel members expressed a willingness to provide advice on statistics and modelling even after the Panel has disbanded.

However, the Panel also **reiterated** its disappointment at not only the loss of the benthic sampling component in recent years but also the lack of acoustic monitoring in 2017, 2018 and 2019 and the longstanding loss of at least behaviour monitoring except during seismic surveys.

[2] See https://www.iucn.org/sites/dev/files/final_statement_from_wgwap_on_benthos_11july2019_en-ru.pdf. As noted under Item 5.1.2.3, Alcock indicated that some benthic sampling was being considered for 2022 in conjunction with the Sakhalin Energy seismic survey; apparently ENL had conducted benthic sampling (outside the Joint Programme) in 2019 and 2020 but no details were available at this meeting.

As noted by the Panel repeatedly over the years, the elements are essential to proper monitoring and assessment of risks to gray whales and the effectiveness of mitigation measures.

Regarding the future of the Joint Programme (or independent Sakhalin Energy efforts), in addition to restoring the lost components, the Panel advised on the value of:

(1) UAV/drone technology which allows for relatively inexpensive photogrammetry of whales to better understand demographic parameters, body condition and health of gray whales off Sakhalin (see Appendix 2 to this report);
(2) maintaining at least some monitoring effort (acoustic, visual/photo-ID) throughout the season to inform on mitigation measures and changes in habitat use; and
(3) satellite tagging some whales (following the precautions established by the IWC Scientific Committee during the previous tagging exercises) late in the season to further inform on the whales' movements and the risks to which they are exposed outside the feeding season.

3 ANNUAL POPULATION ASSESSMENT OF BIOLOGICAL AND DEMOGRAPHIC CHARACTERISTICS OF WESTERN GRAY WHALES

An update of the annual population assessment was presented by Cooke (see document WGWAP 22/20). The population model used is individual-based and incorporates age, sex and reproductive status of the individuals. The data fitted included photo-ID results from seasons up to and including the 2020 season from the two field projects at Sakhalin: the RGWP (see document WGWAP 22/10) and the Joint Programme, whose catalogue is curated by the National Scientific Centre for Marine Biology (NSCMB, formerly called A.V. Zhirmunsky Institute of Marine Biology/IBM), Far Eastern Branch of the Russian Academy of Sciences/FEB RAS) (document WGWAP 22/7), as well as the results from cross-matching with Mexican photo-ID catalogues up to the 2019 winter season (Urbán *et al.*, 2019) and the results of satellite tracking of whales off Sakhalin (Mate *et al.*, 2015). Matches with Japan up to 2016 (Weller *et al.*, 2016) were included in the analysis for the first time. A whale bycaught in China in 2011 failed to match any of the whales in the RGWP Sakhalin catalogue, but this record could not be used in the population analysis because only a left-side photo had been obtained (the RGWP catalogue uses right sides as the defining aspect). The photo from China had not been compared with the Joint Programme's catalogue.

The RGWP data presented in document WGWAP 22/7 were based on preliminary field judgements, whereas the population model was fitted to the final data from the RGWP catalogue that had gone through the matching process conducted annually by Olga Sychenko. Some whales that in the field were thought to be new whales were subsequently matched to whales already in the catalogue.

The best-fitting model was selected in the usual manner (see document WGWAP 22/10) and a sample of the estimated population trajectories is shown in Figure 1. The two Sakhalin catalogues have not been cross-matched since 2013 (when data were available through 2011), and thus it is necessary to designate one or the other as the primary catalogue for new whales first seen in 2012 or later. However, as shown in Figure 1, the choice makes little difference. By 2020, the number of whales regularly using the Sakhalin feeding grounds was estimated to be

220-270 individuals, a trend in numbers showing continued growth, more than doubling since the start of this century.

Previous analyses of the photo-ID data (document WGWAP 21/13) found that the sighting rates in Mexico could account for about half the Sakhalin population, and it was assumed that the remainder of the whales wintered in the western North Pacific. However, inclusion of the data from Japan yields a more complex picture, resulting in a very small (< 15) estimated number of whales that migrate into or through Japanese waters. This leaves a substantial number of whales that cannot be accounted for by the existing data from Japan and Mexico. While this result could indicate the presence of additional, unknown wintering grounds or migration routes, it is also possible that the numbers of whales migrating to (or through) Japan and Mexico have been underestimated. Such underestimation could arise if, for example, the whales observed in Japan and Mexico are not a representative sample of the whales using those areas.

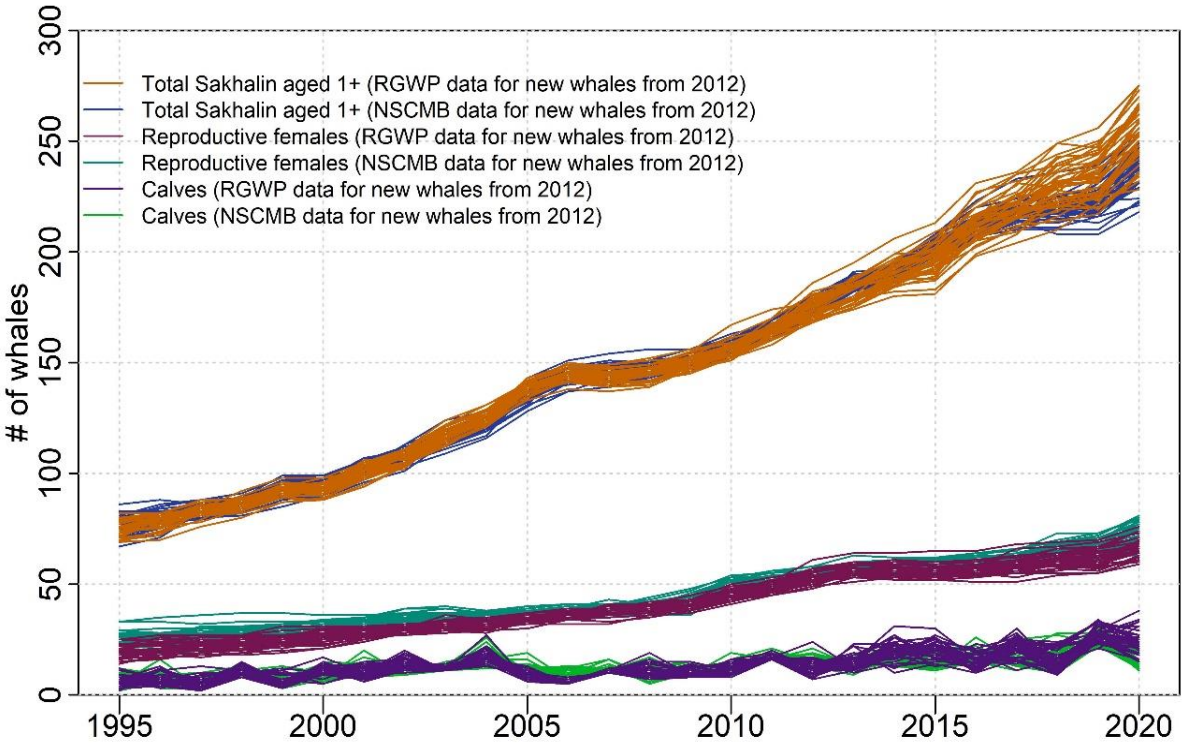

Figure 1. Sample of the posterior distribution of population trajectories of gray whales at Sakhalin based on the separate RGWP and NSCMB datasets.

In summary, the model results still indicate that at least half of the Sakhalin whales overwinter in the eastern North Pacific, and we know that some whales migrate to or through Japanese waters. However, the size of any western North Pacific population remains highly uncertain. Broadening the geographic scope of photo-ID studies rangewide could bring better resolution to this matter and international research efforts such as satellite tagging and acoustic studies in the potential Asian wintering areas (with subsequent winter photo-ID work in any locations where the presence of gray whales is confirmed) may be among the most feasible approaches. The IWC Scientific Committee and its Range-wide Working Group are hereby encouraged to pursue these and other approaches to filling the need for more and better data.

The Panel has identified several factors that might affect the survival rate of calves that are weaned off Sakhalin:

(i) disturbance from seismic surveys (conducted by Sakhalin Energy in 2010, 2012, 2015, 2018, and planned for 2022; numerous other surveys by ENL and other operators)
(ii) decline in Piltun benthic biomass from 2013 to 2016 (assumed constant thereafter, as data collection ceased in 2017 and onwards)
(iii) ice cover (length of ice-free season).

The results in document WGWAP 22/10 showed that none of these factors had a detectable effect. The estimate of the median calf survival rate was 0.72 (SE 0.06). The estimated effect of seismic surveys was +0.05 (SE 0.15) and of the benthic biomass change was -0.10 (SE 0.20). Hence neither effect was significantly different from zero, but precision was low. The latter result was not sensitive to the assumption (possibly incorrect) that the benthic biomass was constant after 2016 (see discussion under item 2.2). It is possible that additional seismic surveys were conducted by other companies prior to 2010 near gray whale habitat of which the Panel was unaware, before IUCN began on the Panel's behalf to keep track of activities on the Sakhalin Shelf; this could partially invalidate the comparison between presumed seismic and non-seismic years. The seismic surveys conducted in 2021 (see Appendix 3) would not affect this analysis, which used data only through 2020.

In its 20th report, the Panel had noted the finding of Gailey *et al.* (2020) that the post-weaning survival rate of Sakhalin calves appeared to be positively correlated with the length of the ice-free season and recommended that this factor be examined further using the Cooke population model. As documented in Appendix 1 of document WGWAP 22/10, only minimal variation in the length of the ice-free season was found over the time period – the Sakhalin habitat was largely ice-free throughout the period of whale presence (15 May through 15 December) over the years. Thus, there was no scope for a relationship with calf survival. The apparent relationship between ice-cover and calf survival rate found by Gailey *et al.* appeared to be due to a combination of: (i) the use of different ice cover data than the data those authors themselves cited and (ii) their selection, from a range of different options examined, the option that showed a nominally significant correlation by chance, without having accounted for the extra degrees of freedom in the calculation of the *p*-value.

4 NOISE ISSUES

4.1 Summary of the 19th and 20th Noise Task Force (NTF) meetings

Nowacek summarized the work of the NTF at its 19th and 20th meetings, both held virtually in the spring and autumn of 2021. The focus was on two topics: (i) creating a Monitoring and Mitigation Plan (MMP) for the planned 2022 Piltun-Astokh 4D seismic survey, including attempts to make it broadly applicable for future surveys, and (ii) completing work on other outstanding noise issues. The NTF-19 report was available as NTF-19/Report for the WGWAP-22 meeting; both it and the NTF-20 report were posted following this meeting. [3]

[3] https://www.iucn.org/sites/dev/files/ntf-19_report_final.pdf; https://www.iucn.org/sites/dev/files/ntf-20_report_final.pdf

4.1.1 Development of the MMP for 2022 Sakhalin Energy's seismic survey

With regard to the MMP for the 2022 seismic survey, the NTF reviewed its advice dating back to 2010 about the best time in the season, from the perspective of whale protection, to conduct such a survey, i.e. early or late in the open-water season. Significant time was dedicated to the topic at the NTF-19 meeting, including reviewing data on the timing of arrival of different segments of the population, notably mother-calf pairs. After consideration of these and other data and the operational constraints discussed in the NTF-19 and NTF-20 reports, the NTF's advice did not change, i.e. from the whale population's, rather than individual whales', perspective it is best to start and finish as early in the season as possible. According to Kirchner, the MMP for 2022 was to be based on the 2018 MMP as agreed before the Russian government refused to issue a permit for acoustic monitoring (i.e. to be based on the original version of the 2018 MMP which included the acoustic component). For 2022, some specific considerations for A-zones during poor visibility, based on 2018 field experience, were added with the objective to provide more guidance to the central commander (see Item 4.2 for definitions and discussion of the final MMP text).

During the NTF-20 meeting a sub-group consisting of Nowacek, Reeves, Donovan, Racca and Kirchner focused on logical structure and formulations of the most recent draft MMP, leading to the final draft as it was presented at WGWAP-22 for Panel endorsement. The final MMP is discussed under Item 4.2 and the most recent information on the source reduction test is discussed under Item 4.3.

4.1.2 Summary of NTF conclusions on Sakhalin Energy's 2020 and 2021 acoustic monitoring effort and plans for 2022 and beyond

After an abrupt discontinuation of regular acoustic monitoring (i.e. monitoring annually without regard to whether or not a Sakhalin Energy seismic survey takes place) in 2017, the Company reinstated the practice in 2020, a decision taken at least partially in response to recommendations by the Panel. The 2020 results were reviewed at NTF-19 and described in the report from that meeting (and noted in the WGWAP-21 meeting report, item 2.2). The 2021 monitoring was reviewed briefly at NTF-20 as full results were not available at that meeting. It was noted, however, that in 2021 the autonomous underwater acoustic recorders (AUARs) had been placed at the same two locations as in 2020. Preliminary analyses of the 2021 data were presented in document WGWAP-22/11, and an initial examination revealed no major periods of loud noise (as defined in the Company's MMPP), but final conclusions could not be drawn as the full dataset was not available.

The Panel considers it unfortunate that the Company had recorders in place only during August and September in 2021 rather than for a timespan similar to 2020 (73 days, from 7 July to 16 September). Also, the Panel considers that the number of stations deployed in 2020 and 2021 represented less than the minimum necessary to maintain the time series begun under the Joint Programme in 2003 and continuing through 2016. At least a third recorder should have been deployed at the 'control' station to the north of the Piltun feeding area. A more thorough discussion of the need for and benefits of long-term acoustic monitoring is given in the WGWAP-19 (Item 4.1) and WGWAP-20 (Item 2.1) reports; also see recommendations WGWAP-19/05 and WGWAP-20/02.

4.1.3 Acoustic presence/tracking of gray whales in southern Asia range waters

At previous meetings, WGWAP heard summaries of annual acoustic detections by the US Navy of what were thought to be gray whales in the East China Sea (see WGWAP-17 report, item 2.2; WGWAP-19 report, item 11.2.3; WGWAP-20, item 6.2). Discussions on this topic had included the possibility of coordination with Navy personnel to guide researchers towards areas where the signals were detected, thereby facilitating visual confirmation of the whales' species identity. However, no tangible progress had been made. Nowacek, Southall, Weller and Reeves are continuing to investigate ways to confirm whether the calls are being produced by gray whales. Recent discussions with a Chinese colleague, Songhai Li at the Marine Mammal and Marine Bioacoustics Laboratory, Institute of Deep-sea Science and Engineering, Chinese Academy of Sciences, determined that recordings made near Hainan Island in the South China Sea are available and will be checked for possible gray whale calls. In addition, Dr Li will pursue contacts with Chinese mariners, fishermen and researchers in hopes of obtaining visual or acoustic evidence of gray whales in areas of potential occurrence.

4.2 Recommended MMP for the 2022 Sakhalin Energy's seismic survey

4.2.1 Presentation

Donovan provided an overview of the NTF-agreed MMP (Monitoring and Mitigation Programme) for the 2022 seismic survey. This MMP builds upon the work undertaken for Sakhalin Energy's 2010, 2015 and 2018 MMPs and the lessons learned from them. The 'base case' for the 2022 MMP was the 2018 MMP including the acoustic component that had to be removed when authorities refused to grant a permit to use acoustic equipment just prior to the start of that survey. No such difficulty was anticipated for 2022.

After a thorough review by the NTF (see Item 4.1), the primary principles of the earlier MMPs were retained:

(1) start and finish as early as possible in the season to minimise whale exposure to noise; and
(2) give priority to the protection of the entire population over the protection of individuals, with the exception of mother-calf pairs.

The area in which seismic data will be acquired in 2022 is much smaller than was the case in 2018 as the Company will not be reshooting the data-gap patches near platforms that were previously surveyed using Ocean Bottom Nodes (OBN) rather than streamers (i.e. towed airgun arrays). This means that approximately half as many airgun 'shots' will be needed compared to the 2018 survey.

Unlike in previous Sakhalin Energy surveys, the Company had decided not to support the participation of an Independent Observer.

A fundamental part of the MMP remains the monitoring of numbers, distribution and behaviour of whales before, during and after the survey. There are two components to this: visual and acoustic (detailed field protocols for each are appended to the main MMP text). The collection of real-time acoustic data also forms part of the mitigation strategy; these and other data collected will be analysed after the survey to evaluate the effects of noise on whales and improve future mitigation.

As previously, there will be a shore-based Command Centre and Central Commander who will consolidate real-time information, facilitate communication amongst scientists, marine mammal observers (MMOs) and crew and make appropriate strategic decisions including judgement calls (in light of the guiding principles given in the MMP) during periods of extended poor visibility, keeping in mind the guiding principle to minimise overall exposure of whales to noise.

There will be eight stations with bottom-mounted AUARs spaced appropriately along the feeding area boundary (called the Perimeter Monitoring Line, PML, in the context of the MMP and the Feeding Area Boundary, FAB, in other contexts) in accordance with the acoustic protocols. These recorders transmit processed information in (near) real-time via iridium satellite links and form the basis for several mitigation measures including determination of the A-zone discussed below. The MMP specifies the approach to be taken in case of a failed station or in the unlikely event that all fail. In addition to these eight stations there will be at least one buoy set up within the feeding area roughly at the 10m isobath between the shore-based visual-observation platforms that will archive data throughout the survey for later analysis.

The visual monitoring effort aims to cover the entire inshore segment of the seismic survey area at all times (with twice-weekly trips to areas to the north and south of the survey area), including at least one week before and after the survey. The visual monitoring is obviously weather-dependent.

The observation methods will follow those of previous years and detailed protocols are appended to the MMP. In summary there will be four shore platforms with experienced and trained teams who will monitor distribution and behaviour and use theodolites to determine exact positions of gray whales that can be transmitted in real-time to the Command Centre. In addition, there will be two vehicle-based photo-ID teams who will also undertake distribution scans to the north and south of the seismic survey area.

There will also be four trained MMOs on the seismic vessel who will be responsible for monitoring the exclusion zone (see below) using the naked eye and handheld binoculars as necessary. They will also have access to a pair of big-eye binoculars for monitoring shoreward the PML if necessary. Finally, there will be two experienced MMOs on the chase vessel (that normally works with the seismic vessel to check lines for objects in the water or to make sure the streamers are clear) who will also be used to check A-lines (see below) if there is poor visibility from shore.

Fundamental to the mitigation approach is the identification of an A-zone defined as the overlap of the region inshore of the PML and the area bounded by the 156 dB per-pulse SEL isopleth for the current acquisition point. This relates to minimising behavioural disturbance within the feeding area and is the basis for the classification of A-lines (and A-line segments) where additional mitigation measures are applied. Guidance for the designation and updating follows the approach used during the 2018 survey.

As noted earlier, the objective is to begin the survey as soon as conditions permit (probably mid-June) and the mitigation and monitoring teams are in place. In terms of survey strategy, the objective is to acquire all designated A-lines as soon as possible given circumstances (weather, feathering/matching to ensure comparability of results from previous seismic surveys) with priority being given to those closest to shore and ensuring that A-lines are acquired during good visibility wherever possible.

The mitigation measures near the seismic survey vessel throughout the survey are as in previous years and include shutdowns due to the presence of specified marine mammals within the authority-designated exclusion zone (at least 1km from the source for most large whale species), guidance on ramp-up procedures under different situations and guidance on night-time surveying.

There are several additional measures (and associated guidance) for the A-zone. Primary amongst these is that no seismic data acquisition can occur if a mother-calf pair is seen (prior to 1 August) or any whale is seen (after 1 August) and rules on when data acquisition can commence or recommence under several different circumstances (including poor visibility).

In conclusion, Donovan commented that many people from the Panel and the Company had worked with great diligence and a spirit of co-operation over the years to address difficult, often complex scientific and technical issues related to noise and especially seismic surveys. Mutual understanding of terminology and concepts by the biologists and the engineers took some time to achieve, but once it had been achieved, great advancements in mitigating the potential effects of seismic surveys on cetaceans became possible, not only off Sakhalin but elsewhere (e.g. Nowacek *et al.*, 2012, 2013, 2015; Nowacek and Southall, 2016). The Task Force approach had allowed excellent collaborative work to be undertaken without compromising the Panel's independence.

4.2.2 Conclusions

Reeves noted that in 2018 the Company had been forced to modify the final Panel-approved MMP because of the refusal of the authorities to allow the use of acoustic buoys. This is not expected for the 2022 survey and there is no expectation of any overlap with other companies' seismic surveys.

Given this, the Panel **endorsed** the 2022 MMP (included as Appendix 1 to this report[4]), recognising the dedicated and thorough work of the NTF. The 2022 MMP will also be uploaded to the seismic survey page of the WGWAP website. The Panel hopes that this MMP document, reviewed in light of the experience of the 2022 seismic survey, will be revised and maintained by the Company as a model for monitoring and mitigating future surveys.

Finally, with respect to the absence of an Independent Observer for the 2022 seismic survey, the Panel noted that this would be the first time there had been no Independent Observer for a Sakhalin Energy seismic survey. Noting that it was in the Company's interest to demonstrate transparency in its operations, the Panel suggested that the Company reconsider its decision. In the absence of WGWAP guidance and feedback from an advisory group during the survey, the inclusion of an Independent Observer to help document the Company's implementation of the MMP in 2022 would provide a strong message that Sakhalin Energy is committed to the principles of openness and precaution in managing risks to gray whales.

4.3 Source reduction test

Kirchner updated the information originally discussed at the NTF-19 meeting on this important experiment[5]. The source reduction test (SRT) planned for 2022 builds on the single-line SRT

[4] And the NTF-20 report.
[5] See https://www.iucn.org/sites/dev/files/ntf-19_report_final.pdf

carried out on a line east of the Astokh platform in 2018. That test involved shooting the single line in both south-headed and north-headed directions east of the Astokh platform. The shortcomings of the seismic data processing related to the single-line character of the 2018 experiment were noticeable, but that effort nonetheless made it possible to draw some conclusions for source reduction, with 500 in^3 considered promising to give a viable 4D signal. Results had been shared at the NTF-18 meeting in April 2020[6].

Further to discussion during NTF-19, the Company planned to repeat and expand the SRT in 2022. The plan would be to shoot a swath of up to eight lines covering ca. 50 km^2 with the source reduced from 2870 in^3 to ca. 500 in^3. A stepwise reduction of the source was not planned. Some of the 'empty' north-headed vessel passes would be used for the test (after the north-headed lines have been acquired with the full source). The area of interest would be west of the Astokh platform, where a clear 4D signal is to be expected. It is known from acoustic modelling (although this should be confirmed in the field) that a source volume of 500 in^3 would not result in any A-zones and hence would not require any behavioural mitigation.[7] Details such as specific configuration of the reduced source, swath width and length of line segment are still to be decided with the seismic acquisition contractor. The purpose of the SRT would be to demonstrate that a source as small as 500 in^3 can be used to obtain a viable 4D signal at key reservoirs in depths ranging from 1800 m to 2000 m below the seabed. Data processing will be carried out in 2023 with interpretation of 4D signals to be expected towards the end of 2023.

The Panel expressed thanks to Kirchner for his dedication to finding ways to minimise the amount of acoustic energy used in seismic surveys whilst still allowing adequate results to be obtained, highlighting its benefits not only to future surveys off Sakhalin but also as a template for other areas and operators.

During the discussion following Kirchner's presentation, it was noted and agreed by all present that given the importance of this work, not only to Sakhalin Energy and other companies operating on the Sakhalin Shelf but industry-wide, the results of SRTs should be published in the peer-reviewed literature. Kirchner suggested the geoscience and engineering journal *First Break* as an example of a suitable outlet[8].

It was further noted that the improvements in seismic survey technology and data analysis methods since 2001, including those owing to the work of JASCO, Sakhalin Energy and their Russian scientific colleagues, has been remarkable, e.g. in sound propagation and full waveform modelling. Although hope was expressed by meeting participants that the results of the SRTs would have global application and all operators would eventually begin to use smaller sources, it was also noted that the effects of using smaller sources were not yet fully understood and it would be some time before a wide-scale changeover can be expected to occur. Kirchner pointed out, for example, that the proposed reduction to 500 in^3 was specific to the planned Astokh 4D survey, and there are major differences between 3D surveys for exploration purposes and this kind of targeted time-lapse survey where the structure and depth of the reservoir is known in advance. In other words, exploratory surveys generally require larger sources than those where the features of the reservoir are better known.

[6] See https://www.iucn.org/sites/dev/files/ntf-18_report_final.pdf, item 2.2.

[7] The Panel noted that valuable results (viable 4D signal and elimination of A-zones) could be achieved not only by decreasing the source volume (e.g. from 2870 in^3 to ca. 500 in^3) but also by reducing the source's horizontal directionality and the underwater depth of the airguns and by increasing the frequency of shots. Unfortunately, due to time constraints and the Panel's dissolution, these options could not be pursued by the NTF.

[8] https://www.earthdoc.org/content/journals/fb

4.4 Joint Programme acoustic close-out report 2003-2016

For some years, a comprehensive analysis and report on the acoustic data collected from 2003-16, primarily by the Joint Programme, has been in preparation by the Pacific Oceanological Institute (POI). A draft of the report was provided to the NTF, as document NTF-20/4, but unfortunately it contained virtually no comprehensive analyses, instead containing almost exclusively a compilation of plots and processed data from previous annual reports. The Panel reiterated the value of these longitudinal data, and it hopes that the comprehensive analyses will be conducted in the near future.

4.5 Brief overview of Sakhalin Energy's noise-generating activities in 2022+

The Company's plans for noise-generating activities from 2021-25 were provided in document WGWAP-22/12. Alcock noted that there had been no major changes since the overview presented at the WGWAP-21 meeting.

4.6 Developments and activities by other companies operating on the Sakhalin Shelf in 2021 and plans for 2022+

Berzina-Rodrigo and her team updated an overview of offshore energy projects centred in or near the gray whale feeding areas on the north-eastern Sakhalin Shelf originally provided to the WGWAP-21 meeting. This current compilation contains an updated map and the latest information from publicly available sources on the developments and activities by operators other than Sakhalin Energy (document WGWAP-22/13 included as Appendix 3 to this report).

Notable findings include the following. ENL carried out seismic surveys in summer 2021 and was planning reconstruction and further expansion of Sakhalin-1 facilities in coming years. At the nearby field, Lebedinskoye, Rosneft planned to drill an additional well in 2022-2024 to maintain its production level. Gazprom Neft planned to resume geological exploration at its Neptune and Triton fields in 2023 and had partnered with Shell for exploration and production, technological interaction and carbon footprint reduction at the Ayashsky Block (Sakhalin-3). Due to time constraints, there was no discussion of the document at this meeting.

4.7 Snapshot of Seismic Survey/Noise Task Force achievements and noise issues that require continued attention

The Noise Task Force (NTF), originally convened as the Seismic Survey Task Force (SSTF) in 2007, was established by the Panel to allow the time necessary for difficult, often complex scientific and technical discussions on noise-related issues, especially those arising from activities conducted by Sakhalin Energy. As noted earlier, many individuals from the Panel and the Company have worked with great diligence and a spirit of co-operation to address such issues. Mutual understanding of the terminology and concepts used by biologists and engineers took a considerable time to achieve but has led to solid advancements in approaches used to mitigate the effects of seismic surveys on cetaceans.

Examples of the products developed by the SSTF/NTF include:

(i) codifying the nearshore (Piltun) gray whale feeding area by establishing the spatial limit of the 95% density of gray whale occurrence (the 20m isobath represents a reasonable approximation for this line and was used in ENL's 2001 monitoring and mitigation programme (Johnson *et al.* 2007);
(ii) incorporation of advanced noise propagation modelling to inform monitoring and mitigation planning;
(iii) the monitoring and mitigation plans[9];
(iv) identifying other, non-seismic sources of noise from industrial activities and working with the Company to reduce them as much as possible; and
(v) contributing to the development of exposure thresholds, specifically by urging Sakhalin Energy and other operators to incorporate data collected from all their efforts, seismic survey- related and otherwise, to further understanding of the impacts of noise on whales. In addition to all the SSTF/NTF reports[10], task force work led to several publications and conference presentations (e.g. Nowacek *et al.*, 2012, 2013, 2015; Nowacek and Southall, 2016). In effect, the SSTF/NTF became a forum where representatives from the Company and the Panel could 'roll up their sleeves' and resolve complicated issues related to noise. Often, of course, solutions ended up representing compromise, but the cooperative nature of the interaction allowed for all perspectives to be heard and seriously considered, and this enabled the task force to make significant progress towards the goal of minimizing the amount of sound energy introduced into the water around gray whales at Sakhalin.

5 OTHER SAKHALIN ENERGY ACTIVITIES IN 2020, 2021 AND BEYOND

5.1 Sakhalin Energy's activities in 2020 and 2021 and plans for 2022 onwards

5.1.1 Marine Mammal Observer programme and ship strike avoidance measures in 2020 and 2021 and plans for 2022

Sakhalin Energy (Vinogradov) provided a summary of 2020 MMO activities based on document WGWAP-22/14. Standard ship-strike avoidance and mitigation measures were applied at all times in accordance with Sakhalin Energy's MMPP. Two MMOs worked aboard two crew-change vessels (*Polar Baikal* 4 June–29 August and *Polar Piltun* 4 June–21 October – dates indicate the first and last vessel trips during the ice-free navigation season) transiting in prescribed navigation corridors between Kaigan port and the Company's offshore oil and gas platforms, for a total of about 257 hrs of operation. Of that time, *ca* 1.5 hrs involved transits outside the corridors. Deviations from the navigation corridors were made to avoid third-party vessels. Prescribed speed limits were not exceeded during any of the crew-change vessel trips.

In addition, a total of about 860 hrs of observation was conducted by two MMOs alternating among five supply vessels to assist with photo-ID data collection. In total, eleven species of marine mammals were observed during supply and crew-change vessel transits (*ca* 1,436 individuals/395 sightings of which 547 individuals/272 sightings were of cetaceans); there were 205 sightings of 436 individual gray whales, most having come from work associated with photo-

[9] Sakhalin Energy's 2010 MMP was arguably the most comprehensive plan ever developed, and while it was certainly informed by the Johnson *et al.* (2007) programme, it represented a significant advancement in managing a seismic survey to minimise the risk to whales.
[10] Available at https://www.iucn.org/western-gray-whale-advisory-panel/panel/task-forces/a-glance-meetings-and-reports

ID data collection. Although no cases of striking a marine mammal were recorded, there were 21 cases in which vessel operations were altered to avoid striking marine mammals, eight of these cases involving gray whales. The latter comprised four course changes, three decelerations, and one case of the vessel stopping because a whale was at a distance of 1 km ahead but not moving away.

The Company also provided preliminary information on the 2021 field season. One MMO accompanied the only crew-change vessel. In total, 4 species of cetaceans (including 5 gray whale sightings) and 4 species of pinnipeds were observed.

Alcock clarified that the corridors and mitigation measures mentioned in the report were developed by Sakhalin Energy for travel to and from its own assets and formed a part of its MMPP that had previously been discussed by the Panel. She did not have information about other companies but presumed that they would have developed a similar approach for their own assets.

A question was raised about the availability and integrity of caches of equipment for sampling dead gray whales and in particular assessing cause of death (including ship strikes). In September 2009 a dead gray whale was found on a Sakhalin beach (see document WGWAP-7/13 and WGWAP-7 report, item 9.6). Since its inception, the Panel had been urging Sakhalin Energy to anticipate such an event and to establish and maintain caches of necropsy equipment (e.g. see recommendations WGWAP4/005) and IUCN had posted a Russian translation of a well-known marine mammal necropsy manual to assist local scientists.[11] Vinogradov indicated that the kits were still available and in good condition.

The primary difficulties with attempting a necropsy or full examination of a stranded carcass in this region are meeting the Russian Federation legal requirements, obtaining the correct permissions and deploying a suitable veterinarian before the whale has become too decomposed. Nonetheless, the Company indicated that it had established a communication protocol to enable rapid alerting of the appropriate regional organization and requesting approval to work with a specialist in the event of encounters with injured or dead whales.

5.1.2 Sakhalin Energy's commitments related to International Finance Corporation (IFC) Performance Standards

5.1.2.1 BACKGROUND

The Panel's engagement with Sakhalin Energy on the subject of the Company's compliance with IFC Performance Standard 6 for Biodiversity Conservation and Sustainable Management of Living Natural Resources (PS6) began in November 2015 at the WGWAP-16 meeting where it was agreed to establish an IFC Performance Standards Task Force, which met in Gland in May 2016.[12] The substance of this engagement has been summarized at annual WGWAP meetings since then.[13] At the last meeting of the Panel (WGWAP-21), Cooke presented a preliminary framework for evaluating sources of potential adverse impacts on Sakhalin gray whales as candidate subjects of an offset (as defined in PS6). A meeting of the 'offset working group' to

[11] See https://www.iucn.org/downloads/wgwap_7_doc_20_necropsy_kit_presentation.pdf regarding the necropsy kits and https://darchive.mblwhoilibrary.org/handle/1912/1823 for the necropsy manual (in English).
[12] See WGWAP-16 report, item 19.2.1; also see the task report at https://www.iucn.org/sites/dev/files/content/documents/pstf-1_may_2016_report_final.pdf
[13] See WGWAP-17 report, item 9; WGWAP-18 report, item 6; WGWAP-19 report, item 5; WGWAP-20 report, item 4.4; WGWAP-21 report, item 9.

discuss the framework in late January 2021 concluded that this approach could be used to identify offsets if offsets were deemed to be required. However, as noted in the WGWAP-21 report, final determination of whether the Company needed an offset or not was primarily a matter to be decided between the Lenders and Sakhalin Energy. Therefore, the time devoted to this subject in Gland was limited to a brief presentation of document WGWAP-22/18 from Sakhalin Energy and a few comments from Hancox (on behalf of the Lenders).

5.1.2.2 SAKHALIN ENERGY PRESENTATION

Alcock presented Sakhalin Energy's Conservation Management Plan (SECMP)[14] for gray whales which was developed as part of its updated Biodiversity Action Plan (BAP) to comply with IFC PS6. She explained that the content of the SECMP covered the Company's Ecologically Appropriate Areas of Analysis from the Critical Habitat Assessment, the Critical Habitat triggering criterion, the objective of the SECMP, the Company's view of the status of gray whales in the potential impact zone, potential impacts of the Sakhalin-2 Project, residual impacts of the project as indicated by monitoring and the Company's assessment of how it had achieved net gains for gray whale conservation through application of Additional Opportunities. Alcock also explained how the Company had applied the 'mitigation hierarchy' of preventative, remedial and other measures implemented for gray whales and the Company's assessment of outcomes.

5.1.2.3 DISCUSSION

Hancox stated that his company, Ramboll (the Lenders' representative), intended to provide its final commentary on the BAP by the end of November. He considered the work presented by Alcock to have been a very valuable exercise, noting that the ability to demonstrate measurable benefits of mitigation had always been a difficult issue to deal with and the concept of Additional Opportunities adopted by the Company was helpful. Ramboll had accepted the Company's decision to move away from the concept of offsets, which cannot be used if impacts cannot be measured or quantified. Hancox noted that Cooke's work identifying key risks to gray whales had helped identify the removal of derelict fishing gear as a practical activity that could genuinely contribute to whale protection; he did not agree with the judgement of Russian fisheries authorities that, in contrast to the results of Cooke's preliminary analysis, abandoned fishing gear has only a 'low' impact on gray whales.

The Panel noted that a version of the BAP was publicly accessible on the Sakhalin Energy website but it is in clear need of updating since the version currently posted is dated 2009.[15] Bos pointed out that once the updated version of the BAP is published, it is likely to trigger scrutiny by civil society regarding what aspects of environmental monitoring the Company does and does not intend to continue into the future.

When asked whether the Company planned to resume monitoring of the benthos as an element of its biodiversity programme, Alcock indicated that this was being considered for 2022 in conjunction with the Sakhalin Energy seismic survey.

Torres pointed out that most of the discussion of impacts on the gray whales at Sakhalin had focussed on behaviour and distribution, yet whales can also respond physiologically to disturbance events. She emphasized that faecal samples can be collected non-invasively before,

[14] Not to be confused with the joint IUCN/IWC CMP for western gray whales.
[15] http://www.sakhalinenergy.ru/media/library/en/environmental/biodiversity/7._Biodiversity_Action_Plan.pdf

during and after disturbance events to assess variation in hormone levels, including glucocorticoids that reflect the stress level of the whale. She also reiterated the importance of monitoring body condition, stressing that photogrammetry using images obtained from UAVs (drones) provides an ideal way of doing this inexpensively and easily. The Joint Programme already had trained drone pilots who are able to obtain photo-ID images, so collecting images for photogrammetry should be readily achievable. Significant datasets can be compiled quickly, and valuable comparisons could then be made between the whales at Sakhalin and those observed off western North America to better understand how health and energy storage may vary between foraging grounds and years. The Panel **endorsed** this view and Torres offered to provide guidance and support to the development of this line of research and monitoring.

Alcock, speaking on behalf of Sakhalin Energy, welcomed this offer from Torres, and a first step was taken by Torres by providing a brief guide to UAV-based photogrammetry of whales for inclusion in this report (see Appendix 2).

6 WESTERN GRAY WHALE CONSERVATION EFFORTS IN RUSSIA AND RANGEWIDE IN 2021 AND BEYOND

Berzina-Rodrigo said that while this was the final meeting of WGWAP, the conservation of western gray whales remains a very important issue. The presence at the meeting of nearly 60 participants showed the continuing high level of interest of many stakeholders who were now preparing for a handover to different parties to carry on efforts at local, national and international levels under a different framework. IUCN remained committed to supporting the efforts being made towards the 'next chapter' in the work on western gray whale conservation, and this was undoubtedly the case for other stakeholders.

She noted that it was clear that active exploration and production of oil and gas on the shelf will continue and the noise footprint, along with other anthropogenic pressures, are bound to increase. Addressing cumulative effects and implementing common mitigation measures is essential for ensuring the long-term conservation of the gray whale population. This makes the effort to advance a national conservation strategy, being led by Roszapovedtsentr of Minprirody and the Russian expert community, critically important and IUCN was pleased to note the progress being made both for gray whales and bowhead whales in the Okhotsk Sea (see Item 6.1.) Similarly, IUCN welcomes the efforts made to reinvigorate the Memorandum of Cooperation (MoC) Concerning Conservation Measures for the Western Gray Whale Population range-wide and the implementation of the IUCN/IWC Range-wide Conservation Management Plan for Western Gray Whales (see Item 6.3).

6.1 Progress on development of Russian Federation strategy, action plan and roadmap for western gray whale conservation in 2021-2030

6.1.1 Presentation by Minprirody

Krever reported that the Russian Federation uses a project management mechanism to develop and implement national projects to address tasks related to addressing State priorities. These include sustainable development, environmental protection and the conservation of biodiversity. The 'Ecology' national project includes 12 federal projects, among them the federal project 'Preservation of Biodiversity and Development of Ecological Tourism'.

This federal project is being implemented in the following subject areas:

(1) increasing protected areas and improving the efficiency of management of the system of federal protected area;
(2) preserving biodiversity and restoring or reintroducing rare and endangered wildlife species;
(3) developing ecological (= nature-focussed) tourism in the national parks and promoting comprehensive tourism products for Russian and international markets.

The federal project has approved a list of thirteen key wildlife taxa (species and populations) requiring measures for restoration or reintroduction, of which two are cetaceans: Okhotsk Sea (western) gray whales and Okhotsk Sea bowhead whales. [16]

The Russian Business and Biodiversity Initiative is one of the key mechanisms aimed at supporting and financing activities, including the protection of and research into rare species. It is aimed not only at raising funds, but also at increasing the social and environmental responsibility of commercial companies.

Minprirody has created a Working Group on Business and Biodiversity Conservation that thus far includes representatives of over 20 commercial companies. Minprirody has entered into co-operation agreements with some of the commercial companies that provide funding for the most important conservation and monitoring activities related to the 13 priority species and populations.

As part of the federal project, a Working Group on the Conservation and Restoration of Selected Rare and Endangered Species of Wildlife in the Russian Federation has been formed. Within this, Expert Sections for the conservation and restoration of selected priority animal taxa have been established that include representatives of state institutions (e.g. those managing protected areas) as well as representatives of scientific, non-governmental, educational, public and other organizations working on conservation of the respective species. The most relevant to the work of WGWAP is the Cetacean Expert Section.

Expert Sections are tasked to develop strategic documents on conservation and restoration, including roadmaps, detailed action plans and recommendations on methods for estimating abundance and monitoring.

The Cetacean Expert Section is responsible for developing conservation strategies for the Okhotsk Sea (= western) gray whale population and the Okhotsk Sea bowhead whale population. Draft strategies have been reviewed and are being finalised; they are expected to be available in the near future (see item 6.2.2 below). The strategies will provide the basis to develop roadmaps for the implementation of measures included within the strategies.

The Cetacean Expert Section workplan for 2022 and beyond includes:

[16] The *List of rare and endangered wildlife taxa that require priority measures for restoration and reintroduction of the Minprirody* includes Amur tiger, Central Asian leopard, Far Eastern leopard, snow leopard, polar bear, bison, saiga, Przewalski's horse, argali (Altai mountain sheep), dzheren, Siberian crane (white crane), Okhotsk (western) gray whale and Okhotsk bowhead whale.

(1) preparation and conclusion of a co-operation agreement with commercial and non-commercial companies to ensure implementation of the roadmaps and conservation strategies for the Okhotsk (= western) gray whale and bowhead whale populations; and
(2) implementation of the roadmaps that stipulate inclusion of whale conservation measures outlined therein into the corporate biodiversity conservation strategies of commercial companies and the action plans of non-commercial organizations.

Funding of the activities will be allocated from the federal budget which should cover the current activities of the institutions managing the protected areas, as well as from extra-budgetary funds, including those provided by commercial companies.

To ensure collaboration with international organizations that have been engaged in the activities of WGWAP under the auspices of IUCN, it is advisable to consider the possibility of concluding a co-operation agreement between the Minprirody, IUCN, Sakhalin Energy and other stakeholders.

6.1.2 Discussion

With respect to the anticipated co-operation agreement between Minprirody and Sakhalin Energy, drafts have been exchanged and modified, as well as discussed by the respective legal departments. Samatov expected that after a series of meetings to finalize the draft, the Company would be in a position to sign the agreement before the end of 2021.[17]

With respect to other companies on the shelf, Krever noted that ENL was already a part of the Biodiversity and Business Working Group, as well as a member of the Cetacean Expert Section. She anticipated that once the co-operation process has been completed with Sakhalin Energy, something similar would be completed with ENL. However, the process had not started with any of the other operators. She anticipated that groundwork would need to be laid initially with the parent company, Gazprom.

Krever added that there would be value of Minprirody entering into agreements with other stakeholders, including other countries (e.g. the range states that have signed the Western Gray Whale Memorandum of Co-operation – see Item 6.3.2), international organizations (e.g. IUCN, IWC) and institutes. This could include multilateral agreements for specific programmes (broader or narrower than a western gray whale conservation strategy).

The Panel recognised the importance of this Russian national initiative to help ensure the future of western gray whales (and Okhotsk Sea bowhead whales) and supported the concept of including an international component.

6.2 Stakeholder activities and plans in Russia

In its previous presentation at WGWAP-21, the Marine Mammal Council (MMC) of Russia had committed to continue collaboration with Minprirody, IUCN and other stakeholders in developing a Strategy for the conservation of the Okhotsk (western) gray whale population in the Russian Federation. A significant part of the recently created Cetacean Expert Section (see Item 6.1) consists of board members and regular members of the MMC. The Cetacean Expert Section, which includes scientists as well as business and NGO representatives, is expected to

[17] At the time of report finalization, the Panel had received no further information from Samatov.

serve as an objective and professional advisory unit under the auspices of Minprirody to ensure effective conservation and management of cetacean populations. The MMC continues to be committed to providing scientific advice on conservation of the western gray whale population and, if necessary, is open to establishing and chairing an independent scientific advisory panel provided adequate funding becomes available.

6.2.1 Discussion

The Panel thanked Shpak and Burdin for their dedicated work on drafting the whale conservation strategies.

Burdin (who is the lead for drafting the gray whale strategy) confirmed that he and others had been actively working on documents throughout the autumn and winter of 2020-2021 and until the start of this year's field season. He was now available again to work with Shpak (who is taking the lead on drafting the Okhotsk bowhead whale strategy) and Kondrashina (Executive Secretary of the Minprirody Cetacean Experts Section). The gray whale strategy is in good shape, but some disagreements remain on *inter alia* ship strikes, entanglement and pollution. Burdin hoped consensus could be reached on the draft strategy early in 2022, after which it could be translated into English and reviewed by international experts including those who had been members of the Panel. There will be considerable differences between the gray and bowhead whale strategies as the Okhotsk population of the latter is confined to Russian waters whilst gray whales have a number of complex international considerations associated with their large geographic range. Burdin emphasized that an international co-operative effort was needed to conserve western gray whales (see Item 6.1).

Burdin concluded that obtaining adequate funds to implement national whale research programmes is a major problem. The work is expensive, and obtaining the resources needed to survey potential habitat areas of western gray whales and Okhotsk Sea bowhead whales remained problematic.

Krever expressed appreciation of the work of Burdin and Shpak in supporting the development of the strategies. She noted that some funding was available through a Global Environmental Facility (GEF) project and a number of businesses may also assist with funding.

Kondrashina asked all participants at the meeting with an interest in becoming involved in the western gray whale strategy to share their contact details with her (via Berzina-Rodrigo).

6.3 Update on rangewide efforts within the IWC

6.3.1 Presentation

The relevant recent work of the IWC including its Scientific Committee was presented by Staniland. The effects of the gray whale Unusual Mortality Event in the eastern North Pacific were still evident but the stranding rate per capita appeared to be decreasing and the need for continued long-term monitoring was stressed. The Scientific Committee again re-emphasised its repeated recommendation that the two existing Sakhalin photo-ID catalogues (along with the biopsy data) be brought into a joint catalogue under the auspices of the IWC, recognising the

extensive work that had already been undertaken to finalise an agreement in this regard among the relevant parties. It encouraged all data-holders to co-operate to realise this important goal.

The IWC is currently updating the joint IWC/IUCN western gray whale Conservation Management Plan (CMP)[18], to be based in part on the outcome of a postponed Scientific Committee workshop to finalise rangewide considerations into an updated CMP. The workshop is now planned for 2022. This will in turn feed into a stakeholder workshop (including country representatives, NGOs, businesses) and consideration at the upcoming Commission meeting in October 2022 (IWC68). After working closely with the IUCN panels since the beginning, the IWC will continue its work on gray whales through its various committees. Staniland also referred to an IWC survey programme covering much of the North Pacific to estimate abundance and collect biopsies from and photo-identify whales including gray whales. After several unsuccessful attempts in recent years to obtain permission to carry out an IWC–Pacific Ocean Whale and Ecosystem Research (IWC–POWER) survey in Russian waters of the western Bering Sea, the IWC would welcome any additional advice on how to facilitate obtaining a permit. To date, no plans for the POWER cruises to cover the Okhotsk Sea had been made.

6.3.2 Discussion

The Panel thanked Staniland for his presentation and noted the excellent co-operation between the Panel and the IWC Scientific Committee to date. It was pleased to hear that western gray whales would still be considered by the IWC and the Panel encouraged all parties collecting data on gray whales in the western North Pacific to submit summaries and papers to the IWC for annual review by the Scientific Committee. Further, the Panel looked forward to progress on the CMP via the scientific and stakeholder workshops and also expressed its belief that an updated[19] and revitalised 'Memorandum of Cooperation concerning Conservation Measures for the Western Gray Whale', initially developed in 2014 and signed so far by the IWC Commissioners of five of the eight or nine range states (Japan, Republic of Korea, Russian Federation, USA and Mexico), could become a valuable mechanism for supporting rangewide conservation work.

There was a short discussion over how best to obtain permits in Russian waters and Krever noted that several permits may be required for even a single cruise. Participants, especially those from Russia, were requested to provide Staniland with advice after the meeting.

7 INDEPENDENT EVALUATION: CONCLUSIONS & RECOMMENDATIONS

Edwards said that IUCN's policy of conducting 'external' evaluations was a part of its attempt at best practice for its Independent Scientific and Technical Advisory Panels[20]. Regular independent evaluation is regarded as essential for transparency and for enabling stakeholders to see results, therefore all such evaluations are publicly available. The 2021 WGWAP evaluation was the fifth and final one, and as such was seen as an important part of the Panel's legacy. Given that WGWAP's mandate was ending, the focus and scope of work for this evaluation was to consider the full 17-year life of the western gray whale panels (starting with the Independent

[18] https://iwc.int/western-gray-whale-cmp
[19] The update is necessary *inter alia* given the many references to WGWAP in the existing document.
[20] See https://www.iucn.org/theme/business-and-biodiversity/our-work/business-approaches-and-tools/independent-scientific-and-technical-advisory-panels

Scientifc Review Panel convened in 2004) as well as recommendations and observations for the future.

7.1 Presentation by Ajabu Advisors

David Gordon of Ajabu Advisors LLC provided a brief overview of the final independent evaluation of WGWAP, highlighting their Conclusions, Key Factors of Success and Recommendations.

7.1.1 Conclusions

(1) From the outset, WGWAP operated in a context where multiple institutions and organizations were 'engaged' in one way or another with whale conservation efforts;
(2) The Panel encouraged and contributed to a dramatically improved understanding of western gray whales;
(3) The Panel's existence and the work it undertook drew attention to western gray whales and increased public and professional interest in their conservation;
(4) The 'reputational risk' to Sakhalin Energy and the Lenders was reduced;
(5) Sakhalin Energy benefitted from Panel advice as it sought to minimise the impacts of its activities (e.g. noise, habitat disturbance, vessel strikes) on gray whales;
(6) Indirectly, the Panel probably helped other oil and gas companies to minimize their impacts;
(7) The Panel, IUCN, Sakhalin Energy and others involved in the panel process were not successful in their efforts to engage other industries on the Sakhalin Shelf and the Russian Far East generally;
(8) The lessons learned and relationships built are contributing to a conservation strategy for western gray whales being developed by Russian federal authorities.

7.1.2 Key factors of success

(1) The Panel's independence from undue corporate, governmental and NGO influence ensured its legitimacy in the eyes of most stakeholders;
(2) The Panel managed, for the most part, to work collaboratively with corporate, governmental and NGO actors;
(3) The Panel maintained transparent practices in operations and reporting;
(4) The presence of outside observers brought additional expertise and contributed to the Panel's legitimacy;
(5) The inclusion of respected scientists as Panel members and associates maintained the high quality of advice and gave the Panel credibility in the views of most stakeholders;
(6) Skilled facilitation by IUCN assured effective functioning of the Panel process under changing circumstances.

7.1.3 Recommendations

(1) IUCN and the Panel should document and disseminate as much of the information gained over the years as possible;
(2) IUCN and other stakeholders should develop an action plan to secure necessary funding for ongoing western gray whale conservation efforts;

(3) The Russian government should incorporate WGWAP approaches, expertise, and recommendations into its regulatory framework and the conservation strategy for Okhotsk (= western) gray whales currently under development;
(4) Sakhalin Energy should ensure monitoring and adaptive management that includes qualified, experienced external experts to verify the information generated from monitoring information and ensure that mitigation measures have been implemented in accordance with IFC Performance Standards;
(5) All parties should champion adoption of a comprehensive range-wide initiative and associated Conservation Management Plan for western gray whales under the aegis of IWC.

In conclusion, Gordon posed the following question as a way to stimulate discussion under Item 7.2:

> The Panel has had a meaningful impact on encouraging western gray whale conservation. Some core functions may not continue without it. How should these core functions in bringing independent scientific expertise to industry practice, verifying monitoring and mitigation measures, and serving as a focal point for scientific research, be maintained in future?

7.2 Discussion

On behalf of the Panel, Reeves thanked the evaluation team for their thorough and professional report. He appreciated the emphasis placed in the evaluation on the importance of transparency and of archiving and disseminating the data and information that had arisen from the Panel's work over the past 17 years.

There was some discussion on the difficulty of prioritising data and information for archiving given that it is impossible to predict what might be needed in future. Loss of any of the data collected by the Joint Programme, the individual companies and the RGWP would be a great pity, but it is also essential that the stored (archived) data are *accessible* for applied (and for that matter, basic) research. Whether this will occur is in question given the inevitably sharp drop-off in funding that is coming with the end of Sakhalin Energy's support of IUCN and the Panel and the unwillingness, to date, of some data holders (specifically ENL) to participate. The ability of IUCN or another international body (such as the IWC) to assume ongoing responsibility for archiving data and information, and, very importantly, responding to requests from researchers for access under agreed conditions, will depend *inter alia* on adequate funding.

A separate but related issue is transparency. Racca noted that whilst industry often funds creditable research on noise and its effects on wildlife, this funding is often conditional, with restrictions on the extent to which data and results can be made public. The Panel experience has been exceptional, and in some respects unique: it has shown that with thoughtful setting of terms and conditions, along with rigorous facilitation by an 'honest broker' (in this case IUCN), independent scientists can interact with industry-sponsored specialists as well as NGOs to develop constructive ways of dealing with difficult and sensitive issues in an open, respectful and co-operative manner. As banks and companies come under ever-increasing scrutiny and both governments and civil society demand greater accountability in regard to environmental impacts, the Panel hopes that the collaboration between Sakhalin Energy and IUCN under the WGWAP mantle will be seen as an instructive example and possibly as a model.

With respect to funding mechanisms, Nowacek referred to the situation for offshore wind development in New York state where legislation requires that every megawatt of power produced carries a modest contribution to a biodiversity research fund administered by the state agency for energy resource development (hence ensuring industry-independent research and availability of data). Donovan referred to government-organised work undertaken in Ireland to obtain baseline data for oil and gas (previously) and now marine renewable energy, known as the ObSERVE programme[21]. Such government-led fundraising mechanisms to support environmental impact work are now in place in several countries and such a model may be useful when it comes to finding ways to support gray whale monitoring and research post-WGWAP. Krever added that Minprirody will be looking carefully for opportunities to develop similar approaches in future legislation to raise funds for western gray whale conservation and research.

8 WGWAP CONTRIBUTIONS AND 'NEXT CHAPTER' IN WESTERN GRAY WHALE CONSERVATION

8.1 Next steps in WGWAP closure and legacy plans

8.1.1 Brief summary of WGWAP recommendations and lessons learned

Reeves noted that the Panel had met privately with IUCN, Sakhalin Energy, and Lenders (represented by Hancox) on the day before this meeting to discuss and attempt to resolve the status of WGWAP recommendations that remained 'open' (i.e. not yet implemented or rejected). As mentioned under Item 1.6 (above), the Panel will develop a Final Statement after this meeting intended to, among other things, highlight key recommendations for the future. It will focus not only on actions that Sakhalin Energy should continue to take or should initiate, but also on actions that other companies operating on the Sakhalin Shelf should consider.

The Panel members identified a number of key items to address including:

a) analyzing 'resilience' by pairing benthic prey sampling and stress hormone levels (in whale faeces, biopsies or whale exhalation) with assessments of individual body condition (via photogrammetry and field observation by researchers);
b) improved methodologies for within-season density and abundance estimation;
c) tagging to better understand movements, diving, acoustic behaviour and habitat use;
d) assessment of the entire underwater soundscape[22] experienced by gray whales in the Sakhalin feeding areas through time, both long-term and intra-seasonal (by monthly or biweekly periods) which would probably require credible control-station analyses overseen and mandated by a regulatory agency;
e) establishing and maintaining regular interactions between research teams collecting data in the field to ensure data reliability and comparability;
f) rigorous evaluation of the effectiveness of mitigation measures in the short and long term;
g) finding ways to integrate new technology (e.g. UAVs, passive acoustics, non-invasive tagging) without compromising value of data series derived from 'traditional' methods;
h) commitment to annual acoustic monitoring;

[21] See https://www.gov.ie/en/publication/12374-observe-programme/ and https://www.marei.ie/project/observe-ii/
[22] No long-term region-wide analysis has yet been undertaken (see Item 4.4). It is possible that such an analysis will show that the anthropogenic noise footprint in the nearshore (Piltun) feeding area has improved over time due to measures taken by Sakhalin Energy (and others) to limit the amount of sound energy entering the water as a result of their operations (e.g. quieter vessels).

i) continuation of annual (or at least regular) population dynamics modelling, preferably drawing on a single photo-ID and genetics data set under a unified management framework;
j) resumption of habitat monitoring in the truest sense of regularly sampling gray whale prey;
k) importance of transparency, independence and regular (mandatory) reporting of fieldwork results not only to regulators but also to the public.

The Panel **stresses** that most if not all of the work called for should not be the responsibility of a single company. There is a great need for government-mandated co-operation and sharing of both the costs of acquiring and analysing data and sharing of the data under a fair and secure process focussing on agreed conservation and management needs.

A problem that recurred over the years and that may be endemic to panel arrangements of this kind lies in the differences between what is required by regulation and what is needed for good conservation science and mitigation. Sakhalin Energy felt, understandably, that its primary obligation was to comply with Russian regulatory requirements and commitments agreed with the Lenders and only secondarily to the Panel. Therefore, if the quality and results of an analysis were approved by Minprirody and deemed adequate by the Lenders, the Company was generally unable to carry out more in-depth analyses because of budgetary limitations and shareholder pushback. The Panel was often frustrated by the fact that Sakhalin Energy was constrained from sharing data either legally (e.g. 'raw' acoustic data is not allowed to leave the country) or contractually (by opposition from its Joint Programme partner, ENL), even when the option was offered (as had long been the case with photo-ID data) of entrusting the data to a neutral 'third party' (such as the IWC) which would have provided access to data under a formal 'data sharing agreement'. Such an approach would have provided a better basis for conservation management and further enhanced the Company's reputation as a responsible operator.

Mate, whose own long history of research on gray whales and consistent involvement as a formal observer of IUCN panels on behalf of the Lenders, provided his perspective on WGWAP's 'legacy'. He noted the degree to which turnover in leadership at Sakhalin Energy, and IUCN, and to a lesser extent the turnover in Panel composition, had resulted in differences in individual 'mindset' (from enthusiastic to adversarial) that had influenced the Company's relations with IUCN and the Panel. On balance, he felt that the process, 'new' though it was in 2004, had worked very well and had ended up helping to make Sakhalin Energy a world-class operator that was able to rely on high-quality expertise when it came to gray whale science and conservation. He therefore strongly urged the Russian government to strive to set up a mechanism sufficiently similar to WGWAP to assure continuity in terms of international participation, independence and transparency.

8.1.2 Website and future access to knowledge and information

Berzina Rodrigo summarized IUCN's communications strategy for WGWAP's closing stage as agreed in 2020, which includes arranging for future access to western gray whale information and the Panel's knowledge and legacy. She specified three main elements of the strategy and their associated deliverables and outputs, as follows:

- Building on the technical knowledge base developed by the Panel – transform the WGWAP website into a website/section about western gray whale conservation,

inventory of documents and knowledge produced by WGWAP, peer-reviewed publications, final statement by the Panel;
- IUCN-developed explanatory materials highlighting insights from the Panel's work for broader (non-technical) audiences – updated WGWAP Stories of Influence report, issue briefs;
- Strengthening the profile of western gray whale conservation – final media release, news stories or articles.

Berzina-Rodrigo made clear that implementation of this strategy would involve items that either the Panel or IUCN would have the primary responsibility for producing. As a rule, Panel members would be expected to review technical aspects of the items being led by IUCN.

At the Panel's 2021 meeting, an initial draft of the 'inventory of WGWAP documents' was presented as document WGWAP-21/27 (and see WGWAP-21 report, item 14.1). Dorina Seitaj from the IUCN Marine and Polar Programme will help co-ordinate this undertaking. The inventory is expected to span the entire panel period from 2004 to 2022 and would include a variety of types of 'legacy' products such as workshop and meeting reports, guideline documents describing best practice, public statements from the Panel, distribution maps, published journal articles and the searchable database of Panel recommendations. A fairly extensive discussion of website issues had taken place at the last Panel meeting and this was summarized in the WGWAP-21 report, item 14.1.

At the present meeting, Seitaj and Berzina-Rodrigo explained that IUCN was undertaking a complete overhaul of its main website which is expected to go live by Spring 2022. The final, agreed approach and structure are not yet known but are expected to be revealed within the next few months. There is no risk of losing the portal within the IUCN system currently dedicated to providing access to Panel recommendations, but some, possibly much, of the other material currently posted on the WGWAP website may need to be reformatted or 'repackaged' (i.e. the way information is presented must be changed), relocated or even removed entirely from the IUCN system. A wide range of options is being considered – e.g. a scaled-down WGWAP website managed by IUCN or one of its commissions (such as the Species Survival Commission), a dedicated gray whale section on the main IUCN website, a section within the IUCN Library and/or spaces in other sectors (academic institutions, intergovernmental or national governmental bodies, industry organizations, NGOs etc.) willing to host some or even all of the material. Edwards highlighted that IUCN staff would no longer be available after the end of March 2022 to curate WGWAP materials or respond to requests for data or document access. He emphasised that there could be significant costs even just to hold material and make it generally accessible.

The Panel noted that archiving the entire collection of documents in a single, secure and publicly accessible repository would be ideal. However, IUCN stated that it would be necessary, at a minimum, to rigorously prioritise the various kinds of materials currently on the website and decide which are essential ('core' WGWAP products) and which are expendable in one sense or another – meaning that the latter can either be housed on a non-IUCN site or simply deleted (drafts, privileged material etc.). Some items may already be available on, or could be transferred to, other websites (e.g. those of Sakhalin Energy, International Association of Oil & Gas Producers, JASCO, universities) and the links to such items could be provided somewhere within the IUCN system. In conclusion, a major effort will be required, to be led by Berzina-Rodrigo

with assistance from Seitaj and others in IUCN, Panel members and Company officials, to prioritise items and develop a strategy for long-term storage and accessibility.

One potential site for at least portions of WGWAP materials is the IWC, which Staniland noted has considerable experience with, and the capability to organize and manage, scientific and conservation-related data and literature. He offered to assist as much as possible in any future discussions. In this context, several Panel members noted the difficulty of searching the IWC system, for example using keywords.

There was considerable discussion of the more general but important question of how to structure or organize the body of WGWAP work, regardless of the repository, to make it truly searchable, retrievable and accessible. In particular, it would be desirable to have the material organized and indexed in a way that allows users to determine what is (and isn't) available. Academics and researchers typically rely on search engines such as Google Scholar, ResearchGate and Academia, but only a handful of Panel products have been published in the peer-reviewed literature that normally is indexed and findable via those routes.

Whilst the present WGWAP web section hosts all of the Panel and task force reports, for example[23], it only provides access to a portion of the numbered meeting documents that are deemed public, not the internal or confidential ones, that can also be important sources of information and are generally only briefly summarised in Panel or NTF reports. In this regard it was noted that although the current document numbering system had proven quite manageable for those directly involved, many of the working documents submitted to meetings were provisional or confidential and some remained earmarked as 'internal' despite IUCN's consistent efforts to make them public.

Recognising the great importance of this topic, Panel members agreed to assist IUCN as much as possible with this complex task.

8.1.3 Upcoming legacy documents

As mentioned in previous WGWAP reports, the Panel was expected to produce three additional scientific papers for publication in peer-reviewed journals – one on cumulative impacts to be led by New, one on western gray whale population assessment to be led by Cooke and one on data collection and analysis for offshore noise-generating events (e.g. seismic surveys) to be led by Nowacek.

Also as mentioned previously, the Panel, with help from Seitaj and Berzina-Rodrigo, was expected to produce a series of 'issue briefs' (referred to in the WGWAP-21 report, item 14.2, as 'brochures on best practices') intended to make key information and recommendations from the entire body of WGWAP work more readily accessible in a short, structured and non-technical format. Drafts of such brochures on vessel strikes, oil spill prevention and response, food and feeding ecology, photo-ID and noise were already available and under review by IUCN.

8.2 Stakeholders' visions of how western gray whale conservation could be pursued post-2021

The following statements were provided by several stakeholders:

[23] https://www.iucn.org/western-gray-whale-advisory-panel/resources/meeting-reports

8.2.1 Sakhalin Energy

Alcock stated that although the term of the Panel was ending, the Company's activities to monitor and conserve gray whales would not end. In addition to the need to comply with Russian Federation requirements, the Company has made commitments to the UN Global Compact Sustainable Development Goals. It also subscribes to global initiatives related to transparent reporting and publishes an annual sustainable development report, which is consistent with Global Reporting Initiative principles. The Company has externally certified its environmental management system which is compliant with International Organization for Standardization (ISO) 14001 to ensure that environmental issues are identified and measures are in place to mitigate impacts. As discussed under Item 5.1.2, the Company has also voluntarily committed to meeting IFC Performance Standards, including PS6. Alcock assured the meeting that all of these commitments will remain into the future. She also noted that much of the Panel's guidance and advice over the years had been incorporated in Company standards and procedures. Also, the Company intends to continue working with the Russian regulatory agencies, in particular Minprirody's Cetacean Expert Section described under Item 6.1. Alcock expressed her hope that this body will act as an effective vehicle for continuing identification and application of good practices for gray whale conservation.

Kirchner added that hydrocarbon reservoir management is ultimately the driving force behind acquiring geophysical data. Sakhalin Energy has been in the production phase for well over a decade and has no plans for exploration. Therefore, any plans for further seismic surveys to monitor the reservoirs will come under increased scrutiny by the Company as well as the regulator (State Reserves Committee). He considered it likely that the volume of sound energy introduced to the marine environment by Sakhalin Energy's activities would continue to decline as more reliance is placed on simulation modelling and more is learned from the source reduction experiment in 2022 (see Item 4.3).

8.2.2 IUCN

Boris Erg (Director of IUCN's Regional Office for Eastern Europe and Central Asia) stated that he was encouraged by the progress of the federal project discussed under Item 6.1. The reported advancement of a Memorandum of Understanding between the federal project and Sakhalin Energy was also encouraging. IUCN wishes to be involved in western gray whale conservation in the future as the Panel's legacy is too valuable to be lost. Of course, the future will be different, but the Panel system has left a well-defined structure and process to build upon. He suggested that it would be good to expand the geographical scale of efforts to encompass the full range of the species (see, for example, the Memorandum of Cooperation discussed under Item 6.3). There will be discussions within IUCN to see what form or forms future support might take,

8.2.3 WWF Russia

Alexey Knizhnikov (Head of the Business Environmental Responsibility Programme at WWF Russia) referred to several concerns that need to be addressed in light of the end of the Panel, and especially in regard to continuing: (i) critical, independent review of harmful activities, (ii) refinement of approaches to mitigation and (iii) ensuring that legacy recommendations (see Item 8.1.1) are properly addressed. If these concerns are not addressed satisfactorily under Russian leadership, then he feared that all achievements to date would be lost. It had not been possible thus far for the MMC to take an independent leadership role within the federal project's structure

(see Item 6.1.1). Noting the comments made under Item 8.2.1, Knizhnikov stressed that it was critical for Sakhalin Energy to assure stakeholders of the Company's willingness to continue collaboration. Regarding the legacy of WGWAP, he was confident that efforts to conserve and protect other wildlife species and populations in Russia (and elsewhere) would benefit from the lessons learned from this experience.

9 CLOSING REMARKS

Various stakeholders present at the meeting, whether in person or online, provided the following closing remarks.

9.1 Shell

Larissa Leitch spoke on behalf of Shell, one of the Sakhalin Energy shareholders. She applauded the work of Panel members and IUCN on what had been a challenging project. The Panel had excelled in producing good independent scientific advice and transparency. It had significantly expanded scientific knowledge and helped to develop methods of monitoring and mitigating industrial impacts that were globally applicable, and transferable to other fields such as renewable energy. She trusted that Sakhalin Energy would continue to help conserve marine biodiversity on the Sakhalin Shelf by implementing WGWAP recommendations and sharing best practices with other companies and the Russian government. With respect to the Russian national strategy, she stressed the need for broad support from science and industry, within Russia and internationally. The importance of continuing long-term datasets lent itself to a co-ordinated approach and the recent IUCN congress in Marseille had emphasized that no country or government could solve complex issues of nature conservation alone. Partnership and collaboration are essential for addressing problems and finding optimal solutions. Shell's strategy is to work with other organizations and NGOs, and she looked forward to continuing collaboration in western gray whale research and conservation.

9.2 Sakhalin Energy

Alcock extended heartfelt thanks to the Panel from Sakhalin Energy and hoped this was au revoir rather than goodbye. The challenges associated with conserving western gray whales had had a salutary effect on the Company's own development over the years. The transparency instilled by the WGWAP process had led to more robust processes and procedures and increased the Company's capability and knowledge. Whilst the Company's objectives may at times have seemed at odds with those of the Panel, the whole Company was committed to minimizing negative impacts on these special animals. Finally, she thanked her colleagues and the Lenders and their consultants for the key roles they had played in helping breach seeming impasses.

Racca, one of the Company's long-time contractors, added that WGWAP had been a wonderful collaboration and he hoped a similar approach could be applied to many other at-risk species and populations in the future.

9.3 Lenders

Yoshiko Ohyama from the Project Finance Department, Sustainable Development Office at Mizuho Bank, Ltd expressed her thanks on behalf of the Lenders. All discussions through the Panel had contributed to Sakhalin Energy's efforts to comply with IFC PS 6 and more generally to the conservation management of western gray whales. She hoped that the legacy programmes as envisioned would come to fruition.

9.4 Minprirody

Krever said she had listened carefully to the many comments made during the meeting about the future of gray whale conservation on the Sakhalin Shelf and beyond. She would take all into

account and looked forward to a broad consultation with Russian and international participants including IUCN on the future direction to be taken with the Russian national strategy.

9.5 Civil Society in addition to WWF

Masha Vorontsova – who was involved with WGWAP for a sustained period of time, mainly in her former position with the International Fund for Animal Welfare (IFAW) and most recently as an independent ocean expert – expressed appreciation of the work of WGWAP and hoped that NGOs would continue to be involved in future efforts to conserve western gray whales, whether under the rubric of Minprirody, IWC or any other mechanism.

9.6 IUCN

Minna Epps (Director of IUCN's Global Marine and Polar Programme) described WGWAP as a flagship approach that could be replicated elsewhere. She was pleased to see at UNFCCC COP26 that the oceans were recognised as highly important in the fight to address challenges associated with climate change. Marine industries are increasing and the unique aspects of WGWAP in terms of transparency, independent scientific oversight and stakeholder involvement provided an excellent example of how to improve industry practices. She extended special thanks to Berzina-Rodrigo for her incredibly hard work, always carried out cheerfully and respectfully, and noted that this was one of the keys to the Panel's effectiveness in recent years.

Gerard Bos (Director of IUCN's Global Business and Biodiversity Programme) said the WGWAP process had been a wonderful learning journey. This was a sad moment, but also a moment of celebration. He thanked its Chair and Co-chairs for their dedication over the 17 years of the Panel's existence, and all other Panel members, past and present. He also thanked Sakhalin Energy and its consultants for their major investments of time and resources to support the WGWAP process. The Lenders and the banking community had been essential, as had various practitioners in the Russian Federation and on Sakhalin Island. He thanked the observers, noting that it was critical for the voices of NGOs to be heard and taken seriously. IUCN staff had contributed immensely to the success of the Panel process, but their leadership role will shortly be over and the responsibility for carrying western gray whale conservation forward will be spread more widely. Finally, he thanked the support staff and technical teams, including the interpreters and rapporteur, who made it possible to conduct these international meetings so successfully year after year.

There is now more clarity on options for the future. Sakhalin Energy has given assurances that it will follow many of the Panel's recommendations and continue to operate in a way that minimizes impacts on gray whales. The world is very different from what it was in 2004 when the original Independent Scientific Review Panel was convened, and questions of environmental responsibility are now better understood and have a higher profile. Processes such as WGWAP, and the other panels triggered by it, have contributed to this improved state of affairs. How to reconcile economic development with environmental conservation continues to be a major challenge but is now at least better understood. The good work and practices brought about by WGWAP will live on and IUCN is committed to ensuring that the core documentation remains accessible. It would continue to seek support from the financial community, commercial organizations and philanthropists, hoping to convince them of the good business case for nature conservation.

9.7 The Panel

Individual members of the Panel retain their great interest in and commitment to the conservation of western gray whales.

10 REFERENCES

Gailey, G., Sychenko, O., Tyurneva, O. , Yakovlev, Y., Vertyankin, V., van der Wolf, P., Drozdov, K. and Zhmaev, I. (2020). Effects of sea ice on growth rates of an endangered population of gray whales. *Scientific Reports* 10, 1553. https://doi.org/10.1038/s41598-020-58435-3

Johnson, S.R., Richardson, W.J., Yazvenko, S.B., Blokhin, S.A., Gailey, G., Jenkerson, M.R. and others (2007). A western gray whale mitigation and monitoring program for a 3-D seismic survey, Sakhalin Island, Russia. *Environmental Monitoring and Assessment* 134 (1). https://doi.org/10.1007/s10661-007-9813-0

Mate, B.R., Ilyashenko, V.Y., Bradford, A.L., Vertyankin, V.V., Tsidulko, G.A., Rozhnov, V.V. and Irvine, L.M. (2015). Critically endangered western gray whales migrate to the eastern North Pacific. *Biology Letters 11*(4), 20150071. https://doi.org/10.1098/rsbl.2015.0071

Nowacek, D.P., Vedenev, A., Southall, B.L. and Racca, R. (2012). Development and implementation of criteria for exposure of western gray whales to oil and gas industry noise. In: A.N. Popper and A. Hawkins (eds), The Effects of Noise on Aquatic Life. Advances in Experimental Medicine and Biology, vol 730. Springer, New York. https://doi.org/10.1007/978-1-4419-7311-5_119

Nowacek, D.P., Bröker, K., Donovan, G.P., Gailey, G., Racca, R., Reeves, R.R., Vedenev, A.I., Weller, D.W. and Southall, B.L. (2013). Responsible practices for minimizing and monitoring environmental impacts of marine seismic surveys with an emphasis on marine mammals. *Aquatic Mammals* 39(4), 356–377. https://doi.org/10.1578/AM.39.4.2013.356

Nowacek, D., Clark, C., Mann, D., Miller, P., Rosenbaum, H., Golden, J., Jasny, M., Kraska, J. and Southall, B. (2015). Marine seismic surveys and ocean noise: Time for coordinated and prudent planning. *Frontiers in Ecology and the Environment* 13:378-386. https://doi.org/10.1890/130286

Nowacek, D.P. and Southall, B.L. (2016). Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys. IUCN, Gland, Switzerland. 42pp. https://portals.iucn.org/library/node/46291

Urbán R., J., Weller, D., Martínez A., S., Tyurneva, O., Bradford, A., Burdin, A., Lang, A., Swartz, S., Sychenko, O., Viloria-Gómora, L. and Yakovlev, Y. (2019). New information on the gray whale migratory movements between the western and eastern North Pacific. IWC Scientific Committee doc. SC/68a/CMP/11. portal.iwc.int/e/sc68a/documents.

Weller, D.W., Takanawa, N., Ohizumi, H., Funahashi, N., Sychenko, O.A., Burdin, A.M., Lang,A.R. and Brownell, R.L., Jr. (2016). Gray whale migration in the western North Pacific: further support for a Russia-Japan connection. IWC Scientific Committee doc. SC/66b/BRG16.

APPENDIX 1 - MONITORING AND MITIGATION PLAN FOR SAKHALIN ENERGY'S 2022 PILTUN-ASTOKH 4D SEISMIC SURVEY

See "MONITORING AND MITIGATION PLAN FOR THE 2022 PILTUN-ASTOKH 4D SEISMIC SURVEY" in this archive.

APPENDIX 2 - A QUICK GUIDE TO UAS-BASED PHOTOGRAMMETRY OF WHALES

By KC Bierlich and Leigh Torres

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Photogrammetry Overview

To obtain metric measurements from an aerial image, measurements made in pixels are multiplied by the ground sampling distance (GSD) to convert to standard units (e.g. meters) (Fig. 1A). GSD represents the distance on the ground that the length of each pixel represents (i.e., the linear size of the pixel) and thus sets the scale of the image (m/px or cm/px). Figure 1A illustrates how GSD is dependent on the camera sensor, focal length lens, and altitude. Thus, Unoccupied Aircraft Systems (UAS) equipped with different cameras and focal length lenses will have inherent differences in GSD as altitude increases (Fig. 1B). As GSD increases, so does the length each pixel represents in a photo, potentially obscuring important features in the photo (such as the boundaries between features) and introducing measurement error.

Add a laser altimeter (LIDAR) to UAS

All UAS come with an onboard barometer for recording altitude, but adding a laser altimeter will dramatically improve accuracy (see Bierlich et al., 2021a)

- Manuscript: https://www.int-res.com/abstracts/meps/v673/p193-210/
- Most studies have used a LightWare SF11/C LIDAR
    - https://www.mouser.com/datasheet/2/321/28054-SF11-Laser-Altimeter-Manual-Rev8-1371857.pdf
- See Dawson et al., 2017 for description of installation and setup of laser altimeter.
    - Manuscript: https://www.frontiersin.org/articles/10.3389/fmars.2017.00366/full
- See Duke University's Marine Robotics and Remote Sensing (https://marineuas.net/) Lab's GitHub for installation instructions for a laser altimeter housing on a DJI Phantom 4 Pro (described in Bierlich et al., 2021a)
    - Repository: https://github.com/marrs-lab/DJI_PH4_LaserAltimeter

Field protocol

Before Take-off

- Record the launch height of the UAS, measured from the camera lens to the water surface. So, if performing hand launch and recovery from a boat, record the launch height of the person holding the drone (can be done one time for each person-boat combination and applied to all flights).
- Before take-off, record video of the GPS time to sync the UAS video and laser altimeter.
    - Digital Clock is an app that can be downloaded to an iPhone https://apps.apple.com/us/app/digital-clock-big-led-alarm/id1287009111
    - Can also link a GPS unit to an iPad
        - E.g., BadElf GPS unit (https://bad-elf.com/)

Collect Training data

- Bierlich et al. (2021a, b) developed a Bayesian statistical model to incorporate uncertainty associated with UAS-based measurements by using measurements of known-sized objects at various altitudes as training data to predict the length measurements of unknown sized whales.
    - Bierlich et al. (2021a): https://www.int-res.com/abstracts/meps/v673/p193-210/
    - Bierlich et al. (2021b): https://www.frontiersin.org/articles/10.3389/fmars.2021.749943/abstract
- Collect training data by flying over an object of known size (e.g., a board) floating at the surface at altitudes that encompass the range used to collect imagery of whales (e.g., within 10-120 m).
- Training data are preferably collected during the flight over whales (e.g., at the start of each flight), but can also be collected before or after the field season.
- Bierlich et al. (2020) provide free training data for some UAS aircraft
    - https://research.repository.duke.edu/concern/datasets/fq977v51n?locale=en

Flying over whales

- Collect video of whales when they are flat and straight at the surface with minimal wake or refraction. Ensure the camera is nadir (90˚, straight down) to obtain an accurate altitude reading. Typical flight altitudes over gray whales are ~25-30 m using a Phantom 4 Pro and ~30-40 m using an Inspire 2.

Data processing

- Import videos into VLC Media Player (https://www.videolan.org)
- Add subtitles to the video to view embedded metadata and obtain barometer altitude
- Collect still frames of the whale in the video using the Snapshot function
    - Whale should be straight with minimal curvature, flat at the surface, and with minimal wake and refraction around the edges of the body
- Record the time in the video of each snapshot (relative to the time-stamp at the beginning of the video). Then add this snapshot time to the GPS time obtained from filming the digital clock. Align this summed time with the matching time from the laser altimeter readings at the time of the snapshot to obtain the altitude at which the video and subsequent snapshot were obtained.
- Rank each photo for quality in measurability following Christiansen et al. (2018)
    - Manuscript: https://www.int-res.com/abstracts/meps/v592/p267-281
    - See supplementary material for guide on seven attributes for measurability quality http://www.int-res.com/articles/suppl/m592p267_supp/

Photogrammetry

- Import each snapshot into MorphoMetriX, an open-source photogrammetry software to make measurements of the whale (Torres and Bierlich, 2020)
    - Manuscript: https://joss.theoj.org/papers/10.21105/joss.01825
    - Repository: https://github.com/wingtorres/morphometrix
- Collate MorphoMetriX outputs into a single datasheet using CollatriX (Bird and Bierlich, 2020)
    - Manuscript: https://joss.theoj.org/papers/10.21105/joss.02328
    - Repository: https://github.com/cbirdferrer/collatrix#installation

  CollatriX can calculate a suite of body measurements and body condition metrics, including the Body Area Index (BAI; Burnett et al 2018), which is a scale-invariant value effective for comparison across individuals and groups of animals. Relative to other tested body condition indices, BAI has the lowest uncertainty (Bierlich et al. 2021b).

Incorporate Measurement Uncertainty

- Set up Bayesian statistical model to incorporate measurement uncertainty associated with:
  - Total body length and morphometric relationships (e.g., rostrum to blowhole and total body length) following Bierlich et al., 2021a
    - Manuscript: https://www.int-res.com/abstracts/meps/v673/p193-210/
    - Repository: https://research.repository.duke.edu/concern/datasets/fq977v51n?locale=en
  - Total body length and body condition, e.g., body area index (BAI), following Bierlich et al., 2021b
    - Manuscript: https://www.frontiersin.org/articles/10.3389/fmars.2021.749943/abstract
    - Repository: https://github.com/KCBierlich/Body_Condition_Analysis

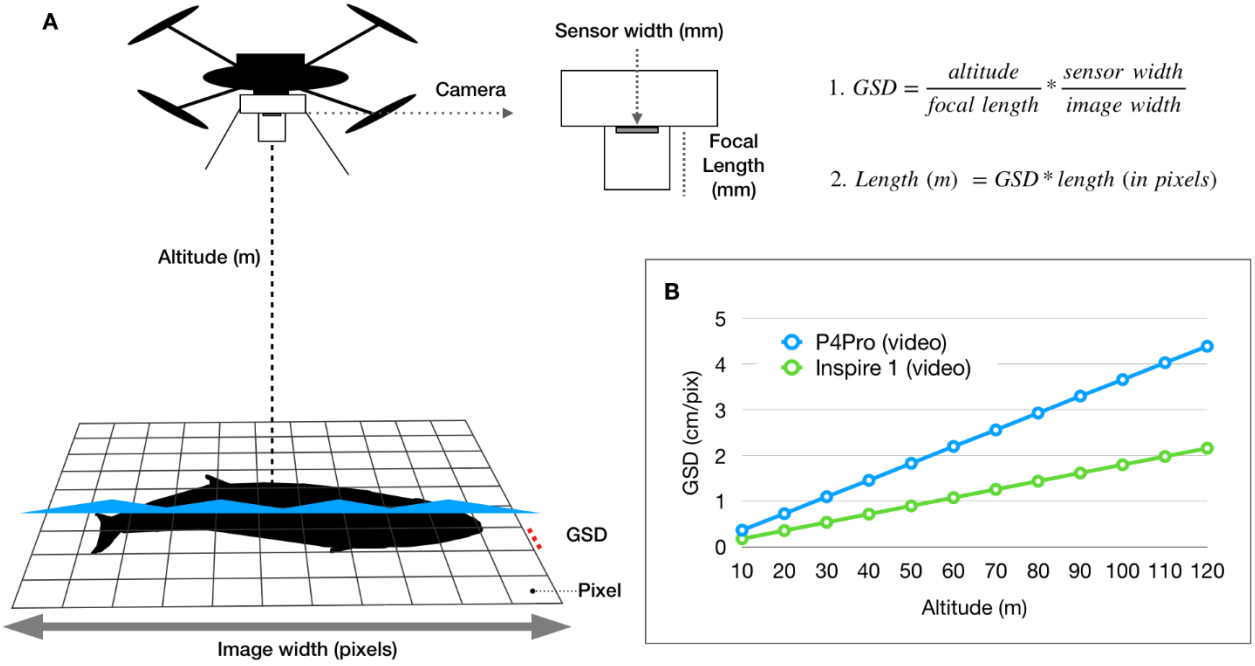

Figure 1: Overview of photogrammetry methods and calculating ground sampling distance (GSD). A) Photogrammetry methods for how each image is scaled to convert measurements in pixels to standard units (e.g., meters). Altitude is the distance between the camera lens and whale (usually at the surface of the water). Figure from Torres and Bierlich (2020). B) The exact (not accounting for distortion or altitude error) ground sampling distance (GSD) for two UAS platforms commonly used to obtain morphological measurements of cetaceans. The difference in GSD between the P4Pro and Inspire 1 is due to the difference in sensor width and focal lengths of the cameras used. Figure from Bierlich et al. (2021a).

References and Additional Information (including other relevant gray whale photogrammetry studies)

Bierlich, K., Schick, R., Hewitt, J., Dale, J., Goldbogen, J., Friedlaender, A., et al. (2021a). Bayesian approach for predicting photogrammetric uncertainty in morphometric measurements derived from drones. *Mar. Ecol. Prog. Ser.* 673, 193–210. doi:10.3354/meps13814.

Bierlich, K.C., Hewitt J., Bird, C.N., Schick, R.S., Friedlaender, A., Torres, L.G., Dale, J., Goldbogen, J., Read, A.J., Calambokidis, J. and Johnston, D.W. (2021b). Comparing uncertainty associated with 1-, 2-, and 3D aerial photogrammetry-based body condition measurements of baleen whales. *Front. Mar. Sci.* 8:749943. doi: 10.3389/fmars.2021.749943

Bird, C. and Bierlich, K.C. (2020). CollatriX: A GUI to collate MorphoMetriX outputs. *J. Open Source Softw.* 5, 2323–2328.

Burnett, J.D., Lemos, L., Barlow, D., Wing, M.G., Chandler, T. and Torres, L.G. (2018). Estimating morphometric attributes of baleen whales with photogrammetry from small UASs: A case study with blue and gray whales. *Mar. Mammal Sci.* 35, 108–139.

Christiansen, F., Vivier, F., Charlton, C., Ward, R., Amerson, A., Burnell, S., et al. (2018). Maternal body size and condition determine calf growth rates in southern right whales. *Mar. Ecol. Prog. Ser.* 592, 267–281.

Christiansen, F., Rodríguez-González, F., Martínez-Aguilar, S., Urbán, J., Swartz, S., Warick, H., et al. (2021). Poor body condition associated with an unusual mortality event in gray whales. *Mar. Ecol. Prog. Ser.* 658, 237–252. doi:10.3354/meps13585.

Dawson, S.M., Bowman, M.H., Leunissen, E. and Sirguey, P. (2017). Inexpensive aerial photogrammetry for studies of whales and large marine animals. *Front. Mar. Sci.* 4. 10.3389/fmars.2017.00366

Lemos, L.S., Burnett, J.D., Chandler, T.E., Sumich, J.L. and Torres, L.G. (2020). Intra- and inter-annual variation in gray whale body condition on a foraging ground. *Ecosphere* 11. 10.1002/ecs2.3094

Lemos, L.S., Olsen, A., Smith, A., Burnett, J.D., Chandler, T.E., Larson, S., et al. (2021). Stressed and slim or relaxed and chubby? A simultaneous assessment of gray whale body condition and hormone variability. *Mar. Mammal Sci. (In Press.*, 1–11. doi:10.1111/mms.12877.

Perryman, W.L. and Lynn, M.S. (2002). Evaluation of nutritive condition and reproductive status of migrating gray whales (*Eschrichtius robustus*) based on analysis of photogrammetric data. *J. Cetacean Res. Manage.* 4, 155–164.

Torres, L.G., Nieukirk, S.L., Lemos, L. and Chandler, T.E. (2018). Drone up! Quantifying whale behavior from a new perspective improves observational capacity. *Front. Mar. Sci.* 5. doi:10.3389/fmars.2018.00319.

Torres, W. and Bierlich, K.C. (2020). MorphoMetriX: a photogrammetric measurement GUI for morphometric analysis of megafauna. *J. Open Source Softw.* 5, 1825–1826.

APPENDIX 3 - OVERVIEW OF OIL AND GAS PROJECTS AND LICENSE BLOCKS/FIELDS IN OR NEAR WESTERN GRAY WHALE FEEDING AREAS OFF NORTH-EASTERN SAKHALIN

Summary of publicly available information prepared by IUCN v. 1 November 2021 (updated)

Note: The information sources used to prepare this summary include company websites, annual and sustainability reports, tender information, the list of projects subject to the State Environmental Expert Review (SEER, Russia), press releases, news media, as well as NGOs. The below schematic map is based on publicly available information and is intended only for illustrative purposes (not to scale). The designation and depiction of areas on this map should not be interpreted as any opinion on the part of IUCN or WGWAP concerning the legal status, authorities or operators, or delimitation of boundaries. Coordinates, boundaries etc. on the map are not exact and therefore should not be used as such. Compiled by Anete Berzina-Rodrigo and Zanda Krukle.

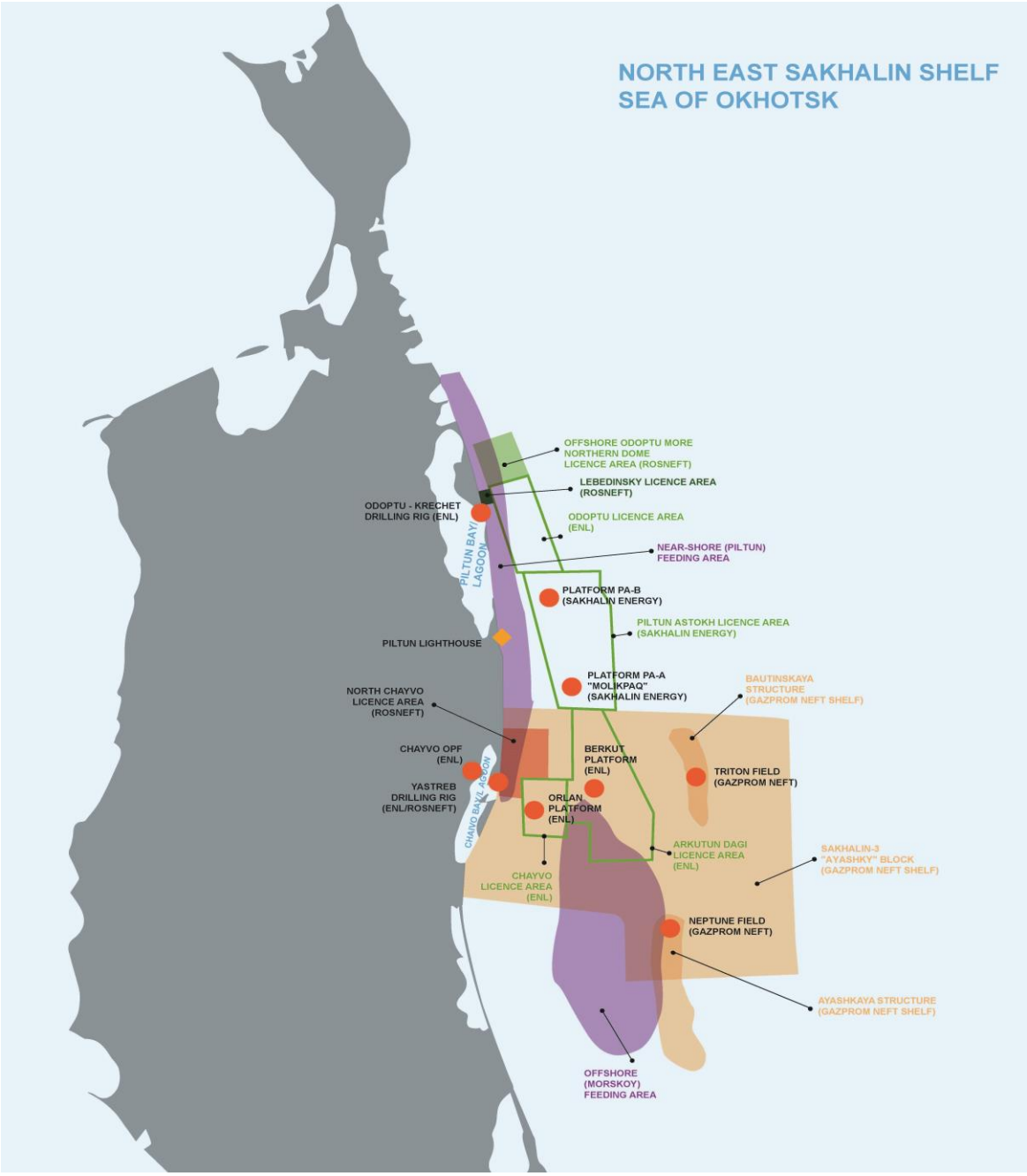

Figure 3. Schematic map showing the approximate locations and boundaries of oil and gas development areas in or near the gray whale feeding areas off north-eastern Sakhalin and elsewhere on the eastern Sakhalin shelf.

Sakhalin Energy Investment Company Ltd.

Participants

Production Sharing Agreement (PSA) with Russian party, represented by:

- the State (Russian Federation Government)
- the Sakhalin Oblast Administration

Shareholders:

- Gazprom (50%+1 share)
- Royal Dutch Shell plc (27,5% - 1 share)
- Mitsui (12.5%)
- Mitsubishi (10%)

Website: https://www.sakhalinenergy.ru/

Sakhalin-2 project, Piltun-Astokh

Phase

Production

Assets / infrastructure

2 offshore oil and gas platforms:

- Piltun-Astokhskoye-A (PA-A / Molikpaq)
- Piltun-Astokhskoye-B (PA-B)

Trans-Sakhalin pipeline system

Activities 2021

See above and associated documents

Planned activities 2022+

See above and associated documents

Note: Another block, Lunskoye, is located further south, away from western gray whale feeding areas.

Exxon Neftegas Limited
(a subsidiary of ExxonMobil)

Participants

PSA with Russian party, represented by

- the State (Russian Federation Government)
- the Sakhalin Oblast Administration

Shareholders:

- U.S.-based ExxonMobil 30%
- Russian State-owned company Rosneft acting via its affiliates RN-Astra (8.5%) and Sakhalinmorneftegas-Shelf (11.5%);
- Japanese consortium SODECO 30%;
- Indian state-owned oil company ONGC Videsh Ltd. 20%

Website: https://www.sakhalin-1.com/

Sakhalin-1 project, Arkutun-Dagi block

Phase

Production since 2015

Assets / infrastructure

- Field developed using Berkut, Russia's biggest oil and gas drilling platform.[24] MP Berkut is a single structure of integrated decks with operational equipment, including flare boom, drilling module, residential module and helipad[25]. Production from the block is transferred to the existing Chayvo onshore processing facility (OPF) via an approximately 25km-long well-stream flowline.[26]
- 18 wells were drilled during first development stage and 30 are planned to be built during second stage. By 2020, 32 wells had been drilled from the platform.[27] It is possible that during 2021 new wells were drilled; however, no information has been found on websites.

Activities 2021

- Production: Sakhalin-1 project in total (all fields) produced 12.4 million metric ton (mmt) of liquid hydrocarbons in 2020, and 2.4+ billion cubic metres (bcm) of gas was supplied to consumers.[28]
- EIA for construction of 2 wells from Berkut platform is ongoing. Indicative timing of the EIA: July-November 2021.[29]
- EIA for construction of a sidetrack well from Berkut platform was provided. The planned length of the well is 4,118 m and depth 2,323 m. The construction was planned for 2021-2022.[30] Currently, no information has been obtained on construction works in 2021 or on approval from State Ecological Expertisa.

[24] https://www.sakhalin-1.com/en-RU/Company/Who-we-are/Phases-and-facilities
[25] https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/RUS/AD-Blanket-Proekt_PC-Materials_General-Info-st1.pdf
[26] https://www.offshore-technology.com/projects/arkutun-dagi-oil-gas-field/; https://www.oedigital.com/news/453631-exxonmobil-starts-up-arkutun-dagi
[27] https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/RUS/AD-Blanket-Proekt_PC-Materials_General-Info-st1.pdf
[28] https://www.rosneft.com/upload/site2/document_file/a_report_2020_eng.pdf
[29] https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment; https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/2021/20210722-AD-CSD-drilling/AD-CSD-ERD-2st/3_AD-CSD-ERD_Full-EPS.pdf
[30] https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment; https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/AD-DP-20-D_PC-Materials_Nontechnical-EPS-st2.pdf

- EIA for construction of 10 side tracks of existing production wells was concluded.[31] Approval from State Ecological Expertisa № 681/ГЭЭ was received on 11.06.2021.[32]
- EIA for disposal of additional quantities of drilling and other technological waste was done. On 30.07.2021. the State Environmental Expertisa issued negative decision No. 929/ГЭЭ.
- No information on other construction activities at the field are available in the public domain.

Planned activities 2022+

- 3D seismic survey took place in summer 2021 in order to obtain data for 4D studies (4D surveys involve performing 3D surveys over several years).
- The construction of one well from the Berkut platform is planned for 2021-2022 (no information on works in 2021 is available in the public domain) and another two wells are planned in 2022-2024.[33]
- Construction of 10 side tracks (from 10 existing production wells) are planned in period from 2021-2031. It is planned to drill 1 side track per year.[34] No information was found on works in 2021.
- Plans to develop Central and South Dagi fields, which is expected to increase production by 20%.[35]
- 6 wells (positive conclusion from the State Ecological Expertisa No.68 on 31.01.2020) to be drilled in 2020-2022.[36] No information on works in 2021 is available in the public domain
- Plans to develop drilling and technological waste disposal site in 2020-2021.[37] No information on factual works in 2021 is available in the public domain
- Exxon plans to invest about $5 billion in the Sakhalin–1 project over the next five years.[38]

Sakhalin-1 project, Chayvo block

Phase

Production since 2005

Assets / infrastructure

- Oil and gas are extracted from onshore site (using Yastreb drilling rig) and offshore Orlan platform using wells with lengthy boreholes.[39] Currently, there are 31 wells, including 1 waste injection well and 30 production wells (24 oil production and 6 gas injection wells).[40]
- Pipeline for transporting oil to the De-Kastri oil export terminal in the Khabarovsk Territory.[41]
- Oil and gas produced from the Sakhalin-1 fields is transported to the Chayvo Onshore Processing Facility (OPF), which stabilizes oil for shipment to the international market and gas for supply to the Russian domestic market or reinjection to the field to maintain reservoir pressure. [42] Reconstruction of Chayvo OPF in 2018.[43]

Activities 2021

- The operator was continuing work on the Far East LNG plant.[44] Rosneft announced that its planned to complete the Front End Engineering Design (FEED) and a feasibility study, start preparation of a tender to

[31] https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment; https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/AD-Blanket-Proekt_PC-Materials_Nontechnical-EPS-st2.pdf
[32] https://rpn.gov.ru/activity/services/28159/
[33] Ibid
[34] Ibid
[35] Ibid
[36] Ibid
[37] Ibid
[38] https://ria.ru/20210928/neft-1752097310.html
[39] https://www.sakhalin-1.com/en-RU/Company/Who-we-are/Phases-and-facilities
[40] https://www.sakhalin-1.com/ru-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment
[41] Ibid
[42] Ibid, https://www.sakhalin-1.com/ru-RU/Company/Who-we-are/Chayvo-field#%D0%9C%D0%BE%D1%80%D1%81%D0%BA%D0%B0%D1%8F%D0%BF%D0%BB%D0%B0%D1%82%D1%84%D0%BE%D1%80%D0%BC%D0%B0%C2%AB%D0%9E%D1%80%D0%BB%D0%B0%D0%BD%C2%BB
[43] https://gge.ru/press-center/news/glavgosekspertiza-odobrila-proekt-rekonstruktsii-beregovogo-kompleksa-podgotovki-bkp-chayvo-proekt-s/
[44] https://www.interfax.ru/russia/793941

select a contractor for engineering, procurement and construction (EPC), and start marketing gas from the project in 2021.[45]

- EIAs for drilling a group of wells at Chayvo and geophysical offshore surveys for the LNG plant are on pause, as is a Strategic Environmental Assessment (SEA) for further development of the field. (Only first stage of EIA was completed in 2020, no information on progress in 2021 was available in the public domain). [46]
- EIA was performed for construction of 3 production wells (O-17, O-45 and O-48) and 2 pilot (test) wells. Maximal planned depth is 2653 m and maximal length is 11 200 m.[47] No information was found on EIA approval.
- Another EIA for construction of 3 side track wells were also done. Their maximal planned depth is 2625 m and maximal length is 11 1163 m.[48]
- A 3D seismic survey was conducted in 2021 in order to obtain data for 4D[49], but no information on results etc. was found in the public domain.
- Construction of a pipeline (117 km; capacity 1,2 million tons /year) from Sabo oil pumping station to the Dagi oil treatment facility is ongoing. The reconstruction of 3 pumping stations are also included in the scope of the construction works.[50]
- An EIA for reconstruction of the protective berm of the Orlan platform was produced in 2021. The work is planned to be carried out during the navigation (ice-free) period in the time interval 2022-2024.[51] However, on 24.09.2021, the State Environmental Expertisa issued a negative decision No.1279/ГЭЭ.[52]

Planned activities 2022+

- Reconstruction and development of Sakhalin-1 facilities: expansion of natural gas development at Chayvo field, which will require drilling additional wells, side tracks, maintenance works, and expanding onshore and offshore facilities (incl. reconstruction of the Chayvo Drilling Site and the Onshore Processing Complex). These works are scheduled for 2021–2027.[53] 3 wells and 3 side tracks (for which the EIAs were carried out in 2021) are also included in this group construction project.[54]
- A comprehensive offshore engineering survey programme (incl. seismic surveys) for design of the Far East facility complex to produce LNG is planned for 2020-2022[55] (Approval No.868 was received from State environmental expertisa on 17.07.2020)[56], as well as for development of the Chayvo field.[57]
- The Far East LNG plant's potential start of operation is 2027.[58] The plant's planned capacity is 6.2 million tons/y. The project will include expanding existing Sakhalin-1 Project facilities. The Chayvo OPF will be expanded by adding gas dehydration treatment and compression facilities. Yastreb will drill a new set of wells to develop non-associated gas. A new gas pipeline (200 km long) will be constructed from Chayvo OPF to De-Katri in the existing pipeline corridor, and a new LNG plant will be built near the Sakhalin-1

[45] https://www.nasdaq.com/articles/rosneft-aims-to-complete-lng-plant-feasibility-study-in-2021-2021-04-30; https://www.finam.ru/analysis/newsitem/rosneft-planiruet-v-2021-godu-zavershit-razrabotku-feed-proekta-dalnevostochnyiy-spg-20210430-145023/; https://www.rosneft.com/upload/site2/document_file/a_report_2020_eng.pdf

[46] https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment

[47] https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/2021/20210823-Orlan-driling-detailed-design/4_Orlan-NW_PID.pdf

[48] https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/2021/20210823-Orlan-batch-drilling-2nd-stage_ENG/4_Orlan-ST_PID.pdf

[49] See the associated public consultation materials on the EIA available at https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment

[50] https://sakhalinmedia.ru/news/1127285/

[51] https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment

[52] https://rpn.gov.ru/activity/services/28159/

[53] See the associated public consultation materials on the EIA available at https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment

[54] https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/2021/20210823-Orlan-driling-detailed-design/4_Orlan-NW_PID.pdf

[55] Ibid

[56] https://rpn.gov.ru/activity/services/28159/

[57] See the associated public consultation materials on the EIA available at https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment

[58] https://interfax.az/view/778698; https://ria.ru/20190924/1559026525.html; https://todaykhv.ru/news/economics-and-business/22472/ and https://tass.ru/ekonomika/6919656, as well as https://www.upstreamonline.com/lng/gazprom-and-rosneft-shed-light-on-russian-lng-export-ambitions/2-1-986304

De-Kastri oil export terminal in Khabarovsk Krai, leveraging ENL's existing logistical resources and marine infrastructure.[59]

- The draft long-term program for LNG production in Russia until 2035 refers to the option of a further phase 2 extension of the Far East LNG plant with total capacity of 15 million tons/year.[60]
- Construction of a new pipeline from Sabo oil pumping station to the Dagi oil treatment facility will be finished and connected to Sakhalin-1 infrastructure by the end of 2022.[61]

Sakhalin-1 project, Odoptu block

Phase

Production since 2010

Assets / infrastructure

- Oil and gas produced from an onshore site using super-extended reach horizontal wells.[62]
- During Odoptu Stage 1, the Yastreb rig drilled a total of nine wells. Upon completion of the drilling operations at Odoptu, Yastreb was decommissioned and returned to Chayvo.[63]
- The full-scale operations in Piltun Bay began in 2016, but preliminary development activities for Odoptu Stage 2 began in advance.[64]
- As part of Odoptu Stage 2, a production well was drilled from the new onshore rig Krechet in 2017 and production began in December 2017, which doubled the facility's capacity.[65]
- Other wells may have been drilled but no information on such work was found.
- Odoptu 1 (South) and Odoptu 2 (North) onshore well sites.

Activities 2021

- Production.
- EIA for drilling of 18 wells from Odoptu 1 is ongoing.[66] No approval from State ecological expertisa is yet issued.
- EIA for construction of 4 wells (incl. one production well OR-13 and 3 water injection wells from onshore drilling site Odoptu 2 (North) using Krechet drilling rig.[67] No approval from State ecological expertisa is yet issued.

Planned activities 2022+

- Reconstruction and development of Sakhalin-1 facilities.
- In future, the Krechet will be used to drill 33 more wells at the Odoptu 2 (North) and Odoptu 1 (South) well sites.[68]
- Drilling of 18 wells from the drilling site Odoptu-1 (South) is scheduled for 2020-2027 (approval No.647 from State ecological expertisa issued on 08.06.2020).[69]
- Construction of 2 wells (O-33 and O-34) at Odoptu 2 (North) drilling site was planned in 2020-2021 (EIA approval No.407 from State ecological expertisa issued on 14.04.2020).[70]

[59] https://www.sakhalin-1.com/en-RU/Company/Who-we-are/Phases-and-facilities; https://www.interfax.ru/russia/793941
[60] https://www.rbc.ru/business/02/02/2021/601917309a79470e4a3878e6
[61] https://www.interfax.ru/russia/760899
[62] https://www.sakhalin-1.com/en-RU/Company/Who-we-are/Phases-and-facilities and https://www.rosneft.com/upload/site2/document_file/a_report_2019_eng.pdf#page=38
[63] https://www.sakhalin-1.com/en-RU/Company/Who-we-are/Phases-and-facilities
[64] Ibid
[65] Ibid
[66] See the associated public consultation materials on the EIA available at https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment and https://www.interfax-russia.ru/far-east/news/exxon-planiruet-postroit-18-skvazhin-na-sahaline-1-do-2028g
[67] https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/Odoptu-NWS-Drilling_PC-Materials_Full-EPS-st2.pdf
[68] https://www.sakhalin-1.com/en-RU/Company/Who-we-are/Phases-and-facilities and
[69] See the associated public consultation materials on the EIA available at https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment
[70] See the associated public consultation materials on the EIA available at https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment, https://www.sakhalin-1.com/-

- Construction of well OR-13 and water injection wells is planned from 2022-2023, but the work might be postponed and not finished until 2024.[71]
- Drilling of two production injection wells as part of the development of oil and gas condensate deposits Odoptu-sea is planned in 2022-2024.[72]

Sakhalin-1 project, Lebedinskoye field (within the Odoptu license area)

Phase

Pilot operation of the field began in 2015.

Assets / infrastructure

- 4 production wells pump oil from shore.[73]
- Development of the Lebedinsky deposits is conducted from the Odoptu 2 (North) drilling site.[74]
- Project work was carried out in 2017 to further delineate boundaries of the field; this expanded its area and resource base. [75]
- A pipeline between Lebedinskoye field and neighbouring Odoptu-sea field was constructed in 2017 and commissioned in 2018 to enhance safety of operations.[76]

Activities 2021

- EIA of construction of the new oil production well O-40 was ongoing in 2021. The report states that the well was to be drilled towards Lebedinskoye deposit from Odoptu 2 (North) drilling site. The new well was meant to maintain the planned production level of operation of Lebedinskoye field. The wellbore was expected to have a large deviation from the vertical and to be approximately 10 km long and up to 1,7 km deep. [77]

Planned activities 2022+

- Drilling works will take place from 2022- – 2024.[78]

Note: As mentioned above, according to 2019 and 2020 Rosneft Annual Report[79] and other public sources[80] a portion of the Lebedinskoye field within the Odoptu license area is listed as being a part of the Sakhalin-1 project (operated by ENL and including Rosneft subsidiaries as shareholders). Lebendiskoye is not mentioned on the Sakhalin-1 website.

/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/OP3434EPS-sbmt-for-SEER.pdf?la=en-RU&hash=A8594F6083E2880187A510F9E6C175369FFD8D16

[71] See the associated public consultation materials on the EIA available at https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment, https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/Odoptu-NWS-Drilling_PC-Materials_Full-EPS-st2.pdf

[72] See the associated public consultation materials on the EIA available at https://www.sakhalin-1.com/en-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment, https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/Odoptu-NWS-Drilling_New-wells_General-info-st1.pdf

[73] https://www.rosneft.com/upload/site2/document_file/a_report_2019_eng.pdf#page=38

[74] https://www.sakhalin-1.com/ru-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment

[75] https://www.rosneft.com/upload/site2/document_file/a_report_2017_eng.pdf#page=76

[76] Ibid, https://www.rosneft.ru/business/Upstream/offshore/ and https://llcrnnakhodkanefteprodukt.rosneft.com/business/Upstream/Offshoreprojects/

[77] https://www.sakhalin-1.com/-/media/Sakhalin/Files/Environment-and-safety/Public-consultations-and-assessments/ENG/2021/2021August-OP-40-2nd-stage-ENG/4_OP-40_PID.pdf

[78] Ibid

[79] https://www.rosneft.com/upload/site2/document_file/a_report_2019_eng.pdf#page=38 and https://www.rosneft.com/upload/site2/document_file/a_report_2020_eng.pdf

[80] https://www.interfax.ru/business/720628

RN-Sakhalinmorneftegaz LLC
(a subsidiary of Rosneft)

Participants
Russian State-owned Rosneft 100%

Website: https://www.rosneft.com/

Offshore-Odoptu / Odoptu-Sea field (Northern dome)

Phase
Production since 1998 (Russia's first offshore field)

Assets / infrastructure
- Oil and gas produced from horizontal wells operated/drilled from shore.
- Development of the Odoptu-sea and Lebedinskoye deposits at the present time is conducted from the Odoptu 2 (North) drilling site, but starting in accordance with the Technological Scheme of field development
- Odoptu-sea, in 2021 the Company plans to continue developing fields from the drilling site Odoptu 1 (South) that was put into an operation in 2018.[81]
- Total of at least 49 extended-reach development wells with lengths 5-8 km.[82] As of 01.01.2019 the wellstock consisted of 28 oil producing wells and 7 injection wells.[83] In 2019, 3 additional production wells were drilled and put into operation[84].
- Oil and gas collection and treatment facilities, a reservoir pressure maintenance system, pipelines for transporting oil, gas and water from field, and power-generating facilities.
- A pipeline between the neighbouring Lebedinskoye Field and Odoptu-sea Field was constructed in 2017 and commissioned in 2018 to enhance safety of operations.[85]

Activities 2021
- No information is available in the public domain.

Planned activities 2022+
- No information is available in the public domain.

[81] https://www.sakhalin-1.com/ru-RU/Environment-and-safety/Environment-and-safety/Public-consultations-and-environmental-impact-assessment
[82] https://www.rosneft.ru/press/news/item/199693/ and http://www.sakhoil.ru/article_789_88.htm
[83] https://llcrnnakhodkanefteprodukt.rosneft.com/business/Upstream/Offshoreprojects/
[84] https://www.rosneft.ru/press/news/item/199693/
[85] https://www.rosneft.com/upload/site2/document_file/a_report_2019_eng.pdf#page=38

RN-Shelf Far East JSC
(a subsidiary of Rosneft)

Participants
Russian State-owned Rosneft 100%

Website: https://www.rosneft.com/

Northern tip of Chayvo field

Phase
Production since 2014

Assets / infrastructure
- Oil and gas production from 5 wells with unique, complex design and extended reach (horizontal displacement).[86]
- Effectiveness of the project is achieved by using existing Sakhalin-1 project infrastructure,[87] e.g. Yastreb rig was used to drill wells from shore.[88]
- Permanent oil collection and metering systems for construction of onshore production facilities.[89]

Activities 2021
- Production. Actual production of oil and condensate in 2020 amounted to 0.47 million tons, the total volume of gas supplied to consumers was 0.14 billion m^3. As of 01.01.2021 Rosneft had produced over 7.7 million tons of oil at the block since the start of the project.[90]

Planned activities 2021+
- No information available in the public domain.

[86] https://www.rosneft.com/upload/site2/document_file/a_report_2019_eng.pdf#page=38 and https://www.rosneft.com/upload/site2/document_file/a_report_2018_eng.pdf#page=17
[87] https://www.rosneft.com/press/news/item/153311/
[88] https://www.offshore-mag.com/drilling-completion/article/16783589/extendedreach-drilling-from-shore-to-access-more-chaivo-reserves
[89] https://www.rosneft.com/upload/site2/document_file/a_report_2017_eng.pdf#page=76
[90] https://www.rosneft.ru/business/Upstream/offshore/

Gazprom Neft Shelf LLC
(a subsidiary of Gazprom Neft)

Participants

- 100% Gazprom Neft
- Actively negotiating with several foreign companies about collaboration and participation in development of Neptune field, which was discovered in 2017
- Following a restructuring in 2020, Gazprom Neft Shelf LLC took over operations of the Ayashsky block from another Gazprom Neft subsidiary, GazpromNeft-Sakhalin LLC.

Websites:

- https://www.gazprom-neft.com/company/major-projects/sakhalin/
- https://shelf.gazprom-neft.com/

Sakhalin-3 project, Neptune and Triton fields of Ayashsky block

Phase

Exploration

Assets / infrastructure

- Drilling platform Hai Yang Shi You 982.[91]
- Semisubmersible rig Hakuryu-5.[92]
- 1st well drilled in 2017 discovered Neptune field at Ayashskaya structure.[93]
- 2nd well drilled in 2018 discovered Triton field at Bautinskaya structure. The decision to drill at Bautinsky formation was made on the basis of extensive geological research, analysis of 3D seismic data, and successful drilling at Ayashsky license block.[94]
- 3rd well drilled in 2019 at Neptune field.[95]

Activities 2021

- In July 2021, Gazprom signed a memorandum of cooperation with Shell on the exploration and production, technological interaction and carbon footprint reduction at the Ahashsky Block.[96]
- The Triton and Neptune fields discovered at the Ayashsky license area are at the final stage of geological exploration, including seismicity in amount of 2,5 thousand km^2 (2,157 km^2 were finished until Q2 of 2021.[97]) and drilling of three prospecting wells. According to the results obtained, a decision on technological and economic feasibility of the project will be taken.[98] Possible technologies include the construction of a wellhead platform with onshore processing or the use of subsea production technologies. It will also be evaluated whether Sakhalin -2 infrastructure can be used for development of Triton and Neptune fields.[99]

[91] https://www.offshore-energy.biz/gazprom-neft-finds-new-oil-field-in-sea-of-ohotsk/
[92] https://www.oedigital.com/news/447145-gazprom-to-start-okhotsk-sea-drilling
[93] https://www.offshore-mag.com/drilling-completion/article/16803180/mitsubishi-to-work-with-gazprom-neft-on-offshore-sakhalin-developments; see also: https://rogtecmagazine.com/gazprom-neft-and-mitsui-will-assess-the-prospects-for-cooperation-in-the-development-of-sakhalin-shelf-deposits/
[94] https://ar2018.gazprom-neft.com/results/event-of-year/opening; see also https://www.gazprom-neft.com/press-center/news/gazprom-neft-discovers-a-second-field-on-the-sea-of-okhotsk/ ; https://www.gazprom-neft.ru/press-center/news/gazprom-neft-otkryla-vtoroe-mestorozhdenie-na-shelfe-okhotskogo-morya/ and https://neftegaz.ru/news/drill/196992-triton-syn-neptuna-gazprom-neft-otkryla-2-e-mestorozhdenie-na-shelfe-okhotskogo-morya/.
[95] https://magazine.neftegaz.ru/articles/geologorazvedka/512809-ayashskiy-uchastok-proekt-sakhalin-3-prirastaet-novym-mestorozhdeniyami/
[96] https://www.gazprom-neft.ru/press-center/media/5427906/
[97] https://www.gazprom.ru/f/posts/57/982072/gazprom-emitent-report-2021-6mnth-changes-25-08-2021.pdf
[98] https://neftegaz.ru/news/Geological-exploration/698827-gazprom-i-gazprom-neft-podelilis-planami-na-okhotskoe-more-/
[99] http://www.finmarket.ru/news/5557517

Planned activities 2022+

- Assessment phase will continue until 2022-2023.[100] From 2023, Gazprom Neft plans to resume geological exploration at the Neptune and Triton.[101]
- It is planned that the gas production will start in 2027 – 2030[102] and development of Neptune and Triton fields is the top priority.[103]

[100] https://www.interfax.ru/interview/663791
[101] https://ria.ru/20210928/gaz-1752098589.html; https://sakhalinmedia.ru/news/1168469/; https://nangs.org/news/upstream/gubernator-sakhalina-rasskazal-o-perspektivakh-razvitiya-dobychi-nefti-i-gaza
[102] https://neftegaz.ru/news/Geological-exploration/698827-gazprom-i-gazprom-neft-podelilis-planami-na-okhotskoe-more-/; https://sakhalinmedia.ru/news/1168469/
[103] https://shelf.gazprom-neft.ru/press-center/interview/69930/

ANNEX 1. LIST OF PARTICIPANTS

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ANNEX 2. MEETING AGENDA

WESTERN GRAY WHALE ADVISORY PANEL			**9-10 November 2021**
22nd meeting			**Hybrid format: IUCN's Headquarters, Main room Gland, Switzerland and teleconference**
	08:00 – 13:00	Central Europe	CET / UTC+1 hour
	10:00 – 15:00	Moscow / Saint-Petersburg	MSK / UTC+3 hours
	18:00 – 23:00	Yuzhno-Sakhalinsk	SAKT / UTC+11 hours
	17:00 – 22:00	Vladivostok	VLAT / UTC +10 hours
	16:00 – 21:00	Tokyo	JST / UTC +9 hours
	23:00 – 04:00	US/Canada Pacific coast	EST / UTC-5 hours
	02:00 – 07:00 07:00 – 12:00	US/Canada East coast UK	PST/ UTC-8 hours UTC (GMT)
Day 1 – Tuesday, 9 November 2021 - 08:00 – 13:00 CET This block will focus on the results of 2020 and 2021 seasons and plans for 2022 and beyond, final stock-taking of achievements/progress in WGW conservation, as well as begin discussion of Panel's final observations and conclusions (incl. issues that require future tracking and attention).			**Documents / presentations**
1. INTRODUCTIONS			
08:00 – 08:30	**1. Organizational matters** [Reeves, IUCN] 1.1 Welcome from IUCN [Erg] 1.2 Opening remarks [Krever, Roszapovedcentr of Minprirody] 1.3 Chair's welcoming remarks 1.4 Brief introductions of all participants in room & online 1.5 Adoption of agenda 1.6 Documents 1.7 Final report drafting procedures and timeline 1.8 Logistics onsite & virtually		WGWAP-22/1 WGWAP-22/2 WGWAP-22/3 WGWAP-22/4
2. OUTCOMES OF PROGRAMMES ON GRAY WHALE RESEARCH AND MONITORING IN 2020 AND 2021, PLANS FOR 2022 AND BEYOND & ANNUAL POPULATION ASSESSMENT			
08:30 – 10:30	**2.1 Summary of 2020 fieldwork results, 2021 preliminary results and plans for 2022 and beyond (incl. progress with studies/analysis using long-term data)** 2.1.1 Russia Gray Whale Project [RGWP / Burdin] 2.1.2 ENL/Sakhalin Energy Joint Programme [Sakhalin Energy] 2.1.3 Any other monitoring activities on the Sakhalin Shelf & Kamchatka [Vertyankin, NGOs or any other participants with information] 2.1.4 Other areas outside Sakhalin-Kamchatka in the Western Pacific, also update on western gray whales documented in Eastern Pacific 2.1.5 Annual assessment of biological and demographic characteristics of western gray whales [Cooke] 2.1.6 Q&A and discussion		WGWAP-22/5-EN/RU WGWAP-22/5-EN/RU-PPT WGWAP-22/6-EN/RU WGWAP-22/7-EN/RU WGWAP-22/8-EN/RU-PPT WGWAP-22/9-EN/RU WGWAP-22/9-EN/RU-PPT WGWAP-22/10-EN/RU-PPT WGWAP-22/20

	2.2. Overview on programme achievements for WGW conservation and conclusions on critical issues requiring continued attention 2.2.1 Summary presentation(s) on achievements by programme teams 2.2.2 Discussion (incl. issues and risks that require continued attention)	
10:30 – 10:50	Coffee break	
3. ADDRESSING NOISE ISSUES, INCLUDING SEISMIC SURVEY PLANS IN 2022 AND BEYOND AND REGULAR ACOUSTIC MONITORING OUTSIDE SEISMIC SURVEYS		
10:50 – 12:20	**3.1. Addressing noise issues, including seismic survey and regular acoustic monitoring** 3.1.1 Summary of the Noise Task Force (NTF) recommendations on Sakhalin Energy's Monitoring and Mitigation Plan (MMP) for seismic survey 2022+ 3.1.2 Summary of NTF conclusions on Sakhalin Energy's 2020 and 2021 acoustic monitoring effort and plans for 2022 and beyond 3.1.3. Brief overview of Sakhalin Energy's noise-generating activities in 2022+ 3.1.4 Activities by other companies in 2021 and plans for 2022+ [anyone present, supplemented by Berzina-Rodrigo / IUCN as necessary] 3.1.5 Q&A and discussion **3.2 Overview of NTF achievements and conclusions on noise issues, incl. those that require continued attention** 3.2.1 Summary presentation on achievements 3.2.2 Discussion	NTF-19/REPORT WGWAP-22/11 EN/RU_PPT WGWAP-22/12_PPT WGWAP-22/13 WGWAP-22/19
4. OTHER SAKHALIN ENERGY ACTIVITIES IN 2020, 2021 AND BEYOND		
12:20 – 13:00	**4.1 Sakhalin Energy activities in 2020, 2021 and plans for 2022 onwards** 4.1.1 Marine Mammal Observer programme and ship strike avoidance measures 2020, 2021 and plans for 2022 4.1.2 Sakhalin Energy's commitments related to IFC PS6, implementation of mitigation hierarchy (incl. offsets) 4.1.3 Brief update on OSR issues by Sakhalin Energy and Ramboll, follow up 4.1.4 Q&A and discussion **4.2 Overview achievements for WGW conservation and conclusions on critical issues requiring continued attention** 4.2.1 Summary discussion	WGWAP-22/14-EN/RU WGWAP-22/14-EN/RU-PPT WGWAP-22/18
13:00	Adjourn and lunch	

Day 2 – Wednesday, 10 November 2021 This block will focus on progress made by companies, the Russian authorities, IUCN, Panel and other stakeholders towards conserving WGWs and on products that capture and reflect on collective legacy (incl. activities before March 2022 when the Panel process officially concludes).		**Documents / presentations**
INTRODUCTIONS		
08:00 – 08:05	Introductions of new participants in the room or online (if any)	
5. WGW CONSERVATION EFFORTS IN RUSSIA AND RANGE-WIDE		
08:05 – 09:00	**5.1 Western gray whale conservation efforts in 2021 and beyond** [with opening remarks by IUCN] 5.1.Progress on development of Russian Federation strategy, action plan and roadmap for WGW conservation in 2021-2030 within the framework of the Russian national project "Ecology" [Krever, Roszapovedcentr of Minprirody] 5.1.2 Stakeholder activities and plans in Russia (incl. Sakhalin) [Shpak / Marine Mammal Council, as well as time for NGOs and any others] 5.1.3 Update on rangewide efforts (incl. the Conservation Management Plan and the Range States' Memorandum of Cooperation) [Lent & Staniland, IWC] 5.1.4 Q&A and discussion **5.2 Conclusions on issues that require continued attention** 5.2.1 Discussion	WGWAP-22/17
6. FINAL EXTERNAL WGWAP EVALUATION RECOMMENDATIONS		
09:00 – 09:30	**6.1 External evaluation conclusions & recommendations** 6.1.1 Setting the scene: background and scope [Edwards, IUCN] 6.1.2 Presentation by evaluation team [Allen & Gordon, Ajabu Advisors] 6.1.3 Q&A	WGWAP-22/15 WGWAP-22/16
09:30 – 09:50	Coffee break	
7. WGWAP CONTRIBUTION AND "NEXT CHAPTER" IN WGW CONSERVATION		
09:50 – 11:00	**7.2 Next steps in WGWAP closure and legacy plans** 7.2.1 Brief summary of key WGWAP recommendations and lessons learned 7.2.2 Website / future access to knowledge and information: IUCN/Panel priorities and stakeholder needs 7.2.3 Review of Panel products completed and upcoming in late 2021 and early 2022 7.2.4 Closing communication plan and how stakeholders can support dissemination and uptake of 'best-practice' approaches and recommendations developed within the WGWAP process	
11:00 – 11:20	Coffee break	

11:20 - 12:20	**7.3 Visions of stakeholders (other than Panel and IUCN) of how WGW conservation can be pursued post-2021** 7.3.1 Sakhalin Energy's vision 7.3.2 Other stakeholder vision (Russian authorities, other companies, NGOs, IWC and others) 7.3.3 Discussion on key issues to keep an eye on / needs / priorities (incl. integration of WGWAP functions like the population assessment)	
8. WRAP UP AND CONCLUSIONS		
12:20 – 12:50	**9.2 Wrap up and conclusions** 9.2. Space for short interventions for closing remarks / comments [all participants]	
12:50 – 13:00	**9.3 Concluding remarks** [Bos & Epps, IUCN]	
13:00	Adjourn and lunch (+group photo)	

ANNEX 3. LIST OF DOCUMENTS

List of documents, presentations and materials distributed in connection of the 22nd meetings of the WGWAP (with links to download those designated as public)

AGENDA ITEM	DOCUMENT #	TITLE	TYPE	LANGUAGE	STATUS	SUBMITTED BY
1. INTRODUCTIONS						
1. Organisational matters	WGWAP-22/1	Agenda (including time schedule), v. 8 November 2021	Document	English	Public	IUCN
	WGWAP-22/2	Повестка дня КГЗСК-20 (включая расписание), v. 8 November 2021	Document	Russian	Public	IUCN
	WGWAP-22/3	List of documents distributed in connection with the 22nd meeting of the WGWAP, v. 8 November 2021	Document	English	Public	IUCN
	WGWAP-22/4	Список документов, распространяемых в соответствии с 22м заседанием КГЗСК, v. 8 November 2021	Document	Russian	Public	IUCN
	N/A	List of participants to the WGWAP-22 meeting, v. 8 November 2021	Document	English	Public	IUCN
2. OUTCOMES OF PROGRAMMES ON GRAY WHALE RESEARCH AND MONITORING IN 2020-2021, PLANS FOR 2022 AND BEYOND & ANNUAL POPULATION ASSESSMENT						
Session 2.1.1 Russia Gray Whale Project (RGWP)	WGWAP-22/10_PPT	Russia Gray Whale Project Research off North-East Sakhalin and Easter Kamchatka in 2021 (by Burdin A., Sychenko O. Kamchatka Branch of Pacific Geographical Institute, FED RAS, Petropavlovsk-Kamchatsky, Russia, Kunitsa A. Moscow State University)	Presentation	English	For internal use at this stage	Burdin / RGWP

2.1.2 ENL/Sakhalin Energy Joint Programme	WGWAP-22/5-EN	Report on Gray Whale Monitoring Program Off Northeast Sakhalin Island in 2020 (incl. Appendix 1. Joint Program Publications)	Report	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/5-RU	Отчет по Программе мониторинга серых китов у северо-восточного побережья острова Сахалин в 2020 г. (вкл. Приложение I. Опубликованные работы по Совместной Программе)	Report	Russian	For internal use at this stage	Sakhalin Energy
	WGWAP-22/5-EN_PPT	Joint Gray Whale Monitoring Programme: 2020 Results and Future Strategy	Presentation	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/5-RU_PPT	Результаты Совместной Программы Мониторинга серых китов в 2020 г. и стратегия исследований	Presentation	Russian	For internal use at this stage	Sakhalin Energy
	WGWAP-22/6-EN	Distribution and abundance of gray whales in shelf waters of Sakhalin during August-September 2020: Report on surveys conducted under the 2020 Program for Gray Whale Monitoring Offshore Northeastern Sakhalin Island (by V. A. Vladimirov (RPO Marine Mammals Council), I. A. Timokhin (MSU) and S. A. Tyurin (LGL Eco LLC))	Report	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/6-RU	Распределение и численность серых китов в шельфовых водах северо-восточного Сахалина в августе-сентябре 2020 г. Report on surveys conducted under the 2020 Progrm for Gray Whale Monitoring Offshore Northeastern Sakhalin Island (RPO Marine Mammals Council), I. A. Timokhin (MSU) and S. A. Tyurin (LGL Eco LLC))	Report	Russian	For internal use at this stage	Sakhalin Energy

	WGWAP-22/7-EN	Photo-Identification of Gray Whales (Eschrichtius robustus) off the Northeast Coast of Sakhalin Island in 2020: Report on surveys conducted under the 2020 Progrm for Gray Whale Monitoring Offshore Northeastern Sakhalin Island (by Yu.M. Yakovlev, O.M. Tyurneva, Peter van der Wolf)	Report	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/7-RU	ФОТОИДЕНТИФИКАЦИЯ СЕРЫХ КИТОВ (ESCHRICHTIUS ROBUSTUS) У СЕВЕРО-ВОСТОЧНОГО ПОБЕРЕЖЬЯ О. САХАЛИН В 2020 Г. (Ю.М. Яковлев, О.М. Тюрнева, Питер Ван дер Вольф)	Report	Russian	For internal use at this stage	Sakhalin Energy
	WGWAP-22/8-EN_PPT	2021 Gray Whale Joint Monitoring Program Implementation	Presentation	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/8-RU_PPT	Выполнение совместной программы мониторинга серых китов в 2021 году	Presentation	Russian	For internal use at this stage	Sakhalin Energy
	WGWAP-22/9-EN	2022 Program for Gray Whale Monitoring of the North-East Coast of Sakhalin Island	Document	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/9-RU	Программа мониторинга серых китов у северо-восточного побережья острова Сахалин на 2022 год	Document	Russian	For internal use at this stage	Sakhalin Energy
	WGWAP-22/9-EN_PPT	Gray Whale Joint Monitoring Program Scope of Work 2022	Presentation	English	For internal use at this stage	Sakhalin Energy

	WGWAP-22/9-RU_PPT	План работ по Совместной программе мониторинга серых китов в 2022 году	Presentation	Russian	For internal use at this stage	Sakhalin Energy
Session 2.1.5 Annual assessment of biological and demographic characteristics of western gray whales	WGWAP-22/20	Annual assessment of biological and demographic characteristics of western gray whales	Presentation	English	For internal use at this stage	Cooke / WGWAP
3. ADDRESSING NOISE ISSUES, INCLUDING SEISMIC SURVEY PLANS IN 2022 AND BEYOND & REGULAR ACOUSTIC MONITORING OUTSIDE SEISMIC SURVEYS						
Session 3.1. Addressing noise issues	NTF-19/REPORT	Report of the 19th Noise Task Force meeting (NTF-19), April-June 2021	Document	English	Public	Nowacek / WGWAP NTF
	WGWAP-22/19	Draft Sakhalin Energy's Monitoring and Mitigation Plan for the 2022 Piltun-Astokh 4D Seismic Survey, v. revised 22 October 2021	Document	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/11-EN_PPT	Results of Acoustic Monitoring of Sakhalin Energy's Offshore Facilities in 2021	Presentation	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/11-RU_PPT	Результаты акустического мониторинга морских производственных объектов «Сахалин Энерджи» в 2021 году	Presentation	English	For internal use at this stage	Sakhalin Energy
Session 3.1.3 Brief overview of Sakhalin Energy's potentially noise-generating activities in 2022-2025	WGWAP-22/12_PPT	Sakhalin Energy Offshore Activities 2021−2025	Presentation	English	Internal	Sakhalin Energy

Session 3.1.4 Other company activities 2021 and plans for 2022+	WGWAP-22/13	OVERVIEW OF OIL AND GAS PROJECTS AND LICENSE BLOCKS/FIELDS IN OR NEAR WESTERN GRAY WHALE FEEDING AREAS OFF NORTH-EASTERN SAKHALIN: Summary of publicly available information prepared by IUCN, v. updated 1 November 2021	Document	English	For internal use at this stage	IUCN
4. OTHER SAKHALIN ENERGY'S ACTIVITIES IN 2020-2021 AND BEYOND						
Session 4.1.1 Marine Mammal Observer programme and ship strike avoidance measures 2021-2021 and plans for 2022+	WGWAP-22/14-EN	MARINE MAMMAL OBSERVER PROGRAMME 2020: CLOSE-OUT REPORT	Report	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/14-RU	ПРОГРАММА НАБЛЮДЕНИЯ ЗА МОРСКИМИ МЛЕКОПИТАЮЩИМИ В 2020 ГОДУ: ЗАКЛЮЧИТЕЛЬНЫЙ ОТЧЕТ	Report	Russian	For internal use at this stage	Sakhalin Energy
	WGWAP-22/14-EN-PPT	Marine Mammals Observation Programme 2020 and preliminary result of 2021 field season	Presentation	English	For internal use at this stage	Sakhalin Energy
	WGWAP-22/14-RU-PPT	Программа наблюдений за морскими млекопитающими в 2020 году и предварительные результаты полевого сезона 2021 года	Presentation	Russian	For internal use at this stage	Sakhalin Energy

Session 4.1.2 Sakhalin Energy**'s commitments related to IFC PS6, implementation of mitigation hierarchy (incl. offsets)**	WGWAP-22/18	Sakhalin Energy's Conservation Management Plan for WGWs as part of the overall Sakhalin Energy's Biodiversity Action Plan	Document	English	For internal use at this stage	Sakhalin Energy
5. WGW CONSERVATION EFFORTS IN RUSSIA AND RANGE-WIDE						
5.1.3 Update on rangewide efforts (incl. the Conservation Management Plan and the Range States' Memorandum of Cooperation)	WGWAP-22/17	Presentation on range-wide efforts by Dr Iain Staniland, IWC	Presentation	English	For internal use at this stage	IWC
6. EXTERNAL WGWAP EVALUATION CONCLUSIONS AND RECOMMENDATIONS						
Session 7.2 Next steps in WGWAP closure and legacy plans	WGWAP-22/15	Western Gray Whale Advisory Panel (WGWAP) Independent Impact and Learning Evaluation & Annexes (by Chris Allan and David Gordon, Ajabu Advisors, 30 September 2021)	Document	English	For internal use at this stage	IUCN
	WGWAP-22/16	Russian translation of the Executive Summary and Conclusions & Recommendations: Независимая оценка деятельности Консультативной группы по западнотихоокеанским серым китам (КГЗСК), 30 сентября 2021 г., Компания «Аджабу Эдвайзорс»): Краткий обзор & Выводы и рекомендации	Document	Russian	For internal use at this stage	IUCN

	WGWAP-22/21	Presentation by Ajabu Advisors for WGWAP-22	Presentation	English / Russian	For internal use at this stage	Ajabu Advisors
7. WGWAP CONTRIBUTION AND "NEXT CHAPTER" IN WGW CONSERVATION						
Session 7.2.1 WGWAP recommendations process and lessons learnt	N Session 7.2.1 WGWAP recommendations process and lessons learnt /A	WGWAP recommendations and responses with status as of 4 November 2021 available directly from the WGWAP Recommendations Database (incl.description of the database) https://portals.iucn.org/wgwap/	Database	English	Public	IUCN