WESTERN GRAY WHALE ADVISORY PANEL **WGWAP-20**
20th meeting **6-8 November 2019**
Moscow, Russian Federation

REPORT OF THE WESTERN GRAY WHALE ADVISORY PANEL AT ITS 20TH MEETING

CONVENED BY THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE

CONTENTS

ACRONYMS

ACA	Additional Conservation Actions
BBWG	Business and Biodiversity Working Group (Russia)
CETF	Cumulative Effects Task Force
CMP	Conservation Management Plan
Company	Sakhalin Energy Investment Company Ltd.
ENL	Exxon Neftegas Limited
BG	Biodiversity Expert Working Group under the auspices of Sakhalin Oblast Interdepartmental Environmental Council
GPS	Global Positioning System
GPNS	GazpromNeft-Sakhalin, LLC
IFAW	International Fund for Animal Welfare
IFC	International Finance Corporation
ISB	In-Situ Burning
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
LNG	Liquefied Natural Gas
MMO	Marine Mammal Observer
MMP	Monitoring and Mitigation Plan/Programme
MMPP	Marine Mammal Protection Plan
MNR	Ministry of Natural Resources and Ecology of the Russian Federation
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration (USA)
NTF	Noise Task Force
OSR	Oil Spill Response
PHIDNTTF	Photo-ID and New Technologies Task Force
Photo-ID	Photo Identification
POI	Pacific Oceanological Institute
PS6	IFC Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (2012)
RGWP	Russia Gray Whale Project
UAV	Unmanned Aerial Vehicle
UME	Unusual Mortality Event
WGWAP	Western Gray Whale Advisory Panel

EXECUTIVE SUMMARY

The 20th meeting of the Western Gray Whale Advisory Panel (WGWAP-19) was held in Moscow, Russian Federation, on 6-8 November 2019, immediately preceded by the 17th meeting of the Noise Task Force (NTF-17) on 4-5 November 2019. In opening the meeting, the Panel chair noted the recent turnover in Panel membership; welcomed Jane Alcock, the new General Manager of Sakhalin Energy's Health, Safety and Environment Department; expressed regret at Greg Donovan's inability to participate; and acknowledged the always steady, stalwart support from Anete Berzina-Rodrigo, Giulia Carbone Khodabakhsh and others at IUCN.

Doug Nowacek, who stood in for Donovan as chair of the two most recent NTF meetings (NTF-16 and 17), summarised that group's work since the last Panel meeting (WGWAP-19), particularly its review of the Company's analyses of data on whale distribution and behaviour collected during Sakhalin Energy's Piltun-Astokh 4D seismic survey in 2018. Some preliminary results of those analyses had been presented by the Company at NTF-17. The Panel **recommended** that Sakhalin Energy complete its analyses, taking full advantage of the Panel's advice (including what is provided in this report), and that the Company refrain from presenting to Russian authorities its findings on 'no impact' until the analyses are completed.

Concerning other noise issues, (i) Sakhalin Energy reported 'encouraging' results of the reduced source experiment conducted immediately following the 2018 seismic survey although it appeared unlikely that the Company would be able to use a significantly lower-amplitude source for its next seismic survey and (ii) the Company was receptive to a proposed resumption of annual acoustic monitoring at a level that would protect (or restore) the integrity of the Joint Programme's valuable existing time series of acoustic data and ensure that Sakhalin Energy is able to meet commitments with regard to underwater noise stated in its Marine Mammal Protection Plan (MMPP).

The scope of the Joint Programme in 2018 and 2019 was again limited to photo-identification (photo-ID) and distribution surveys (i.e. it did not include benthos, acoustic or behaviour monitoring). The Panel expressed concern about the apparently severe reduction in abundance of whales and the contraction of their distribution in the Nearshore (Piltun) feeding area, trends that are consistent with observations by the Russia Gray Whale Project (RGWP) and that are correlated with declining prey biomass since 2012. These changes are of particular concern given the area's importance to mother-calf pairs. Without further analysis, it remains unclear to what extent the reduced abundance in the Nearshore area is due to (i) fewer whales entering the area, (ii) those that do enter remaining for shorter periods or (iii) a combination. The Panel **recommended** that a proper multi-year analysis of all the abundance and distribution data collected by the Joint Programme be conducted, taking account of survey timing and effort, platform characteristics, observer capacity and environmental conditions, so that well-informed conclusions can be drawn regarding trends in gray whale abundance, by area. The Panel encouraged both field programmes to continue photo-ID work. It also **recommended** that researchers working in feeding areas off both Sakhalin and Kamchatka consider using unmanned aerial vehicles (drones) to supplement photo-ID effort, add the ability for photogrammetric measures of body condition and aid with locating gray whale faeces that would be relevant to hormone and diet studies.

The latest population assessment indicated that the number of Sakhalin gray whales has been increasing over the last 25 years at a rate of about 5% p.a., reaching 240 (SE 8) animals (excluding calves) in 2018, although not all of these whales visit Sakhalin every year. This result implies that the cumulative impact of factors negatively affecting Sakhalin gray whales has, to date, been within the capacity of the population to increase. The decline in food availability in the Nearshore feeding area, which appears to have led to a lower residence time of mothers and the earlier weaning of calves, has not yet had a detectable effect on the demography of the population. The Panel once again commended the ongoing work of the RGWP and recommended that those

studies, on which the annual population assessments have relied heavily, continue. The Panel once again acknowledged and thanked the International Fund for Animal Welfare (IFAW) for supporting the RGWP and encouraged it to continue doing so.

The Panel has repeatedly emphasized its view of the importance of ensuring that a 'joint catalogue' of western gray whales (together with associated data) is finally established and functioning as intended under the auspices of the International Whaling Commission. Once realized, this photographic (and hopefully genetic) database will be a valuable and enduring legacy of the WGWAP process as well as part of Sakhalin Energy's offset strategy in line with the International Finance Corporation (IFC) Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (PS6, 2012).

Associate Scientist Brian Dicks, who participated in the meeting remotely, provided a thorough report of Sakhalin Energy's oil spill response exercise in September 2019 and made a number of suggestions on how the Company's response capabilities could be improved.

As indicated in the MMPP, crew change vessels were required in 2018 and 2019 to remain within navigation corridors and allowed to travel at up to 35 knots during daylight and periods of good visibility but were otherwise limited to speeds of no more than 21 knots. This was in accordance with WGWAP recommendations which accepted the relaxation of speed restrictions for a provisional period pending a more refined estimate of ship strike risk. Sakhalin Energy presented an updated analysis of this risk and expressed confidence that the onboard presence of marine mammal observers would be effective because whales are likely to be seen in time to initiate strike avoidance action. Even though the Panel did not consider the Company's reasoning valid, on the basis of its own analysis the Panel regarded the risk as sufficiently low as to not necessitate a speed limit for crew change vessels at present, noting however that if the southward shift in whale density continues, the suitability of the navigation corridor may need to be reconsidered and possibly reconfigured.

Considerable time was devoted at this meeting to following up on the findings of the Cumulative Effects Task Force (CETF). Discussions centred on ways to implement a cumulative effects framework or integrated management approach for addressing threats to western gray whales, beginning with threat factors that the whales encounter on the Sakhalin shelf.

1 INTRODUCTION

1.1 Welcome from IUCN

Both Boris Erg, Director of the IUCN regional office for Eastern Europe and Central Asia, and Stewart Maginnis, Global Director of IUCN's Nature-based Solutions group, were present to welcome participants on behalf of IUCN. Erg observed that the success of the Panel depended on active participation by science, industry, government and non-governmental organisations (NGOs). This was even more so in light of a new national project in Russia that focusses on business and biodiversity. Maginnis recalled that the Panel had arisen from a 21-year collaboration between IUCN and Shell and stressed the importance of investing in a continuing science programme, noting 'we can't manage what we don't measure'. He added that the science-led, evidence-based support offered by the Panel was a pioneering approach 20 years ago, and it has become a model followed by IUCN in other contexts.

1.2 Chair's welcoming remarks

The Chair, Randall Reeves, thanked IUCN for the warm welcome and encouraging words. Developments over the past year have resulted in changes to both the Panel composition and the Company's representation. Four valued and capable members – Alexander Burdin, Corinne Pomerleau, Grigory Tsidulko and Brandon Southall – have completed their term with the Panel and speaking of behalf of the Panel, Reeves expressed appreciation for their contributions. Four new members have joined the Panel for the period until end of 2021: Leslie New, Olga Shpak, Greg Silber and Leigh Torres. Reeves stressed that the four new members had already proven to be valuable additions, bringing fresh perspectives, scientific strength and diversity to the WGWAP process. Greg Donovan has co-chaired WGWAP for many years but was unable to participate this time. He was sorely missed and the Panel looks forward to his return.

Jane Alcock, Head of Sakhalin Energy's Health, Safety and Environment department, was able to meet directly with the Panel for the first time at this meeting (she had participated remotely in WGWAP-19 and had been engaged inter-sessionally). Bastian Blonk, who interacted closely with the Panel (and Noise Task Force, NTF) in the lead-up to and during Sakhalin Energy's 2018 seismic survey, completed his assignment with the Company in the middle of 2019, with his successor expected to arrive early in 2020. Olga Timofeeva provided seismic survey expertise at this meeting in Blonk's absence.

During the inter-sessional period (between WGWAP-19 and WGWAP-20), three task force meetings took place in Gland, Switzerland, as follows:

- CETF-1, 26 April 2019, chaired by Justin Cooke;
- NTF-16, 27 April 2019, chaired by Doug Nowacek;
- Photo-ID and New Technologies Task Force (PHIDNTTF-1), 28-29 April 2019, chaired by Dave Weller.

The NTF-17 meeting was held in Moscow immediately before this Panel meeting, 4-5 November 2019.

The final reports of all task force meetings are available on the WGWAP website[1].

[1]See https://www.iucn.org/western-gray-whale-advisory-panel/panel/task-forces

On behalf of the entire Panel, Reeves acknowledged Anete Berzina-Rodrigo and Giulia Carbone Khodabakhsh, both of IUCN, for their consistently stellar efforts in support of the Panel's work over the last seven years and thanked them for organizing this meeting (with help from Ella Diarra, also of IUCN) and for managing the extensive inter-sessional work of the Panel, always cheerfully and efficiently. Also, he gratefully acknowledged the excellent support received from Simon Delany, the meeting rapporteur, who, as usual, recorded and polished the minutes in a thoroughly professional fashion and provided them to the Panel and Company immediately after the meeting. Finally, Reeves acknowledged and thanked the Russian-English interpreters, Grigory Shkalikov and Alexander Danilov, for their expertise, diligence and constant good humour, which they bring to every meeting.

1.3 Participants

The list of participants is given as Annex 1.

All but one (Donovan) of the ten current Panel members were present. Associate Scientist and former Panel member Brian Dicks joined the meeting remotely to report on his work in support of the Panel during 2019, serving as its oil-spill expert (see item 4.1.3). Also, former member Alexander Burdin was present as an Associate Scientist to update the meeting on the work of the Russia Gray Whale Project (RGWP).

The Panel again welcomed the representatives of NGOs, Russian Government agencies and institutions, and the Lenders, all of whom regularly attend and contribute significantly to WGWAP meetings as Observers. This engagement with stakeholders is a vital part of the WGWAP process.

Finally, the Panel was again pleased by the representation and active participation of Gazpromneft-Sakhalin, LLC (GPNS) and looks forward to continued engagement with that company and its scientists (see item 6.5). The lack of participation (despite considerable effort by IUCN to enable and facilitate it) by other companies operating on the Sakhalin Shelf, notably Exxon Neftegas Limited (ENL) and Rosneft, was disappointing.

1.4 Agenda

The agenda, as adopted, is given as Annex 2.

1.5 Documents

The list of documents is given as Annex 3.

1.6 Report drafting procedures and timeline

The Panel's report is meant to reflect information presented at and before the meeting, discussions at the meeting, and the Panel's findings, conclusions, recommendations and other forms of advice developed post-meeting from internal discussions, conducted mainly by e-mail. It has become customary for the Panel to finalize its report early in the year following the November meeting. On this occasion, the goal was, as usual, to send a complete draft of the report to Sakhalin Energy for fact-checking by mid-January, and to make the final report publicly available by sometime in February 2020. The Panel once again stresses that its reports are not simply minutes of the November annual meeting but rather a concatenation of its deliberations and consultations over the course of the preceding year.

2 NOISE ISSUES INCLUDING RESULTS FROM SAKHALIN ENERGY'S 2018 SEISMIC SURVEY AND THE COMPANY'S PLANS FOR FUTURE SURVEYS

2.1 Summaries of the NTF-16 (April 2019) and NTF-17 (November 2019) meetings plus inter-sessional work

Nowacek summarized activities of the NTF over the previous year. The NTF-16 meeting was held in April at IUCN headquarters, Gland, Switzerland. No Company representatives attended that meeting, but the NTF-17 meeting in November in Moscow had the full complement of NTF members including those from Sakhalin Energy. The remit of the Noise Task Force (17 meetings to date) and its predecessor the Seismic Survey Task Force (7 meetings before the name was changed) has always been to assess the noise risks to western gray whales and to refine approaches to quantify and minimize their exposure to anthropogenic noise of all kinds, but particularly the noise related to oil and gas development activities on the Sakhalin Shelf. A primary task has been to consider the data collected by the field teams attempting to implement monitoring and mitigation plans (MMPs). For seismic surveys, a focus has been on developing MMPs that limit exposure by minimizing the total amount of sound introduced into the water through various means (e.g., minimizing the area surveyed, planning the survey for times when few whales are present, reducing the source level of the airguns). Another focus has been on collecting data for two purposes: i) to assess whether the seismic survey had detectable impacts on the whales and ii) to improve future MMPs. With respect to future seismic surveys and MMPs, the NTF may need to revise its strategy in light of changing conditions, e.g. shifts in whale usage of the feeding area, planning for poor weather conditions, and dealing with multiple surveys in the same season. Finally, more extensive integration of the results of other companies' surveys (e.g. ENL, GPNS) is needed to help inform future MMPs.

During the 2018 seismic survey, the Company collected a robust data set on distribution and behaviour, and some preliminary results were presented at NTF-17. Later in this report (item 2.2) and more thoroughly in the NTF-17 report, issues that the Panel has with these analyses are discussed. The Panel's main conclusion is that the Company's assertion of 'no impact' is premature. Therefore, the Panel **recommends** that Sakhalin Energy complete the analyses, taking full advantage of the Panel's advice (Appendix 1), and that the Company refrain from presenting its findings on impacts ('impact' vs. 'no impact') to Russian authorities until the analyses are completed. Lastly on this topic, a new 'best practices' document is planned that will contain up-to-date advice on how best to collect and analyse data on the effects of seismic survey on whales. This document will build on previous ones (Nowacek et al. 2013, Nowacek and Southall 2016), involve coordination with a variety of experts, and emphasize the standardisation of data collection and analysis methods.

At NTF-17 the Company also presented initial results from the 'reduced source experiment' conducted immediately after the 2018 seismic survey. As part of its effort to minimize the total sound energy introduced into the water, the Panel has repeatedly encouraged Sakhalin Energy to use a source that is only as powerful as it absolutely needs to be to accomplish survey goals. Historically, the geophysical survey industry, has felt little pressure or seen little need to minimize the source power, but this is an obvious way to reduce the exposure of whales and other biota to potentially harmful noise. The preliminary results of the 2018 experiment conducted are encouraging, though some of the more subtle features of an oil/gas field may be difficult to detect with the lower-amplitude sources. The NTF will continue to follow developments and seek ways of using existing data to probe the possible use of smaller sources instead of relying on additional field experiments. Unfortunately, it appears unlikely that the Company will be able to use a significantly lower-amplitude source for its next survey. However, motivation to reduce the source

amplitude remains high as source reductions could have important implications for future MMPs. Specifically, Racca indicated that modelling of reduced sources in 2018 had shown that use of a 460 in^3 source would have meant there were no A lines whatsoever. Even the A line closest to the feeding area would have been a B line. Any reduction down to 1050 in^3 would have reduced the number of A lines, and < 500 in^3 might have resulted in no A lines at all.

The Company has taken delivery of four new vessels that will be used for servicing the platforms, conducting various field measurements, etc. The NTF was pleased to learn that the acoustic signatures of these vessels are much quieter than the older vessels, including in the dynamic positioning mode, which has caused considerable noise to impinge on the whale feeding area in the past.

Acoustic monitoring in the Nearshore (Piltun) feeding area in non-seismic years has been excluded from Joint Programme since 2017 and control-station sampling ended in 2016. These potentially valuable time-series of data have thus been interrupted and are in danger of being lost entirely. Sakhalin Energy has made several arguments to justify the discontinuation of such sampling, including citing in the Company's MMPP (2019, document WGWAP-20/05) the conclusions of documents by M.V. Lomonosov Moscow State University (ENL and Sakhalin Energy 2013, document WGWAP-16/10) and Kriksunov et al. (2016) that reported finding "no correlation … between the intensity of the companies' activities, including noisy operations, and gray whale abundance and distribution." The Panel does not accept that the results presented in that paper demonstrate 'no correlation'. This claim was made on the basis of mapped combinations of whale occurrence, estimated benthic prey biomass, and noise intensity, but these data were collected at different temporal and spatial scales and crudely averaged, so it was not possible to perform accurate statistical analyses to assess the relationship(s) between noise and gray whale occurrence.

Only two harmful effects of noise on whales were mentioned in Sakhalin Energy's MMPP: temporary or permanent hearing threshold shifts and modifications of whale behaviour, such as deflection of the animals from their preferred migration path, disruption of mother-calf bonds, avoidance of an area, changes in orientation, changes in respiration rates, and interrupted feeding. But two more significant effects are likely: physiological stress response and cumulative impact due to prolonged exposure to noisy industrial activities in the area.

The Panel notes, as it has done previously, that implementation of the Company's approach to noise mitigation (as outlined in the MMPP) cannot be verified unless noise levels are monitored to ensure that the exposure criteria described in Sakhalin Energy's own MMPP, primarily for continuous noise close to the western gray whale feeding area, are being met. The NTF and WGWAP have discussed the possibility of using acoustic modelling to predict exposure, but the Panel does not accept that this can take the place of some level of monitoring. Indeed, several 'noisy' periods in the past have caused exposure well in excess of the thresholds established in the MMPP, and the detection and resolution of some of these has critically depended on recordings made by the monitoring programme. In summary, to document compliance with the MMPP, the Company must re-establish and maintain at least some acoustic monitoring capability.

Regardless of the NTF deliberations, the Panel **reiterates it previous recommendation** that Sakhalin Energy resumes and continues annual acoustic monitoring to protect the integrity of valuable data series as well as to ensure compliance with its MMPP commitments. The Panel understands that costs are an issue, but according to research conducted and presented by Vedenev at the NTF-17 meeting, a basic but effective programme could consist of 3-4 automated underwater acoustic recorders deployed by the Pacific Oceanological Institute (POI) in non-seismic years. One buoy could be situated at the control station, a second at the regular PA-B position, and a third

spare, or deployed close to areas with planned forthcoming acoustic events. Such an effort is low-cost and provides a means of determining which company (or other activity) is responsible for any given noise event. Hancox suggested acoustic monitoring was essential for meeting the requirements and standards of the Lenders, and moreover that prudent operators should view it as a means of 'self-protection' (from criticism should things go wrong). In summary, three main elements constitute the argument for acoustic monitoring: 1. to ensure that operations meet noise standards, and Vedenev's proposed programme would address this; 2. to allow assessment of cumulative exposure (as measured against a reliable baseline); 3. protecting the company's reputation, in this case being able to demonstrate that a noise was or was not caused by Sakhalin Energy. In the NTF-17 meeting, the Company agreed to revisit this issue and report back at the spring 2020 NTF meeting.

The NTF has been following the development of automated techniques that can be used to detect gray whale calls in audio recordings. Both POI and JASCO have been working on such algorithms, which could be useful for detecting the presence of whales in Sakhalin waters but also in other areas of the world, e.g. the east China Sea, where the US Navy has detected what are believed to be gray whales during the months of September to March (see item 6.2 and document WGWAP-17/INF.6). Audio files from the US Navy recordings have been made available to colleagues in Russia and China to assist in detecting whales wherever recording assets are available. Relatedly, data from digital audio tape recordings made at Sakhalin in 1997 and 1998 have been resurrected and valuable recordings of ambient noise levels at that early stage of industrial development are now available.

Finally, the NTF has been considering noise in the context of cumulative effects (see item 6.8). The proposed approach is to take individual impacts and scale them up to model population consequences and cumulative impacts. Bioenergetic models could be used, and New and Cooke have summarized these efforts in document NTF-17/7. Loss of foraging time is an issue for Sakhalin gray whales, and reduced energy intake was especially problematic for calves. Published bioenergetic models for gray whales feeding off Sakhalin and in the Arctic, migrating from wintering grounds in Mexico or putative wintering grounds off China, include estimates of energy loss that could affect survival and fecundity. The assumptions of these models would need revisiting if they were to be used in a management context for Sakhalin. In previous work by the NTF, acoustic exposure from seismic surveys had been estimated by overlaying maps of whale density with maps of estimated or predicted sound levels. More details on this topic are reported under item 4 of the NTF-17 report, in documents NTF-17/17 and 18, and in the CETF-1 report.

2.2 Update on results of the 2018 seismic survey monitoring and mitigation programme and progress with analyses

One of the primary goals of monitoring during the 2018 4D seismic survey was to verify that adequate mitigation measures were implemented to minimize its effects on gray whales. Also, as the NTF has repeatedly emphasized, in addition to verifying that the mitigation protocols were sufficient, the data collected as part of the monitoring program were expected to be used both to assess impacts and aid in refining future MMPs. The whale monitoring program ideally was to consist of collecting data before, during and after the survey on: i) the spatial and temporal patterns of gray whale distribution, ii) whale behavior (e.g. feeding patterns, direction of movement), and iii) photo-ID. Details of the MMP and its execution can be found in the relevant documents (MMP, Company reports).

Onshore whale monitoring was conducted by four marine mammal observer (MMO) teams from 4 June to 9 August whenever conditions were considered suitable. A total of 405 raw theodolite

tracks with 4221 track points were collected. After reviewing the raw data, the Company used for analyses 152 tracks with 3563 track points (>71 hours of theodolite tracking) that satisfied the data-quality criteria (i.e. tracks >10 min in duration, tracks with more than 2 points, maximum distance from theodolite to whale 4-5 km). Focal whale observations had to meet similar criteria, and these resulted in 79 focal observations with a combined duration of more than 33 hours. Finally, scans of whale distribution were made every hour depending on weather conditions. In total, 733 scanning sessions were conducted, and the total number of gray whales counted was 799 animals, though this does not account for the inevitable multiple-counting of individual whales, an issue that could be addressed at least partially by photo-ID.

The NTF noted that this data set was much stronger than the one collected in 2015. However, the culling of both distribution and behaviour data was deemed overly restrictive and the Panel therefore suggested that the data set available for further analyses of effects on whale behaviour is larger than the Company has assumed. The Company considered for the analysis of whales movement only the 11 theodolite tracks that included data in both the 'seismic' phase and the 'pause' phase (i.e. periods between active seismic shooting). Yet, many parameters used to test for effects of seismic do not rely on explicit comparisons of a whale's track during active seismic vs quiet periods. For example, linearity of the track is a parameter derived from the theodolite points and it can be calculated from any portion of a track and subsequently characterized by seismic exposure (active or quiet). With the data set that met its criteria, the Company proceeded with statistical tests of differences in the movement and respiratory characteristics of gray whales. For example, the mean and standard deviation were used to conclude that movement parameters in 2018 were similar during the different periods of observation and that no significant differences were found between the seismic and pause phases. Furthermore, the Company concluded that the number of values in the pre-seismic and post-seismic samples was insufficient to allow reliable assessment of differences in the movement parameters before initiation and after completion of the seismic survey.

There was a lengthy discussion of these data – how they were treated, the statistical tests that were used, and the conclusions that were drawn by the Company. Panel members of the NTF, as well as some other participants, expressed concerns about the analyses presented by Sakhalin Energy regarding the behaviour and the distribution and abundance of whales (both during and outside of the seismic survey period). They also took issue with the Company's conclusion that the seismic survey had no impact on the whales. Based on the documentation provided, the information presented, and the resulting discussions at the NTF and Panel meetings, the Panel determined that the Company's conclusions were premature and unsupported by the data and analyses presented (see, items 2 and 3). To enable the Company to address the Panel's concerns, a summary of problems with the analytical approaches taken was provided immediately after the meetings, and a more detailed explanation of these problems is provided in Appendix 1. Thus, while the Panel commends the Company for developing and largely following its MMP and for implementing shutdowns to protect whales when warranted, further analyses are needed before a firm conclusion of 'no impact' can be asserted.

The Company made two main commitments at the NTF-17 meeting. Firstly, it agreed to take the Panel's advice about statistical treatment of the 2018 seismic survey data – something that would improve the analyses and provide a better basis for conclusions. Secondly, the Company requested specific advice from the Panel on how it might resume annual acoustic monitoring. Specific suggestions on affordable and adequate monitoring were provided under item 3.1 of the NTF-17 report.

2.3 Update on Sakhalin Energy's plans for future seismic surveys

Olga Timofeeva's presentation of document NTF-17/7 included information on the planning of the next Sakhalin Energy seismic survey. Five scenarios are currently being considered, following the surveys carried out in 2015 and 2018, some using both streamers and ocean bottom nodes, others using only one or the other and in different portions of the Sakhalin -2 development area. No seismic acquisition is planned before 2022, and a 'go/no-go' decision is expected to be made in late 2020 or early 2021.

The NTF intends to have significant input into the Company's next MMP as the planning for it should be largely in place by the end of 2021. While the NTF has assembled several MMPs over the years, it should now be well positioned to revisit assumptions and design options. For example, Cooke provided thoughts on some of the core assumptions of the MMPs in document NTF-17/10, and this should serve as a good basis for upcoming NTF deliberations. Additionally, the Company informed the Panel that, in order to maximise the chances of approval for acoustic monitoring during the next seismic survey, it intends to include the MMP within the plans for the seismic survey submitted to the regulators.

2.4 GazpromNeft-Sakhalin's 2019 seismic survey at Ayashsky block

The following summary comes from a presentation given by Boris Dotsenko on preliminary results from the gray whale monitoring programme of Gazpromneft-Sakhalin, LLC (GPNS) in its Ayashsky license area in 2019, which includes the Neptune and Triton fields discovered in 2017 and 2018 respectively.

GPNS conducted a seismic survey in the Neptune field, which overlaps the Offshore feeding area of gray whales (see Map 2), during the summer of 2019. GPNS had approached IUCN about the possibility of obtaining input from the Panel on its monitoring and mitigation programme. The Panel was encouraged by this request although unfortunately it arrived too late for serious consideration. All of the materials that have been produced by the NTF and Panel over the years in support of Sakhalin Energy's MMPs, however, were readily available to GPNS, and put to good use according to Dotsenko.

GPNS set out to conduct a survey with a program that would be in compliance with Russian environmental protection legislation and with various international conventions, including implementing measures to protect gray whales and other fauna. JASCO Applied Sciences was contracted to conduct the acoustic modelling used to establish safety zones. Also, GPNS employed traditional visual observation techniques and an infrared camera/thermal detection system. The visual detection system reportedly functioned well and several mitigation measures were triggered by observations of marine mammals. GPNS also used active acoustics to sample and monitor the area around the seismic survey vessel. The active acoustic monitoring Sonar MAQ-60 had an operating frequency of 57.5-62.5 kHz and provided a presumed range of 1500 m for detecting gray whales.

The Panel pointed out that the hearing ability of gray whales at these frequencies is not known, though it is likely relatively poor. Additionally, the Panel noted that it would be good to know the spectrum of the signal as it could contain significant side lobes which are closer to the range of gray whales' best hearing. Lastly, the operating frequency is certainly well within the range of many toothed cetaceans, so this should also be taken into consideration.

3 PROGRAMMES ON GRAY WHALE RESEARCH AND MONITORING IN 2018 AND 2019 & ANNUAL POPULATION ASSESSMENT

3.1 Joint Programme 2018 distribution and abundance

3.1.1 Distribution in 2018

Vladimirov summarized the Joint Programme's efforts (see WGWAP-20/19) to assess the distribution of gray whales off north-eastern Sakhalin from July to October in 2018 using shore-based observations in the Nearshore (Piltun) feeding area and vessel surveys in the Offshore feeding area (document WGWAP-20/19). He compared distribution patterns in the Nearshore (Piltun) area to previous data going back to 2003, distribution patterns in the Offshore area to data collected since 2001, and count data in both areas to trends since 2003.

3.1.2 Nearshore (Piltun) area

Shore-based surveys of the Nearshore (Piltun) feeding area were carried out from the 13 land-based observation stations used in previous field seasons (2004-2016). Unmanned aerial vehicles (UAVs) were not employed (as was the case in 2017) to assist with distribution surveys in 2018, as they had been in 2017 (see item 6.1 of WGWAP-19 report). Six complete surveys, whereby teams at all 13 of the shore stations carry out surveys 'simultaneously' in a single day, were conducted – 1 in July, 3 in August and 2 in September. The average number of whales counted during these synchronized surveys was 6 and the maximum number counted was 8 (range = 4-8). As has been observed regularly since these distribution surveys began, the whales were aggregated near the mouth of Piltun Lagoon. The vast majority of sightings (72.2%) and whales were located within a very small sub-area (13.8 km^2). While whales were occasionally sighted at other locations in the Nearshore (Piltun) feeding area in 2018, they did not form any semi-'permanent', localized aggregations there.

Due to the limited number of synchronized surveys completed in the Nearshore (Piltun) feeding area in 2018, in some instances the Joint Programme's analysis of gray whale distribution used both shore-based observer data and photo-ID data (e.g. see Figure 4-2 in document WGWAP-20/19). During the July-September period, two photo-ID teams on shore followed "the route along the entire area on a daily basis in order to find and photograph the animals for subsequent laboratory identification." This route was not specifically defined in document WGWAP-20/19 but presumably meant the area overlapping the 13 shore stations. During this photo-ID effort, the coordinates of all whales sighted were recorded, regardless of whether they were photographed. These data provided additional support for the conclusion that the whales in 2018 were concentrated primarily near shore and adjacent to the mouth of Piltun Lagoon, but they also indicated that a few whales were sighted very close to shore, including in locations where they had not been sighted by the observers at the shore stations (Fig. 4-2).

Several peculiarities about the distribution of whales in 2018 were noted in the report, including: (1) the low number of whales using the Nearshore (Piltun) feeding area – the maximum single-survey count of 8 whales in 2018 represents the lowest number ever recorded since the inception of this component of the Joint Programme, (2) a decrease in the average number of whales counted per survey from 25.7 and 22.1 in 2015 and 2016 respectively, to 6.0 in 2018 and (3) the very limited number of whales observed north of the lagoon mouth[2].

[2] Distribution data from 2017 are not included here because they were collected in a non-'traditional' manner using UAVs and are therefore not comparable to the 'traditional' visual observation methods used in all other years (see the report of WGWAP-19 for details).

3.1.3 Offshore area

Eight surveys in the Offshore feeding area were conducted aboard the *Siem Sapphire* (5 complete and 3 incomplete surveys), which has a relatively high observation platform (25 m) and had not been used previously for these surveys. The 2018 surveys did not follow the same transect lines as used in 2011-2017; rather, the 2018 transect lines were shifted to the east "due to certain formalities/logistics-related considerations" (see Fig. 2-1 in document WGWAP-20/19) that are not further described in the document.

One tandem-vessel survey was conducted on 28 September with observation teams collecting data on both the *Siem Sapphire* and the *Polar Baikal*, which is the vessel used previously for the offshore surveys and has a lower observation height (~ 5 m above sea level). The *Siem Sapphire* followed the aforementioned more easterly transect lines while the *Polar Baikal* followed the 'traditional' ENL/Sakhalin Energy track lines (Fig. 2-1). The document states that this tandem survey was "mainly comparative-calibration in nature, and its results were not taken into account in this case." During this survey, the *Siem Sapphire* observation team recorded 124 sightings of gray whales, while the observation team aboard the *Polar Baikal* recorded 59 sightings.

The number of gray whales counted during the five complete surveys in 2018 ranged from 76 to 124 (mean = 95.2), with the highest numbers reported during the 17 September (n=110) and 28 September (n=124) surveys. Gray whale sightings were broadly distributed in 2018 (Fig. 5-3), occurring primarily in waters between 35 and 70 m deep with the highest densities found mostly in the northern portion (52° to 52°15′N) of the survey area (Fig. 4-3). However, survey effort does not appear to have been accounted for, making these data non-comparable (see Appendix 1).

'Synchronized' surveys by the shore-based observer teams in the Nearshore (Piltun) feeding area on 27 September and the vessel-based teams in the Offshore feeding area on 28 September led the Joint Programme to "estimate the total concurrent number of gray whales within the East Sakhalin feeding area" in 2018 as 129 (124 in the Offshore area, 5 in the Nearshore (Piltun) area) (document WGWAP-20/19, p. 25). Document WGWAP-20/19 also illustrates "fluctuations in the numbers of gray whales in the [overall] East Sakhalin feeding area" from 1989-2018 by plotting annual 'maximum' counts in the two feeding areas (Fig. 5-1). The lowest number of whales ever recorded in the Nearshore (Piltun) feeding area, by far (n=8), was in 2018, and this is a continuation of the downward trend that appears to have begun 2012. The authors of WGWAP-20/19 surmised that the whales have moved into the Offshore area for better feeding opportunities, which has led to the increased numbers counted there. However, as mentioned earlier, no adjustment was made to the 2018 to account for the change in height of the survey platform from the *Polar Baikal* to the *Siem Sapphire*, which clearly had some effect on the counts (see Appendix 1). Therefore, the 2018 data should not be compared directly to the data of previous years (as was done in Figure 5-1) without further analysis to account for the variation in observation area.

3.1.4 Discussion and Panel conclusions

The Panel thanked the Company for its presentation on the distribution component of the 2018 programme. However, the Panel does not consider that the final conclusion of document WGWAP-20/19 (p. 33), that "… in terms of its total number the current state of the Sakhalin foraging group of gray whales is relatively stable and generally quite favourable," is supported by the data. We note the following concerns: (1) there appears to have been a severe reduction in abundance and a contraction of distribution in the Nearshore (Piltun) feeding area that is correlated with declining prey biomass since 2012[3], (2) survey effort (time, distance, and observer platform

[3] See the WGWAP Open Statement of Concern on decline of the amphipod prey base in the nearshore feeding area of gray whales near Piltun Lagoon, Sakhalin Island, Russian Far East, 11 July 2019, available at: https://www.iucn.org/sites/dev/files/final_statement_from_wgwap_on_benthos_11july2019_en-ru.pdf

height) has not been assessed and incorporated into calculations and comparisons of whale counts and occurrence, and (3) despite the references made to gray whale abundance and distribution, these values are never actually estimated (see Appendix 1). Very few whales were observed in the Nearshore (Piltun) feeding area in 2018 and in a very small portion of the area (see Fig. 4-4). Figure 5-2 shows increasingly lower densities and more limited spatial distribution of gray whales in the Nearshore (Piltun) area since 2013. The apparent reduction in abundance in the Nearshore (Piltun) feeding area is of concern given that this area appears to be essential habitat for mother-calf pairs; as of 2018, no calves had ever been observed and reported in the Offshore feeding area (see document WGWAP-20/18). Without further analysis, it remains unclear to what extent the reduced abundance in the Nearshore (Piltun) feeding area is due to (i) fewer whales entering the area, (ii) those that do enter remaining for shorter periods of time or (iii) a combination of both. The Panel reiterates its **great concern** about the state of benthos biomass in the Nearshore (Piltun) feeding area given the decline observed in recent years and the population-level consequences that may result from this trend.

The change in observer height from 5 to 25 m on the primary vessel used to conduct the offshore surveys in 2018 must be accounted for in estimates of gray whale density and distribution, particularly before results from 2018 are compared to data from previous years. Results of the tandem survey showed that observers onboard the *Siem Sapphire* counted more than twice as many whales as observers on the *Polar Baikal*. Analyses of the data need to account for variation in observational capacity (as well as variation in environmental conditions) by using appropriate analysis methods, such as distance sampling. Without such correction, the counts from 2018 are not directly comparable to previous years, such as is presented in Figure 5-1 of document WGWAP-20/19.

Additionally, the simple 'density' plots of whale sightings recorded during offshore surveys do not account for variation in survey effort between years or months. Therefore, they cannot be used to assess change or consistency in whale numbers and distribution in the Offshore feeding area across years (see Appendix 1). Preliminary to an analysis, the survey track lines should be overlaid on the maps (e.g. Figs. 4-3 and 5-3) so that patterns in whale distribution can be assessed in relation to the area surveyed.

The Panel **recommends** that a proper multi-year analysis of all the abundance and distribution data be conducted, taking account of survey timing and effort, platform characteristics, observer capacity and environmental conditions, so that definitive conclusions can be drawn regarding trends in gray whale abundance, by area. The most appropriate analysis involves fitting a spatio-temporal density model to the sightings and effort, so that all data can be used, regardless of gaps in coverage.

3.2 Joint Programme 2018 photo-ID

3.2.1 Presentation

Tyurneva summarized the Joint Programme's photo-ID work in 2018 (WGWAP-20/18). The programme's catalogue now contains images of 297 individual whales identified between 2002 and 2018. Of those 297 individuals, 133 (45%) were first identified as calves and are therefore of known age.

Photo-ID methods and platforms in 2018 were similar to those used in 2017 (although methods diverged from those used in 2016; see WGWAP-19 report, item 6.1.2). Work in 2018 was undertaken by three teams. One team worked aboard vessels operating in the Offshore feeding area, deploying a small inflatable when possible, between 19 July and 26 October. Two shore-

based teams collected data on whales in the Nearshore (Piltun) feeding area between 2 June and 29 September. Standard photo-ID methods were employed by all three teams. UAVs (DJI Phantom 4Pro quadrocopters) pre-equipped with factory-installed cameras were also used by the shore-based teams to supplement the traditional digital camera/telephoto lens methods.

In combination, research in the Offshore and Nearshore (Piltun) feeding areas identified 155 individual gray whales (see Fig. 5 of document WGWAP-20/18). Of the 155 whales identified in 2018, ten were calves and two were previously unidentified non-calves that were observed in the Offshore feeding area. Eight of the calves were still accompanied by their mothers, all of which were known females with previous sightings off Sakhalin, while two of the calves were already weaned and independent at the time of their first sighting, therefore their mothers were unknown. A notable early separation of mother-calf pairs was observed in 2018, with the last sighting of a mother-calf pair together in the Nearshore (Piltun) feeding area occurring on 4 August. This differs, in general, from the time-series of data showing that mother-calf separations occurred most often between mid-August and mid-September. All eight of the mothers known to have had calves in 2018 were first sighted in the Nearshore (Piltun) feeding area and then, later in the season after weaning their calves, in the Offshore feeding area.

In total 125 gray whales were photo-identified in the Offshore feeding area, 109 of which were photo-identified only in that location in 2018 (i.e., they were not photo-identified in the Nearshore (Piltun) feeding area). Thirty of the 46 photo-identified whales in the Nearshore (Piltun) feeding area were seen only in that area (i.e., they were not sighted in the Offshore feeding area). Thus, 16 individuals were observed in both feeding areas in 2018. In contrast, only one individual was photo-identified in both feeding areas in 2017 (i.e., 20 of 21 only in the Offshore feeding area and 51 of 52 only in the Nearshore (Piltun) area; see WGWAP-19 report, item 6.1.2.1). As in previous years, no observations were reported of young whales (up to 4 years old), calves, or cow-calf pairs in the Offshore feeding area in 2018 (document WGWAP-20/18).

Photo-ID effort increased in the Offshore feeding area in 2018 relative to 2016 and 2017. In those years, surveys were limited by adverse weather conditions and vessel scheduling issues (see WGWAP-19 report). There was no dedicated small-boat effort in the Nearshore (Piltun) feeding area as had been standard practice in several years prior to 2017. UAVs were also used to collect photo-ID data. Between-year discrepancies in levels of field effort and a 2017 change in field methods notwithstanding, a decline in the number of whales using the Nearshore (Piltun) feeding area, and increased reliance on the Offshore feeding area, apparently continues. For example, Figure 5 in document WGWAP-20/18 shows that in 2018 the number of whales photo-identified in the Offshore feeding area (n=125) was the highest recorded and the number in the Nearshore (Piltun) feeding area (n=46) lower than any in the 2002-2017 time-series (the only exception being in 2002 when the research programme was initiated).

Finally, the results of photo-ID work conducted in Olga Bay (Kamchatka Peninsula) in June 2018 by researchers working independently of the Joint Programme were discussed. The Kamchatka catalogue now includes 174 whales, 95 of them having also been photo-identified off Sakhalin. In 2018, 31 whales were photo-identified at Kamchatka, including: (a) 19 whales also known from Sakhalin, (b) 11 newly identified (i.e. not in any catalogue) non-calf whales and (c) four calves. Of the 31 photo-identified whales, 12 (including all four of the mother-calf pairs) were encountered in feeding areas off Sakhalin later in the 2018 season.

3.2.2 Discussion and Panel conclusions

The Panel thanked Tyurneva for her presentation and again highlighted the importance of the photo-ID work. Weller stated that in his opinion the nearshore habitat was in a state of crisis, noting

that support for this comes from the earliest recorded separation of mother-calf pairs as well as the overall very low number of animals in the Nearshore (Piltun) feeding area. He suggested that mothers had reached a threshold of nutritional depletion and needed to move offshore to feed earlier than usual, leaving their newly independent calves near shore. The nearshore habitat may no longer be able to sustain lactating females over the entire course of a feeding season, and this could result in both decreased calf survival and lower reproductive output in the future. Therefore, follow-up on the survival of calves born in 2018, as well as on the survival and calving intervals of their respective mothers, is of great importance.

Shpak asked about a calf first sighted off Sakhalin that had moved to Kamchatka, then returned to the Sakhalin area after ten years. She asked whether this was a pattern observed for any other individuals. Tyurneva replied that the sighting after ten years had been in the Offshore feeding area and noted that data from Kamchatka are limited in space and time, and therefore similar examples as that described above are not available.

In light of the value of the photo-ID data time-series from both the Joint Programme and RGWP, the Panel **reiterated** its longstanding **recommendation** that this effort continue by both parties into the future.

3.3 2019 Joint Programme fieldwork effort and preliminary results

Samatov provided a summary of effort and preliminary results of 2019 fieldwork, which had two main components – distribution and photo-ID.

3.3.1 Distribution

The distribution surveys were conducted from vessels in the Offshore feeding area and from the 'traditional' shore stations along the Nearshore (Piltun) feeding area. A total of nine standard line-transect surveys of the Offshore feeding area were completed from three vessels, 'Gazpromneft-Sakhalin' (tracklines outside the 12-mi zone), an ENL supply vessel and the crew-change vessel 'Sakhalin Energy' (standard trackline), from June to October. Two shore-based teams worked between 1 July and 30 September. Ten of the shore-based observation sessions were 'synchronized' with four of them occurring in July, four in August and two in September.

3.3.2 Photo-ID

Photo-ID work was conducted between June and October from vessels, from shore, and using UAVs to capture images of the back and dorsal surface of the whales' flukes for matching. Shore-based photo-ID was conducted from 1 July to 30 September by two teams – one stationed on the north and one on the south spit of the seaward border of Piltun Lagoon. A total of 326 photographic 'missions' were conducted. Vessel-based photo-ID effort was implemented from June to October from supply vessels of ENL and GPNS, using small boats deployed from the larger vessel to capture images of the left and right flanks and ventral surface of the whales' flukes for matching. The total number of 'missions' was 94, of which eight were in the Nearshore (Piltun) area and 86 in the Offshore area. More than 40,500 photographs were obtained and 979 whales were sighted (including repeat sightings).

3.3.3 Discussion and Panel conclusions

Although the results from non-synchronised surveys were not included in analyses of abundance and distribution, the Panel **stressed** that those data are valuable and should be incorporated in analyses. New suggested that synchronised surveys are seemingly undertaken to avoid double counting but explained that statistical methods of density estimation that do not require

synchronised surveys are readily available. She offered to work with Company scientists to develop ways for all survey data to be included in analyses (Appendix 1).

Weller noted once again that the total numbers of photographs obtained is not a measure of the photo-ID programme's success. In fact, considering the time required both in the field to collect so many and in the lab to process them, such high numbers of images is inefficient and unnecessary. This issue has been raised by the Panel many times, and **reiterated** its previous advice that the Company (or companies) make a serious effort to train the photo-ID teams to optimise the number of images submitted for analysis. Tyurneva agreed and confirmed that she would welcome a more streamlined approach to the submission and analysis of photo-ID photographs.

The Panel has commented previously on the importance of assuring compatibility between boat-based, shore-based and UAV-acquired photo-ID images. This subject was addressed in some detail under item 7 in the PHIDNTTF-1 report[4]. At the present meeting, Tyurneva gave assurance that the companies were aware of the potential problems and noted that inter-platform comparisons had shown that UAVs can provide many types of valuable information, especially regarding mother-calf pairs and the timing of mother-calf separation. Also, she stated that UAVs enable shore-based photographers to collect images of whales at greater ranges offshore than is possible with traditional digital camera/telephoto lenses.

3.4 Russia Gray Whale Project

Burdin summarized results of 2019 field studies conducted by RGWP. This work began as a pilot project in 1995 and has been ongoing annually since 1997, funded in large part by IFAW. It represents a 20+-year time-series for north-eastern Sakhalin waters and has served as a foundation for western gray whale population assessments.

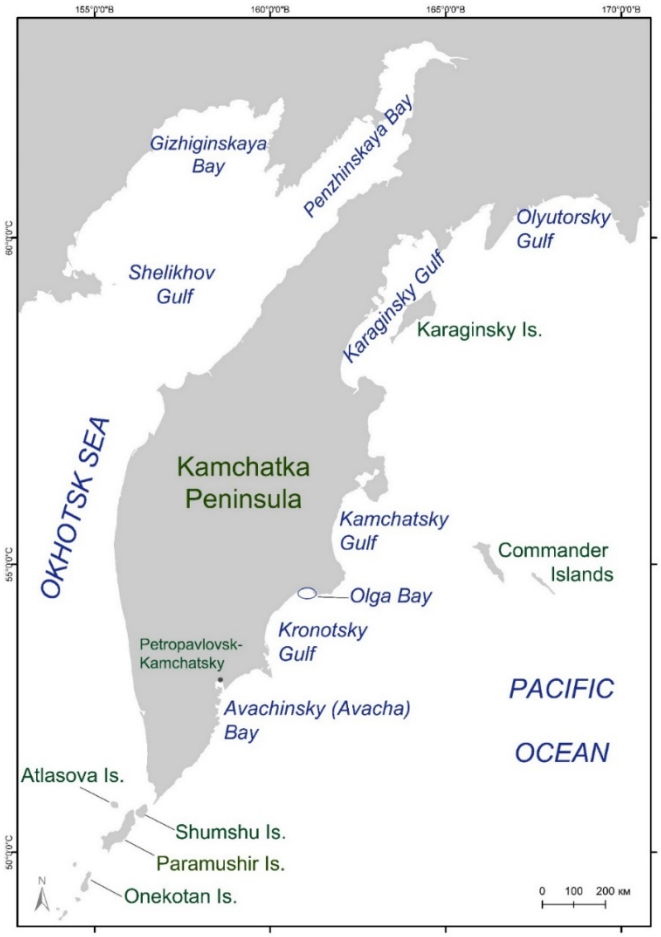
The 2019 season in the Nearshore (Piltun) feeding area resulted in photo-ID of 49 individuals, including 20 calves, the most calves observed in a single year. Only one previously unidentified non-calf was documented. The total number of individual whales in the RGWP photo-ID catalogue is now 302. Survey effort in 2019 exceeded that of previous years (30 surveys compared to an average of 15 surveys previously) despite limitations due to weather conditions and the lack of access to the Offshore feeding area. In addition to photographs, 30 biopsies were collected.

According to Burdin, the low number of photo-identified individuals together with the increased survey effort in 2019 (though many of the surveys were affected by limitations due to bad weather) points to the conclusion that use of the Nearshore (Piltun) feeding area by gray whales is declining. Burdin stated that human activities such as seismic surveys and ENL's sealift operations near the lagoon entrance and inside Piltun Lagoon, along with changes in benthic communities and reduced prey abundance, likely explain the recent shift in distribution and change in habitat use.

The RGWP also conducted photo-ID work in Kronotsky Gulf (eastern Kamchatka; Map 1). Nineteen gray whales were observed in the gulf during boat surveys between 23-25 June and seven of these whales (including 4 calves) were seen in the Nearshore (Piltun) feeding area off Sakhalin in July-August. Several differences in whale distribution in Kronotsky Gulf relative to previous years were noted. Among these, no whales were observed in Olga Bay where whales tended to concentrate over the last 20 years. Instead, whales were seen in 2019 along the coast more than 40

[4] See the PHIDNTTF-1 report at https://www.iucn.org/sites/dev/files/phidnt1_report_final.pdf.

km south of Olga Bay. In addition to the work in eastern Kamchatka, a vessel survey was conducted in July-August in the north-eastern Sea of Okhotsk; no gray whales were sighted.



Map 1. Map of Kamchatka showing locations mentioned in the report.

Burdin reported that the RGWP plans to continue work in 2020 at both Sakhalin and eastern Kamchatka. He expects to expand the boat-based photo-ID and biopsy effort and to recruit new scientists into the project for the 2020 season. He intends for the project's gray whale biopsies to be applied to genetic, stable isotope and fatty acid analyses and additional focus will be placed on collecting faecal material for pregnancy and stress hormone analyses.

There was some discussion of the difficulty of collecting faecal samples at Sakhalin, with Burdin and Weller both describing their inability to do so over many years of trying. Weller mentioned that he had collected samples from only about five defecations in ten years of fieldwork at Sakhalin despite being properly equipped and ready to do so. Vertyankin added that he had tried as well, also without success owing to the unsuitability of the net he was using and the inability to approach the whales closely with the boat he was using. Torres mentioned that in her Oregon study area, UAVs have proven to be extremely useful for locating gray whale faeces although she added that if the whales are not defecating near the surface, UAVs will not help. The Panel **recommends** that researchers working in feeding areas off both Sakhalin and Kamchatka consider the use of UAVs to support their efforts at finding gray whale faeces as well as for other purposes (e.g. photo-ID, photogrammetry for body condition assessment[5]).

[5] Ibid.

In conclusion, the Panel once again acknowledges the extraordinary dedication and commitment of Burdin and his 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 track the return of gray whales to the Russia Far East, where they were either absent or ignored for many decades. The Panel also emphasizes that the biopsies collected by Burdin's team, though hard to obtain, have proven of great value, particularly those obtained in locations away from Piltun.

3.5 Update on joint photo-ID catalogue under IWC auspices

Cross-matching of individuals in the photo-ID catalogues maintained by the Russia Gray Whale Program and the Joint Programme, respectively, was routinely carried out annually under the auspices of IUCN for several years, but this ceased in 2012 and therefore 'new' whales entered into the catalogues after 2011 have yet to be cross-matched. This issue has long been the subject of recommendations by the Panel, most recently Recommendations WGWAP-18/08 and 19/19, both of which remain classified as 'Open – in need of clarification/expansion'. Sakhalin Energy has indicated in its responses that it supports such recommendations in principle, but that it cannot implement them without explicit agreement of its Joint Programme partner (ENL) and that such agreement is contingent upon the receipt of a 'proposal' for a 'data-sharing' agreement from the IWC and IUCN. Although such a proposal has been under discussion for several years, a concrete 'proposal' has never materialized.

It was agreed after some discussion that the matter would be taken up by IUCN, in coordination with the Panel chair. Carbone Khodabakhsh agreed to communicate directly with the IWC Executive Secretary to obtain the necessary documents and advice to move ahead with a draft data-sharing agreement that could then be shared with Sakhalin Energy for action.

The Panel emphasized its view of the importance of ensuring that a 'joint catalogue' of western gray whales (together with associated data) is finally established and functioning as intended under the auspices of the IWC. Once realized, this photographic (and hopefully genetic) database will be a valuable and enduring legacy of the WGWAP process. It was suggested that completion of this task and implementation of the relevant recommendations could be considered as part of Sakhalin Energy's offset strategy in line with IFC PS6 (item 4.4).

Weller briefly noted some of the main themes of the PHIDNTTF-1 meeting in April 2019[6] as follows:

- The existing photo-ID data from Sakhalin, Kamchatka and other areas in the known range of western gray whales are generally in good order and compatible with Joint Programme data;
- The 'blending' of new or recently developed technologies can enhance the value of the existing photo-ID catalogues;
- Types of data collection and ways of maximizing the use of data should be expanded (thoughtfully and deliberately, with assurance of compatibility);
- Collaboration was strongly encouraged;
- Selection of methods and equipment should be tailored to the mission (e.g. objectives, research questions to be addressed) and not the other way round.
- Field testing is essential before wholesale adoption of novel approaches;

[6] Ibid.

- New technologies can generate huge data sets and thus present challenges in terms of data management and archiving;
- Data archiving should be standard practice.

Torres pointed out that it would also be useful for the companies to share UAV imagery and to use such images for comparisons of body condition and other morphometric aspects between the whales at Sakhalin and whales in the eastern North Pacific, including those in her Oregon study area.

3.6 Annual assessment of biological and demographic characteristics of western gray whales

Cooke presented an update of the population assessment (document WGWAP-20/23[7]). The data sources for the assessment were:

- RGWP, Nearshore (Piltun) (photo-ID and biopsy data from 1994-2018);
- Joint Programme photo-ID (Sakhalin, Nearshore (Piltun) and Offshore) (data from 2003-2018, document WGWAP-20/18);
- photo-ID from Kamchatka 2006-2012 (Yakovlev et al., document WGWAP-13/8);
- photo-ID matches with Mexico (up to 2019) (Urbán et al. 2019);
- results of tracking tagged whales (Mate et al. 2015);
- two individually identified dead whales.

As indicated under item 3.5, cross-matching of the two Sakhalin photo-ID catalogues has been accomplished only up to and including the 2011 season. It was therefore necessary, with respect to whales first sighted in 2012 or later, to choose one of the two catalogues for the population assessment. Use of the RGWP catalogue resulted in a somewhat higher estimated calf production in recent years and higher population growth (Fig. 2 of WGWAP 20/23, revised since the meeting).

The data were used to fit a population model as described in previous years. A model selection exercise was performed to identify the best-fitting model. The best-fitting model included differential availability of the various demographic stages (mother-calf pairs, subadults, male and female adults). In the best-fitting model, the relative availability of the different population segments differed between the two research groups and also varied over time. There was also individual heterogeneity in availability: some individuals are seen more regularly off Sakhalin than others. There was only a weak indication that the calf survival rate varied more than would be expected by chance alone.

Using the preferred model, and using the RGWP catalogue for new whales since 2012, the number of Sakhalin gray whales is estimated to have been increasing over the last 25 years at a rate of about 5% p.a., reaching 240 (SE 8) animals (excluding calves) in 2018, although not all of these whales visit Sakhalin every year. A sample from the posterior distribution of population trajectories is shown in Fig. 1 for: (a) all animals aged 1 yr and older, (b) females of reproductive age, and (c) calves.

[7] Revised since the meeting.

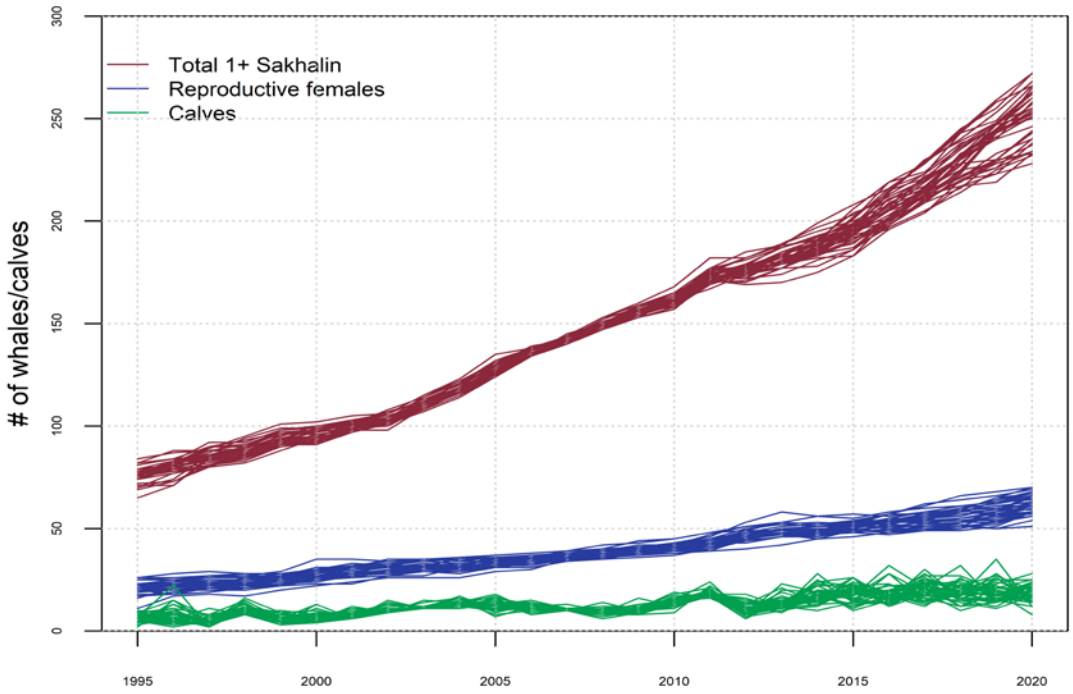


Fig. 1. Sakhalin gray whales: sample from the posterior distribution of population trajectories (from the best-fitting model – see document WGWAP-20/23)

The presence of western-breeding animals (i.e. those which do not migrate to the eastern North Pacific) off Sakhalin was inferred on the basis of the number of matches with the Mexican catalogue (Urbán et al. 2019) being fewer than would be expected if all whales that feed off Sakhalin migrated east in the autumn or early winter. The number of western-breeding animals (i.e. those which do not migrate to the eastern North Pacific) was estimated at 60 in 2018. However, this latter estimate is considered tentative pending a more complete analysis of the data from Mexico.

The assessment results imply that the cumulative impact of factors negatively affecting Sakhalin gray whales has, to date, been well within the capacity of the population to increase. The decline in food availability in the Nearshore feeding area, which has led to a lower residence time of mothers and the earlier weaning of calves (see item 3.2.1 above), has not yet had a detectable effect on the demography of the population.

4 OTHER SAKHALIN ENERGY ACTIVITIES IN 2019, 2020 AND BEYOND

4.1 Oil spill response planning and drills (exercises) including site visit and follow-up actions

Associate Scientist Brian Dicks, who joined the meeting remotely, gave a presentation on his work over the past year reviewing oil spill-related documents and evaluating an oil spill response exercise conducted by Sakhalin Energy in September 2019. His presentation had three main components as follows: review of oil-related Panel recommendations; review of documents provided by Sakhalin Energy in 2019 (oil spill exercise reports 2019, oil section of MMPP, and in-situ burning (ISB) regulation CTO 318.04.69-2015); and representation on behalf of the Panel

in discussions concerning the oil spill exercise conducted at the PA-A platform and Piltun in September 2019.

4.1.1 Recommendations

In the Panel's report of the WGWAP-18 meeting, the five oil-related recommendations that were 'open' at the time were consolidated into a single recommendation, WGWAP-18/15. The first three components of recommendation WGWAP-18/15 proposed a site visit by Dicks to check the status of spill response equipment stockpiles at Nogliki and Prigorodnoye, to attend a training course for spill responders and to attend a major oil spill response exercise. These activities were originally expected to be completed in 2018 but were postponed to 2019 at Sakhalin Energy's request. Unfortunately, Dicks was not able to attend and observe the exercise in September 2019 because of a change to the timing. A compromise was agreed, by which Dicks participated remotely through communications with the Lenders' representatives from PCCI Inc. (hereafter PCCI) who were on site for the exercise, participated in training and inspected the Nogliki equipment stockpile. The remaining two components of recommendation 18/15 related to Panel review of Sakhalin Energy's Oil in Ice Manual and the Company's procedures for final disposal of oily waste. The five elements of the recommendation are discussed individually below.

Inspection of oil spill response (OSR) equipment stockpiles

A PCCI representative was able to visit the Nogliki equipment stockpile and reported that everything appeared to be in good order. Therefore part 1 of recommendation WGWAP-18/15 is now considered 'Closed – implemented satisfactorily'.

Observation of major spill exercise

Dicks reviewed five oil spill exercise reports since the last meeting. He considered these to be of good quality, noting that they were well illustrated and overall were consistent in quality with reports reviewed at previous Panel meetings. His conclusion was that the Company's exercise programme is technically sound and is being well run with good feedback to OSR planning.

In advance of the major oil spill exercise 25 and 26 September 2019, Dicks, Ramboll and PCCI had established checklists for monitoring the exercise and had agreed and tested communications among all parties. Dicks noted that he had worked professionally with PCCI on numerous occasions and that he was confident of their technical competence to attend and review oil spill response equipment and exercises. The main components of the exercise to be monitored were compliance with OSR plans, condition of the equipment being used, effectiveness of deployment, competence and training of personnel involved and awareness of environmental issues, particularly related to gray whales, on the part of those taking part. Communications between Dicks and PCCI worked flawlessly through the exercise and he was able to participate via conference call in the post-exercise review on 26 September.

The scenario was to involve a 4,100 t spill from a Molikpaq (PA-A) well over three days. Offshore, Sakhalin Energy's newly acquired response vessels were to deploy oil recovery equipment and spray dispersant if permitted. Onshore boom deployments for oil recovery were planned near the entrance to Piltun Lagoon and temporary waste storage facilities were to be set up. The onshore response equipment was deployed to the mouth of Piltun Lagoon on the day before the exercise. Unfortunately, the weather didn't cooperate with the plans. A strong Pacific storm with 55 mph winds, 6 m waves and 'longshore tidal currents at >5 knots hit the area on 24-25 September, and this prevented safe deployment and operation of any equipment. Heavy seas breached sand dunes and partly flooded the onshore work camp. Safety concerns were paramount and no personnel were injured.

Despite the inability to deploy equipment, PCCI reported favourably on the exercise. The command post in Yuzhno-Sakhalinsk was established promptly and communications worked well after some initial glitches. Participation by Russian regulators proved constructive and safety considerations were well handled. By working closely with the regulators, the Company was able to obtain permission to apply dispersants; this was the first time that had been achieved. Some environmental issues such as the potential impacts on seabird aggregations were given due attention, but this did not extend to seals or gray whales. PCCI suggested some areas in need of improvement, notably a) the size and layout of the command centre were inadequate and this limited visual displays; b) resource tracking could have been better; c) objectives of the response effort were poorly defined; and d) there was no briefing of outside stakeholders or the press. The exercise was terminated around midday on 25 September due to weather. A major concern of Dicks and PCCI was that gray whales were given little consideration during response planning. Oil spill response plans and MMPP require the presence of MMOs on response vessels and clear instructions to all those involved that dispersants should not be used in or near gray whale feeding areas, but neither of these measures was taken. In regard to these concerns, Samatov stated that two Company marine mammal specialists had been present – one in the command post and one in the field camp. He added that four MMOs had been available at Nogliki base camp for mobilization on response vessels.

A post-exercise debrief was conducted on 26 September among members of the Sakhalin Energy response team, PCCI and Dicks and there was a constructive exchange of views. The PCCI representatives reported that during the visit they had an opportunity to review videos of exercises earlier in the year and that these confirmed that the new response vessels were well equipped and performed well. The rapid permitting for dispersant use was also a positive outcome. However, during the discussions it became evident to PCCI and Dicks that the Company's response team had some worrying misunderstandings on the subjects of dispersant use and gray whale response to spilled oil. These misunderstandings included a general belief that dispersant use was a benefit for the environment as a whole and that gray whales would always avoid oil and therefore not be present, so would not be a concern during response efforts. PCCI and Dicks further noted that the Sakhalin Energy team did not appear to understand that gray whales are benthic and epibenthic feeders and that this creates a clear need to avoid dispersant use in circumstances where it could help oil sink to the sea floor where it would suffocate and contaminate the whales' food resources.

Samatov took issue with several of the points mentioned above, noting that PCCI representatives had not raised any issues concerning gray whale behaviour and feeding ecology with the marine mammal specialist who was present in the field camp. Also, Samatov stressed that the government-approved Net Environmental Benefit Assessment includes numerous scenarios in which dispersant use is a benefit to the environment. He added that Sakhalin Energy's Oil Spill Response Plan prescribes dispersant use in waters deeper than 20 m, and that dispersed oil "cannot contaminate benthic organisms at such depths" because the particles remain in suspension and "disappear" in the water column.

Regardless of the differences in views concerning dispersants, Dicks, PCCI and indeed the Panel are of the view that any remaining misconceptions should be put right so that similar problems don't arise in the future.

Because things did not go as planned (i.e. for Dicks to be present on Sakhalin for the exercise), the Panel considers part 2 of recommendation WGWAP-18/15 to be 'Closed – moot'.

Training course
Because Dicks's site visit to Sakhalin proved infeasible in 2019, the third part of recommendation WGWAP-18/15 was not implemented. The Panel considers that part of the recommendation should be classified as 'Closed – moot'. The Panel may decide to provide a new recommendation in this regard in the future.

Oil in Ice Manual
The Oil in Ice Manual is still in preparation and the Company confirmed that it would not be available for Panel review until at least the end of 2019. Therefore part 4 of recommendation WGWAP-18/15 remains classified as 'Open – no action yet taken'.

Disposal of oily waste
Sakhalin Energy was not able to provide a written summary of its final plans and procedures for disposal of oily wastes as these have not been formally agreed with the regulators. In response to Dicks's invitation for the Company to comment, Alcock noted that Sakhalin Energy's approach is to deal as effectively as possible with short- and medium-term storage and to consider final disposal options according to the kind of waste needing treatment. In her view, it would not make sense to provide a precise statement in the absence of a clear scenario. The Company has contracts with waste-disposal contractors that it believes would be able to dispose of all wastes effectively and safely. Samatov added that regardless of the disposal contracts in place, virtually all of the waste would in all events be transported away from the coastal clean-up areas, in accordance with legislation, and this relocation of the waste should remove any risk to whales. The Company is allowed to accumulate waste for 11 months before final disposal. In view of the information exchange at this meeting, the Panel considers part 5 of recommendation WGWAP-18/15 to be 'Closed – implemented satisfactorily'.

4.1.2 Other oil-related matters
Dicks had no new specific technical comments to make on the oil-related sections of the MMPP. In his opinion, the current version of the MMPP contains clear guidelines regarding gray whale sensitivities and protection measures.

The ISB regulation CTO 318.04.69-2015 clearly sets out the Company's policy for compliance with Russian regulations, primarily based on the use of 'net environmental benefit' analysis which aims to ensure that ISB is only used in the right places and at the right times. Unfortunately, the document is generic in scope and lacks any details on where and how the Company would actually use ISB in its operational areas near the gray whale feeding grounds. In addition, the document contains no details on burn properties of Vityaz crude oil, ISB equipment held or the Company's programme for maintaining and supplementing such equipment.

In response to Dicks's request for clarification of these items, Alcock indicated that ISB would be conducted only during the winter months when no whales are present and the ice would effectively corral or contain the oil and prevent it from dispersing too quickly or widely. Some practical tests had been conducted on the burn properties of Vityaz crude and the main criterion for an effective burn would be the thickness of the layer to be burned. The Panel **requests** that Sakhalin Energy provide further details on the ISB equipment that it currently holds and on any plans that are in place to supplement and maintain these resources.

4.1.3 Discussion
Concern was expressed that the revised Oil in Ice Manual was overdue. Alcock confirmed that the current version was produced in 2013. Dicks and Reeves had provided detailed comments to the Company and the Panel had concluded that this version (version 3), having incorporated the

Panel's comments, was broadly consistent with International Tanker Owners Pollution Federation studies and could be considered to reflect 'international good practice' at that time (report of WGWAP-14, item 16.2). The Company indicated that the update has been delayed and a newly revised version is now expected at the end of 2019.

Alcock responded to Dicks's comments on areas for improvement. She said that use of dispersant was well understood by practitioners at the point of deployment. It was disappointing that the people with whom this was discussed were not better informed, but one of the points of the exercise was to learn about such shortcomings. She added that concerns about the size of the command centre were well known to the Company and that this was an interim solution while another building was being constructed.

In response to a question of whether arrangements were in place for different operators to pool resources (equipment, personnel etc.) in the event of a major spill in the region, Alcock said she was unsure of the details of mutual aid agreements with other operators but she was confident that the companies would help one another in an emergency situation as a matter of principle. Samatov confirmed that there are formal agreements between companies and that joint exercises were sometimes held.

Knizhnikov (WWF Russia) drew attention to the fact that the 2019 exercise once again demonstrated that there are days even during the summer when weather conditions prevent safe operations. For example, aircraft cannot be used in fog and skimming is considered impossible in rough seas. These limitations constitute a big challenge and need to be fully considered in preparing for emergencies. Burning in open waters may seem like a solution, but in the case of the Deepwater Horizon spill in the Gulf of Mexico, responders managed to burn only about 3% of the spilled oil. Knizhnikov also encouraged the Company to consider inviting NGOs and other civil-society organisations to observe OSR exercises. Marcinkowski pointed out that WWF had done a lot of work on OSR in ice conditions and that the gaps identified by WWF are problematic globally and do not apply only to north-eastern Sakhalin.

4.2 Updated Marine Mammal Protection Plan (MMPP)

Sakhalin Energy has been updating its MMPP over the last two years, with substantial input from the Panel in the form of multiple reviews of drafts. Ramboll, acting on behalf of the Lenders, has been carrying out its own independent review of the MMPP drafts whilst also serving to monitor and adjudicate (where necessary) the Company's responses to Panel recommendations for revision.

Hancox reported that the process was very near completion and that only two points remained to be resolved, as follows:

- Definition of the 'peak' season for gray whale presence at Sakhalin;
- Acoustic monitoring during non-seismic years, which the most recent draft of the MMPP explicitly states is not required.

Hancox emphasized the importance of having an updated MMPP in place given that the current version in the Company's operational management system is extremely out-of-date. He suggested that the current revised version be finalized largely as is (following a few minor corrections provided by Ramboll Environ), and that footnotes be included indicating that the above points remain under consideration by the Panel and the Company, with the expectation that the MMPP would be updated again in due course. He said that he expected to receive final feedback from the

Company by mid-November, after which the document would be submitted to the Lenders for approval and then uploaded to the Sakhalin Energy website.

In the report of its last meeting, the Panel reclassified recommendation WGWAP-18/14 as 'Open – no action yet taken' and requested that the MMPP be revised to make clear that the 35-knot speed limit for crew-change catamarans is not a mitigation measure to reduce the risk of ship strikes but was set by the Company out of concerns for safety and manoeuvrability.

4.3 Report on MMO programme and ship strike avoidance measures, including speed limit implementation

Samatov presented results from the MMO Programme for 2018 (document WGWAP-20/8) and preliminary results for 2019 (doc. 20/11) for the crew change vessels *Polar Baikal* and *Polar Piltun* and the supply and survey vessel *Gennady Nevelskoy*.

In 2018, a total of 238 marine mammal sightings (1,572 individuals) were made by MMOs which included five cetacean species and four pinniped species. As to mitigation measures, vessels made 56 course changes, four decelerations, and one full stop as a result of marine mammal encounters. Forty gray whales were observed during 25 sightings in 2018. Sighting distances ranged from 0.2 to 8 km. Fifteen sightings were at distances of less than or equal to the 1 km 'safety' distance. During these encounters, 11 course changes, one full stop (when a whale was observed directly on the vessel's path at 300 m), and one deceleration were undertaken in response to gray whale presence.

In 2019, MMOs were aboard for the entire period of crew change transits (i.e. between 6 June and 17 October). In that period 1,042 individuals (from five cetacean and four pinniped species) were observed in the course of 192 marine mammal sightings. Nineteen gray whales were seen during 18 sightings.

As indicated in the Marine Mammal Protection Plan, crew change vessels were required to remain within navigation corridors and allowed to travel at up to 35 knots during daylight and periods of good visibility (> 1 km or 0.5 nm). They were otherwise limited to speeds of no more than 21 knots. This was in accordance with recommendations WGWAP-17/08 and -17/09 which accepted the relaxation of speed restrictions for a provisional period of 2 years (i.e. the 2017 and 2018 seasons) pending a more refined estimate of ship strike risk. Samatov indicated that in 2017 and 2018, crew change vessels operated at speeds in excess of 21 knots for 69% of the total time of operation. Vessels operated 16% and 0.05% of the time in periods of poor visibility and darkness, respectively.

Samatov concluded that no strikes of marine mammals by vessels have been recorded during the entire period of Company operations in the area.

4.3.1 Discussion

The Panel noted that in 2018 and 2019, observations of clusters of gray whale sightings off Nogliki, near the southern portion of the navigation corridor, were consistent with the general southward shift in the nearshore distribution of gray whales. If the density of whales in this area increases, it may become unsuitable as a navigation corridor. Samatov responded that the Company had noted the increase in number of sightings in the southern part of the corridor in 2018 and 2019 and had dispatched a team to investigate during the monitoring season. He stated that there did not appear to be a regular aggregation of whales in the nearshore area off Nogliki.

As in 2017 (and consistent with recommendation WGWAP-17/08), video-camera monitoring of the sea in front of the crew change vessels continued in 2018 and 2019. As requested in recommendation WGWAP-19/06, the Company provided the Panel with a sample of video footage obtained in the 2019 field season. Provisionally, the quality of the video for determining whether whales or other objects were visible immediately prior to a suspected strike or avoidance manoeuvre was deemed acceptable.

The Panel had expressed concern in the WGWAP-18 report and recommendation WGWAP-19/07 that the Global Positioning System (GPS) instruments may not provide sufficient temporal resolution to assess whether a whale strike had occurred. Therefore, the Panel had requested manufacturers' specifications on the GPS devices used, including details regarding how the GPS receiver calculates speeds, to determine if a rapid deceleration could be attributed to a strike. The Company responded that analysis of GPS data indicated instances of deceleration that were associated with vessel passages in sea states exceeding 4 on the Beaufort scale when vessels were moving against waves but no further information on the GPS devices themselves was provided.

In further discussion of the vessel-speed issue, Alcock explained that during crew change operations, the vessels carried numerous people and were designed to travel at high speed for the comfort of the passengers and for hydroplaning efficiency. However, when doing survey work the vessels travelled at 10 knots because few people were on board and the surveys were conducted during favourable sea states. Earlier the Company had suggested that low-speed operation risked overheating the engines (document WGWAP-16/13).

The Company had supplied the Panel with revised tables on gray whale encounters from the 2017 and 2018 MMO Programme Close-Out Reports (documents WGWAP-19/11 and WGWAP-20/8) in response to an intersessional request. In correspondence with the Company, the Panel pointed out inconsistencies between 'Angle (from the track line)' and the recorded action taken. In some cases, course changes were made even though the whales had apparently first been seen abeam of the vessel. The most likely explanation was that the recorded distances and angles to whales did not always refer to the initial sighting position. The MMO handbook (document WGWAP-20/10) specifies that the initial sighting position is to be recorded but does not emphasize this point.

At this meeting, the Company agreed to ensure that due attention would be drawn to this aspect of the recording protocol during training of MMOs. The significance of this issue for vessel-strike risk is that the position estimates from MMO data should be interpreted cautiously. However, they may still be useful for an approximate estimate of the risk.

The Panel **concludes** that Recommendation WGWAP-19/07 should be Closed. However, closure of the recommendation does not mean the Panel is convinced that the system installed by the Company, given the low resolution, would be capable of detecting all fatal strikes of gray whales. For example, a glancing strike of the head of a gray whale at 45° to the vessel's direction of travel at 35 knots would likely be fatal to the whale but result in a speed change of less than 1 knot and hence would not show up as an unusual deceleration with the present system in place. The Panel accepts, however, that the Company is unwilling to install a system designed to achieve the objective without prior proof of concept by an external party.

4.3.2 Re-assessment of vessel-strike risk from high-speed crew change transits

The Panel revisited and updated its previous assessment of the risk from crew change vessels (see Appendix 1 of the WGWAP-17 report, where details of the approach are given). In 2017 and 2018, there were 25 sightings of gray whales, representing 43 individuals, within 1 km of the trackline (revised Table 5.3 of documents WGWAP-19/11 and -20/8). However, it was estimated that only

about 33% of gray whales on the trackline would be detected at 35 kn, hence the total number of gray whales passing within 1 km would have been about 130, or 65 per year. Assuming a roughly even distribution of whales within this 2 km-wide strip (1 km either side of the trackline), 1% of whales within the strip would be expected, on average, to fall (with respect to their centre of mass) within the 20 m-wide danger zone based on the vessel footprint. Thus, the estimated average number of whales encountered within the danger strip would be about 0.65 per year. Most actual hits at this speed would be fatal, but a whale would have about a 75% chance of being sufficiently submerged to pass under the vessel unscathed. Assuming that 1/3 of potential hits would be avoided by evasive action by the vessel, the resulting estimate of expected fatality rate is about 0.1 whales per year, similar to the WGWAP-17 assessment. Therefore, the Panel does not need to revise its previous advice that operation of the crew change vessel at high speeds is acceptable from a risk point of view, subject to the Panel's recommendations concerning technical measures for the detection of vessel strikes.

4.3.3 Further comments

While the risk of vessel strikes is fairly low, it is not completely negligible. The risk of being struck by crew-change and other vessels should be included as a factor in a future cumulative effects assessment for Sakhalin gray whales.

Comments by the Company at the meeting and in the MMO Close-out Reports suggested a strong belief that the presence of MMOs would prevent vessel strikes, because whales would be seen in time to initiate strike avoidance action. The Panel again cautions against overconfidence in this respect. With travel at 35 knots (18 m/s), and average whale dive times of 80-90 s, the vessel would travel about 1.5 km between surfacing of a whale. Data presented in MMO Close-out Reports indicate that most whales were first seen at ranges closer than 1.5 km; hence many whales would be passed undetected. The Panel believes that the presence of MMOs is valuable for a number of reasons, but that their contribution to reducing the risk of vessel strikes at such high speeds is probably rather modest. The risk of strikes is reasonably low because the amount of vessel traffic is low. If vessel traffic increases in the future, speed limits may well be required.

The Panel **concludes** that Recommendation WGWAP-19/08 should be Closed. Even though the Panel does not consider the Company's reasoning concerning ship strike risk to be valid, on the basis of its own analysis the Panel regards the risk as sufficiently low as to not necessitate a speed limit for crew change vessels at present. As indicated under item 4.3.1, if the southward shift in whale density continues, the suitability of the navigation corridor may need to be reconsidered.

The Panel also drew attention to Recommendation WGWAP-18/14, that the 35-knot speed not be listed in the MMPP as a mitigation measure, because most vessel strikes at this speed would (a) not be reliably prevented by MMOs and (b) be fatal to the whale. Thirty-five knots is simply the preferred speed on operational grounds, which the Panel deems acceptable in this instance because of the low expected number of vessel strikes regardless of speed.

4.4 Update on Sakhalin Energy's plans for IFC PS6 implementation and progress with the development of key associated documents

Tsarenko again reviewed Sakhalin Energy's plans and progress towards implementation of its commitments in regard to IFC PS6 (see the more extensive coverage of this subject in the reports of WGWAP-18, item 6; WGWAP-19, item 5). The Critical Habitat Assessment has been completed and approved by Ramboll. All species (including the gray whale) and habitats (including the north-eastern Sakhalin Shelf) identified as 'critical' have now been explicitly considered in Sakhalin Energy's Biodiversity Strategy and Action Plan. Henceforth the

Company's focus in terms of honouring its IFC PS commitments will be on development of an appropriate offset strategy. In doing so, the Company anticipates benefitting from the Panel's technical advice as well as that of IUCN.

To assist the Company and Panel in moving ahead, Ramboll agreed to convene a Small Group on Offsets, to include representatives from Sakhalin Energy, the Panel and IUCN. This group met briefly in Moscow (on the margins of the Panel meeting) to agree on objectives, procedures and a timeline. The objectives are to help the Company define, identify, describe and justify a set of potential gray whale-related offsets as well as 'additional conservation actions' (ACAs), which could in some cases result in offsets over the long term). Hancox emphasized that assessment of the baseline, in terms of residual impact or risk after mitigation has been implemented, is a wider WGWAP function and within the Small Group's remit. The agreed final list of offset (and ACA) options will be subject to independent review and approval by Ramboll on behalf of the Lenders.

A series of teleconference meetings of the Small Group were planned for the rest of November and December with the goal of at least identifying, by the end of 2019, a suite of viable options for more in-depth consideration during the first quarter of 2020. A face-to-face meeting of the Small Group would then produce a final set of options in the spring, ideally in time for final discussion and agreement in conjunction with one or more task force meetings to be held in Gland in April or May.

The immediate tasks for Small Group members to undertake during the first quarter of 2020 included:

- Review of recent case studies of offsets in the context of migratory species (IUCN, Ramboll);
- Review of past Panel and task force meeting reports for previously identified offset ideas or options (IUCN);
- 'First-cut' review of past, ongoing or planned monitoring, assessment and third-party engagement activities with potential to provide a basis for offsets or ACAs (Sakhalin Energy);
- Review of external (non-Sakhalin Energy-driven) threats to gray whales off Sakhalin (to enable screening review of potential for averted loss) (Sakhalin Energy, Ramboll);
- Review of approaches to offsets of risk (Cooke, Ramboll).

5 SCOPE OF WORK FOR JOINT PROGRAMME GRAY WHALE RESEARCH AND MONITORING IN 2020

Samatov reported that the Joint Programme's Scope of Work for gray whale research and monitoring in 2020 was essentially the same as in 2019. The objectives are to (i) assess the size and rate of increase of the population of whales feeding off north-eastern Sakhalin, (ii) assess the condition of their habitat off Sakhalin, and (iii) increase understanding of gray whale ecology. The information obtained from the Joint Programme is meant to be used to develop habitat conservation measures and identify measures to minimize risks to the whales and their habitat from the companies' activities. The specific tasks for 2020 are to: (i) determine the spatial distribution of the whales during the main feeding season, (ii) assess abundance, demographic indicators, and the physical condition of individual whales, (iii) focus on peer-reviewed publication of 'interdisciplinary, multi-component' analyses of multi-year data, and (iv) "add new technical methods of analysis using Neural Network for automatic detection of gray whale images for photo-ID".

Visual distribution surveys from shore stations along the Piltun north and south spits will be carried out 'periodically'. Vessel-based visual transect surveys of the Offshore feeding area will be conducted approximately every two weeks (weather permitting). Vehicle-based photographic and video surveys (including with UAVs) will be carried out daily in coordination with the distribution surveys. Photo-ID effort in both the Nearshore (Piltun) and Offshore feeding areas will be made from research vessels and from small boats launched from the larger vessels, with frequency and timing dependent on weather and work schedules. Effort near shore has routinely been supplemented in recent years with the use of UAVs but it was not made clear at this meeting whether the use of UAVs this would become 'standard' method for efforts offshore. All of these activities will be conducted during the summer-autumn feeding season.

When asked to clarify how and when the Panel's advice might be considered in Joint Programme planning, Samatov stated that a trilateral agreement among the three companies (ENL, Sakhalin Energy and GPNS) on data sharing was being negotiated and that some aspects of implementation of the various elements in the Scope of Work would be subject to discussions at the annual Joint Programme winter meeting. He added that it would still be possible to consider advice concerning observation methods.

Samatov also said that following discussions at the NTF-17 meeting earlier in the week, Sakhalin Energy was seriously considering the resumption of annual acoustic monitoring, but that if it did so, this would not be as part of the Joint Programme. He confirmed that a resumption of benthic studies under the Joint Programme was not planned for 2020 although he said that ENL had been collecting data on the benthos at Piltun. GPNS has also collected environmental data in the Offshore feeding area (see item 6.5.4).

The Panel was pleased to learn that Sakhalin Energy was seriously considering resumption of regular acoustic monitoring and offered to help with the planning. It also again stressed the importance of benthic monitoring and was encouraged to learn that some benthic data had been collected by other companies in recent years. The Panel hopes that these benthic data will be analysed in a such a way that trends in amphipod biomass that were revealed by previous Joint Programme work can be extended temporally beyond 2017.

Dotsenko (GPNS) informed the Panel that his company's budgeting process took place in the summer, and that it was now too late to influence planning for 2020. From his perspective, it would be best if the three companies in the Joint Programme could plan their activities for 2021 in the first quarter of 2020.

On the subject of incorporating photogrammetry into the photo-ID effort, Samatov said that the companies recognized the value and feasibility of this and were considering it as an option. Weller reminded that the PHIDNTTF had reviewed the possibilities extensively at its meeting in April 2019[8]. Given that the companies are now flying UAVs frequently over gray whales for photo-ID purposes in the Nearshore (Piltun) feeding area, assessment of body condition would be a valuable addition to the research programme. Similarly, adding UAV photogrammetry to work in the Offshore feeding area which would facilitate the comparison of body condition between whales observed in the two feeding areas as a proxy for relative prey availability and quality. Vedenev pointed out that the companies should be able to add this element without requiring additional permits. To photogrammetry to assess and compare gray whale body condition, an important first step in data collection would be to either (1) add a laser altimeter to the UAV (Dawson et al. 2017) or (2) a known-length calibration object on the water during each UAV overflight (Burnett et al.

[8] See the PHIDNTTF-1 report at https://www.iucn.org/sites/dev/files/phidnt1_report_final.pdf.

2018). Both of these methods would facilitate conversion of pixel lengths measured in images to metric units. With or without either of these approaches, the scale-invariant metric of Body Area Index (as discussed in the PHIDNTTF-1 report) can be calculated for whales to allow comparison of body condition across individuals, time periods, and portions of the population (Burnett et al. 2018, Lemos et al., accepted).

6 ADDRESSING CUMULATIVE IMPACTS ON THE SAKHALIN SHELF AND RANGE-WIDE

6.1 Key anthropogenic threats (including risks, pressures and stressors) identified in the IUCN-IWC draft Conservation Management Plan for western gray whales

The actual and potential key threats (interpreted to include risks, pressures and stressors) to western gray whales were identified and discussed in the latest draft of the IWC-IUCN Conservation Management Plan for Western Gray Whales (hereafter referred to as the CMP).

Weller summarized the key anthropogenic threats identified in the CMP, roughly in descending order of likelihood and severity, as a way of introducing the subject of range-wide cumulative effects. These are as follows:

- Entanglement in fishing gear, especially set nets but also a wide variety of other types of gear (see Lowry et al. 2018);
- Vessel strikes;
- Noise;
- Contamination of prey;
- Direct exposure to oil;
- Physical disturbance of prey;
- Physical moderation of the coastal zone.

The issue of climate change is not listed as an anthropogenic threat, per se, but it certainly has the effect of changing the "landscape of exposure" of gray whales to the various threat sources, both lethal and sub-lethal.

It was noted that the version of the CMP currently available on the WGWAP website is long out of date. Weller explained that completion and publication of a final revised version has been delayed pending a stakeholder workshop to be co-organized by IUCN and the IWC. There is a standing invitation from Japan (and alternatively the United States) to host such a workshop, where, ideally, the CMP would be finalised and formally endorsed by representatives of the range states as well as at least some of the other key stakeholders (e.g. fishing industry, shipping organizations, NGOs).

6.2 Recent observations of gray whales in the western North Pacific outside Sakhalin including Kamchatka

Vladimir Vertyankin has been conducting gray whale observations and photo-ID work in the northern part of Kronotsky Gulf, eastern Kamchatka, since 2002. Through 2018, the Kamchatka catalogue included 173 individuals, of which 94 were also included in the Sakhalin catalogue.

During three photo-ID boat surveys in 2019 (25 June, 29 June, 2 July), Vertyankin photographed 41 whales, including re-sightings. Two additional whales were photographed opportunistically. In total, 30 individuals, including 4 mother-calf pairs and 2 unaccompanied calves, were photo-identified. All mother-calf pairs and unaccompanied calves were later seen off Sakhalin. Out of the 30 whales identified off Kamchatka in 2019, 14 had been photographed in Sakhalin waters in previous years.

In a joint (see 3.4. Russia Gray Whale Project) monitoring survey along the coast of Kronotsky Gulf on 23 June, 19 gray whales were encountered, of which only 7 were classified as adults. Approximately 65% of the gray whales encountered were judged to be sexually immature.

As mentioned under item 3.4, recent observations suggest a southward shift in gray whale distribution. Adult whales appear not to spend considerable time in Olga Bay as they did in the past; instead, most individuals sighted in the area nowadays are young. Vertyankin suggested that the benthos in the northern part of Kronotsky Gulf may no longer provide food to attract adult gray whales.

Nowacek provided an update on acoustic records obtained in the East China Sea by the US Navy's Integrated Undersea Surveillance System Marine Mammal Monitoring program (see WGWAP-17 report, item 2.2). The program regularly detects a 55 Hz frequency sweep from what are believed to be gray whales. The pulses are of short duration and exhibit a pattern of multiple harmonics with the first harmonic being very weak. The second and third harmonic are usually the strongest. The sweep is approximately one second in duration and is often emitted in pairs or triplets, with an inter-sweep interval of approximately 3-4 sec. While these vocalizations do not match exactly the sounds recorded from gray whales in the eastern North Pacific, they are more similar to gray whale calls than to known calls of any other mysticete species. Several experts, including Regina Guazzo, formerly at Scripps Institute of Oceanography and now an analyst with the US Navy, have confirmed that these are more likely to be gray whales than any other species.

The 55 Hz sweeps are not very strong and have a limited range of detection. Up to 11 individual gray whales have been detected in a two-hour period. Normally the animals are detected singly or in small groups of two or three. They swim very slowly, generally moving south in the autumn and north in the spring. Since first identified in 2011, the pulses have been detected only when there is a Surveillance Towed Array Sensor System vessel operating in a large area from September to March (see Figure 2 in WGWAP-17/INF.6). While gray whales are still being seen off Sakhalin in September, Cooke pointed out that, based on photo-ID data, many juvenile whales 'go missing' at Sakhalin for several years.

The Navy, via colleagues at Marine Acoustics, Inc., has released an actual sound file from one of these recordings, which is a key step forward as this file can be used to build detectors to be run on audio files from Sakhalin and other locations. This file has already been shared with colleagues from China who have agreed to search their acoustic data for matches. Also, Nowacek indicated that the file could and would be shared with Rutenko for the same use with the extensive POI audio data.

6.3 Unusual mortality event (die-off) of gray whales in eastern North Pacific

An uptick in observations of dead gray whales began along the coasts of Mexico, the USA and Canada in January 2019 and, as reported to the meeting by Weller, the number of strandings by the beginning of November already exceeded the number recorded in any of the previous 18 years. The die-off has been declared an 'unusual mortality event' (UME), which has a particular meaning

in the US marine mammal conservation management context. It began in January in Mexico and unusual numbers of strandings continued to be observed along the entire migration route as the animals moved northward. By the first of October, 212 gray whale deaths had been documented, and unusual numbers of whales in poor body condition were still being observed. An effort is being made, led by the National Oceanic and Atmospheric Administration (NOAA), to collect samples and conduct necropsies on as many of the dead whales as possible. Also, NOAA continues its program of population monitoring using calf production and abundance as trend indices.

This UME is reminiscent of that in 1999-2000 when it was estimated that close to a quarter (approximately 6,000 whales) of the entire eastern North Pacific gray whale population was lost (based on modelling that accounted for carcasses that sank or drifted away without being observed). The population recovered relatively quickly from that die-off and had reached the highest level of abundance (around 27,000 in 2016) before the present die-off began. Unfortunately, the exact cause or causes of the 1999-2000 die-off were never determined.

Weller asked participants to comment on whether they had noticed or heard about any differences in body condition of the whales at Sakhalin in 2019 compared with other years. Tyurneva stated that whales appeared 'normal', with many individuals arriving in poor condition as is typical but with condition improving as the season advanced. Samatov added that more gray whales were photo-identified at Sakhalin (both feeding areas, combined) in 2019 than in 2018. Vertyankin reported that he had seen an emaciated whale in Kamchatka last summer (2019) but was unable to obtain a useable photograph.

Samatov asked whether all of the stranded whales that had been examined in North America in 2019 to date belonged to the eastern population. Weller indicated that many of the carcasses were too decomposed for photographic matching and that tissue samples had not yet been analysed for genetic comparisons, but such analyses would be carried out in due course. In response to a question about the age classes of the stranded whales, Weller said that in 1999-2000, more than 40% of the documented mortality of whales of known length or age consisted of adults. In 2019, it appeared as though a high proportion of the mortality consisted of young animals, but Weller cautioned that it was too early to say for sure.

When asked whether there were concerns about the quality of the whales' habitat, Weller said that he was unaware of any known concerns at this point, adding that two equally plausible hypotheses are being considered: firstly that the whales' prey base has changed, and secondly that the population is simply showing a density-dependent response to being at, or close to, the environmental carrying capacity.

Torres mentioned that in her study area along the Oregon (USA) coast, she had noticed from UAV footage that the body condition of the gray whales there was consistently very good in 2016 but poor every year since. She suspects that there is a correlation between the body condition of gray whales (at least those in her area, many of which are part of the Pacific Coast Feeding Group) with patterns of offshore upwelling (Lemos et al., accepted). Torres also took the opportunity to point to this as an example of the informative results that can be obtained from using UAVs to assess body condition (see report of the Photo-ID/New Technologies Task Force).

6.4 Russian policy landscape

6.4.1 Federal level

In the absence of Svetlana Sheynfeld, Head of the Department for Support and Implementation of the new federal project 'Biodiversity Conservation and Development of Ecotourism' as a part of

the National Project 'Ecology' 2019-2024 (Ministry of Natural Resources and Environment of the Russian Federation, MNR) on the day when this agenda item was addressed, Samatov provided a brief summary of the Business and Biodiversity Initiative which she (Sheynfeld) leads and this was supplemented by the following summary from Berzina-Rodrigo.

The project on 'Mainstreaming Biodiversity into Russia's Energy Sector Practice and Policy' of the United Nations Development Programme (UNDP) / Global Environmental Facility (GEF) / MNR was completed in early 2017, setting the foundation for what is generally referred to as the federal Business and Biodiversity initiative, or programme. In May 2019 a Business and Biodiversity Working Group (BBWG) was approved and established by order of MNR aimed at fulfilling the tasks of the federal project 'Biodiversity Conservation and the Development of Ecotourism' as a part of the national project 'Ecology' 2019-2024[9]. Sakhalin Energy is a member of this working group. Two meetings of the BBWG were held in 2019 on how a number of industries affect biodiversity, as well as development and approval of a workplan. Representatives of about 20 major Russian companies took part in these meetings, all of them expressing readiness to support environmentally significant projects that help to reduce the negative impact on biodiversity in cooperation with government agencies and public organizations. These meetings also underscored the 'significance of accomplishments' of earlier programmes in the Arctic and cited the need to recognise corporate-level biodiversity programmes. The Business and Biodiversity Conference, organized by MNR in collaboration with the Russian Geographical Society and ANO "Expocenter 'Nature Reserves of Russia'" in the framework of the Russian federal project 'Conservation of Biological Diversity and Development of Ecotourism' as a part of the national project 'Ecology' 2019-2024, was set to take place in Moscow on 11 November, immediately after the close of this Panel meeting. The conference was intended to introduce the goals and main purposes of the Business and Biodiversity initiative to the broader audience as well as provide a forum for discussion of its activities in relation to the conservation of biodiversity within the environmental management systems of commercial organizations and the potential for synergy between the activities of commercial organizations and the goals, targets and objectives of the Presidential Executive Order No. 204 on National Goals and Strategic Objectives of the Russian Federation through to 2024 (dated 7 May 2018). Federal and regional state agencies, commercial organizations that participate in the Russian Business and Biodiversity initiative, non-commercial and civil society organizations, as well as international experts were invited to participate in the conference (including Sakhalin Energy and IUCN to share the WGWAP experience). The workplan of the initiative for 2020 includes collaboration and participation of Russian businesses at IUCN events.

6.4.2 Sakhalin Oblast level

Tsarenko gave a presentation on activities at the Sakhalin Oblast level, focusing on the work of the Biodiversity Expert Working Group (BG) under the Sakhalin Oblast Interdepartmental Environmental Council. The BG is chaired by a representative of the Ministry of Natural Resources and Environmental Protection of the Sakhalin Oblast; Tsarenko serves as Coordinator. Membership includes governmental agencies, scientific organizations, NGOs and oil and gas companies. Two meetings have been held since WGWAP-19 – one in November 2018 and one in May 2019.

[9] See, for example:
http://www.mnr.gov.ru/press/news/v_minprirody_rossii_v_ramkakh_realizatsii_natsproekta_ekologiya_sostoyalos_pervoe_zasedanie_rabochey/;
http://www.mnr.gov.ru/press/news/utverzhdena_dorozhnaya_karta_initsiativy_biznes_i_bioraznoobrazie_na_povestke_dnya_sozdanie_ekspertn/;
http://mnr.gov.ru/press/news/natsproekt_ekologiya_voprosy_sokhraneniya_biologicheskogo_raznoobraziya_vykhodyat_na_novyy_uroven_go/

The subject of monitoring and mitigating the potential impacts of seismic surveys on gray whales was on the agenda of both meetings. A resolution of the November 2018 meeting specifically recommended the use of predictive modelling as a mitigation tool to deal with periods of low visibility during seismic surveys. The resolution also recommended that the companies (ENL, Sakhalin Energy and GPNS) "present a multi-year overview of marine mammals monitoring results." When asked if this overview had been presented at either meeting, Tsarenko stated that the recommendation had been proposed by Sakhalin Environment Watch and its 'implementation' was expected to be achieved through the publication of papers on various elements of the Joint Programme.

Vedenev noted that the November 2018 BG meeting had resolved to request that the Ministry of Forestry and Sakhalin MNR approach the Russian Federation MNR with an initiative to include Sakhalin taimen (*Hucho taimen*) research and preservation in the national project Ecology, and he asked why Sakhalin MNR had not done the same for western gray whales. Samatov explained that because the gray whale is a marine species, it falls solely within federal jurisdiction. In contrast, the taimen is found in rivers and therefore falls within the remit of the oblast. Tsarenko added that the BG has been less concerned about the Sakhalin gray whales because they are being monitored whereas the taimen populations (of which seven are recognized on Sakhalin) are not well monitored and their conservation is correspondingly more complex. The taimen is listed as Endangered in the Russian Federal Red Book but requires management engagement at the oblast level.

6.5 Activities of GazpromNeft-Sakhalin

As mentioned earlier, representatives of GPNS attended this meeting as Observers and kindly provided information on the company's activities in 2019. The results of gray whale monitoring during the GPNS seismic survey of Ayashsky block (see Map 2 for location) are summarized under item 2.4. Other activities by GPNS are described below.

6.5.1 Overview of environmental monitoring during the construction of GazpromNeft-Sakhalin's well "Ayashsky No. 2" in 2019

The main objectives of this effort were as follows:

- collate and review existing data and produce a brief baseline environmental and ichthyological evaluation;
- conduct field surveys of environmental components within the license area;
- assess the current state of the environment and the dynamics of observed characteristics in comparison with historical data;
- make recommendations on how to mitigate the impacts of exploration drilling operations on the environment.

The basic set-up involved 14 environmental monitoring stations (including trawling). A scientific research vessel, *Geophyzik*, with a team of 14 experts carried out the monitoring from 26 July to 5 August. Another scientific research vessel, *Dmitry Peskov*, with a scientific team of six specialists, performed ichthyological trawls during 13-15 August. Field surveys included meteorological studies, assessment of atmospheric pollution, hydrological studies, determinations of water quality and bottom sediments, ichthyological studies and observation of marine mammals and birds.

6.5.2 Industrial environmental control during construction of Ayashsky Well No. 2 in 2019

This work was carried out on a mobile floating drilling rig and in waters around it. The main objectives were the same as above for environmental monitoring.

The basic set-up included four marine stations, each located 500 m from the drilling point and one 'background' station at a distance of more than 5 km from the drilling point.

Four surveys were conducted during the drilling season from 20 June to 26 October: five experts operated aboard a multi-purpose emergency rescue vessel, *Spasatel Kavdeikin*, prior to the start of exploration drilling, during the drilling, during well testing and upon completion of drilling operations. These surveys included the same elements as listed above for the general environmental monitoring. Regarding marine mammals, three surveys resulted in 339 sightings, with gray whales predominant.

6.5.3 Monitoring for gray whales and other marine mammals

The GPNS gray whale monitoring effort in the Offshore feeding area in 2019 was conducted from 19 June to 7 October using *Siem Sapphire* for transect surveys and as the mother-ship for photo-ID and hydrobiology work. Onboard observers had drones but apparently these were not fit for purpose (safety considerations, sensitivity to navigation system, frequency interference) and therefore no useful aerial images were obtained.

There were 474 sightings of 1864 marine mammals including 286 sightings of gray whales (1,414 individuals including repeats). Foggy conditions prevailed for much of the time. The photo-ID effort involved 58 ‘missions’ from both the mother-ship and rigid hull inflatable boats, with 551 sightings of gray whales yielding >30,000 photos. In addition to gray whales, 22 fin whales and five North Pacific right whales were sighted – at least some of these made from crew change vessels.

Three hydrobiological surveys were carried out and 75 phytoplankton samples and 50 zooplankton samples were collected, with CTD casts conducted to record depth, temperature, salinity and fluorescence.

Torres thanked Dotsenko for an informative presentation and asked what kind of UAVs were used that failed. Dotsenko was unable to recall but said he would provide this information to the Panel later.

Weller asked whether fishing activities in the area covered by the surveys had been recorded, as recommended by the Panel at last year’s meeting (recommendation WGWAP-19/23). Dotsenko recalled agreeing to provide such information but nothing on fishing activities was reported.

When asked for clarification as to whether the presentation by Samatov on preliminary results of Joint Programme work in 2019 (item 3.3) included what was presented under this item by GPNS, the answer was affirmative. However, Samatov explained that only data on the overall field effort was presented and he pointed out that all data acquired in 2019 would be subject to review, analysis and reporting only after a data-sharing agreement has been reached among the three companies (ENL, GPNS and Sakhalin Energy).

Dotsenko described a software package developed by GPNS for automated digital recognition of individual whales in photographs and showed a video demonstrating the application of this software to match gray whale flukes. Samatov reported that Sakhalin Energy had begun developing similar software in collaboration with Tyurneva.

In closing, the Panel again emphasised the scientific value of any photographs of right whales and asked that GPNS share such images with the Panel for broader scientific purposes, with appropriate permissions for use, as has been done in the past.

6.5.4 Benthic sampling and acoustic monitoring

At the Panel's request, Roman Turchin (GPNS) provided a brief presentation on the benthic sampling that was carried out as part of his company's environmental monitoring programme mentioned above under items 6.5.1 and 6.5.2.

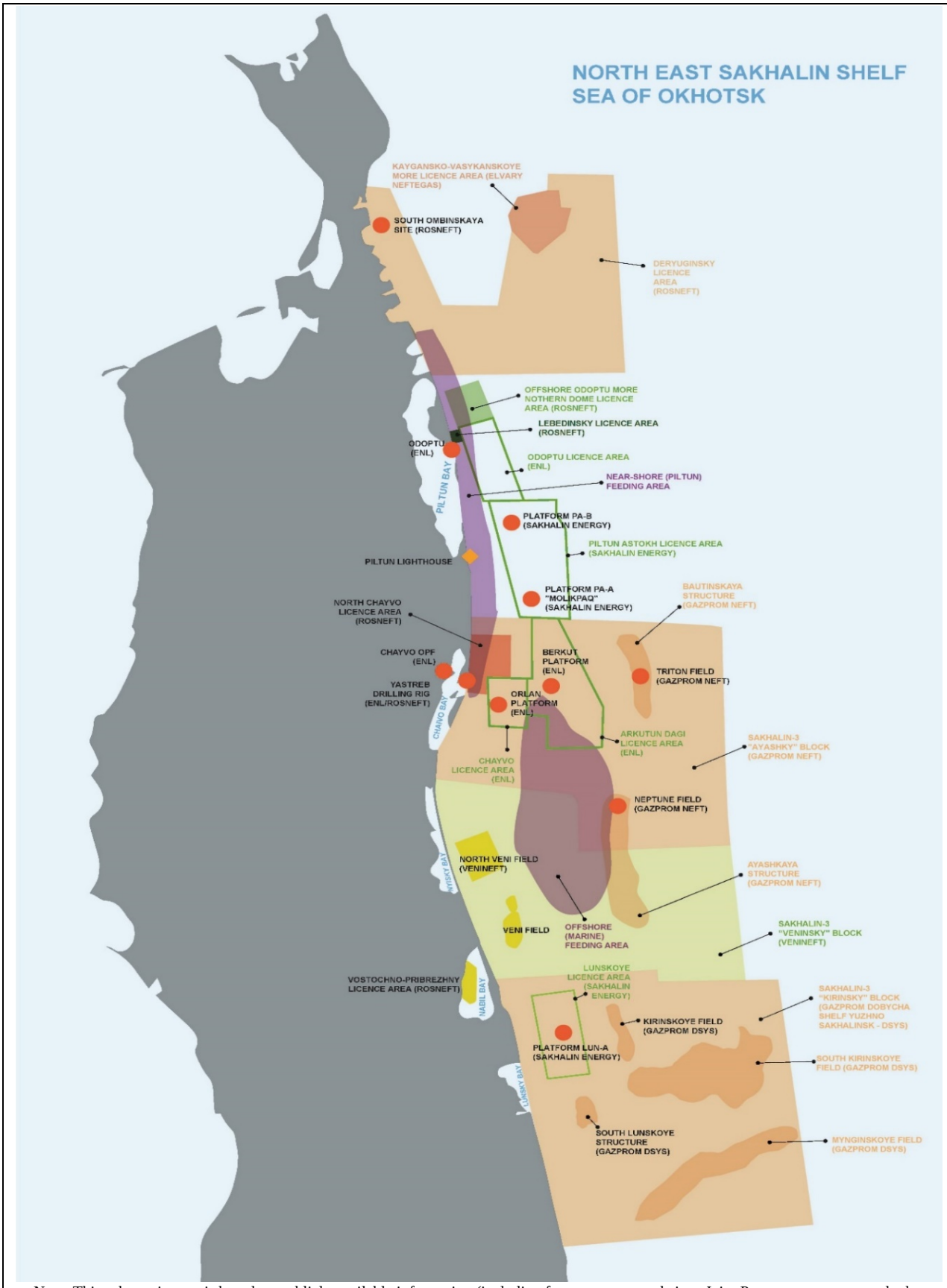
Torres thanked Turchin and encouraged all participants in the Joint Programme to continue monitoring the same sites in the same way year after year, noting that standardization and continuity enhance the value of time-series. Nowacek added that the situation at Piltun where sampling stopped at what appears to have been a critical point in regard to the declining trend in benthic biomass provides an example of what should *not* happen. He also drew attention to the difficulty of assessing carrying capacity without good time-series of data on prey species.

Vedenev asked if GPNS had plans for acoustic monitoring only during years with seismic surveys or on an annual basis. Turchin replied that this was yet to be determined. If the company decides to proceed with development of its field or fields, there will be a full-scale monitoring programme in place, following the models of Sakhalin Energy and ENL. He emphasized that plans are uncertain at this stage, and he pointed out that GPNS lacks flexibility because of its 18-month budgeting cycle. On the assumption that GPNS will rely heavily on acoustic modelling for its seismic survey mitigation plans, Racca stressed the importance of knowing the hydrological profile of the seabed in order to parametrize the models accurately.

6.6 IUCN overview of 2019 activities and future plans of other operators on Sakhalin Shelf

At the Panel's request, Berzina-Rodrigo presented a short overview of 11 oil and gas projects (including Sakhalin-2 operated by Sakhalin Energy) that are located off north-eastern Sakhalin in, partially overlapping, or near gray whale feeding areas, as well as other projects off eastern Sakhalin relevant to addressing broader cumulative impacts on the shelf not only to gray whales but also other marine mammals (doc. WGWAP-20/27; see also Map 1 below). As for previous meetings, she used information available in the public domain (such as company websites, tenders, press releases and news media) and summarized for each project: operators and participants, current stage and existing assets or infrastructure, key activities in 2019 (or new information that has recently become available) and plans for 2020 and beyond (also see WGWAP-19 report, item 10.1.3).

Projects that are in a production mode include Sakhalin-1 across its three blocks – Chaivo, Odoptu and Arkutun Dagi, all operated by ENL (which was invited but declined participation in this meeting). In 2019, ENL carried out seismic surveys, however, no further information on details was available in the public domain. According to news media, the Production Sharing Agreement between the Russian Government and ENL was extended until 2051. Sakhalin-1 shareholders have decided to proceed with construction of a liquefied natural gas (LNG) plant in the village of De-Kastri, Khabarovsk Territory, near the existing Sakhalin-1 oil terminal connected to the pipeline system coming from Sakhalin. This plant could be commissioned in 2027, subject to government approvals, global LNG market trends and other factors. The plan includes reconstruction of existing Chaivo facilities, drilling additional wells, updating or expanding onshore and offshore facilities, as well as construction of a new gas pipeline from the Chaivo gas pipeline to the village of De-Kastri within an existing pipeline corridor.



Note: This schematic map is based on publicly available information (including from company websites, Joint Programme reports and other sources) and it is included here only for illustrative purposes. 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.

Map 2. 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.

Rosneft (which has also been invited to WGWAP meetings but not yet attended) continued production via its subsidiaries at the Lebedinskoye and Offshore Odoptu-More (the Northern Dome) fields (both located in or partially in the Piltun feeding area) as well as at North Chaivo (located in southern part of the nearshore (Piltun) feeding area). In addition, one production well was drilled and commissioned in 2018 to maintain oil production at the Offshore Odoptu-More field according to the company's Annual Report 2018 (published in 2019).[10] That report further highlights that Rosneft is the largest licence holder on the Russian continental shelf and the largest production projects with Rosneft involvement are those off Sakhalin: Sakhalin-1 (as a part of the ENL consortium) and North Chaivo.[11] It is clearly critical to maintain dialogue and explore options for engagement with Rosneft and its partners in order to address cumulative impacts on the Sakhalin shelf.

Gazprom Dobycha Shelf Yuzhno-Sakhalinsk, LLC, a subsidiary of Gazprom, operates the Kirinsky gas and condensate field of the Kirinsky block (Sakhalin-3) on the eastern Sakhalin shelf. It is the only field on the Russian continental shelf where hydrocarbons (gas in this case) are extracted by a subsea production facility without any platforms or offshore structures. The main feature of this facility is a manifold installed at 90 m depth. The manifold is composed of several high-pressure pipelines laid on the same platform and connected according to a particular scheme. Hydrocarbons are extracted, collected via the manifold, and delivered to onshore processing facilities via a pipeline.

Regarding new information on projects that are in an exploration or pre-development phase, the 2018 Rosneft Annual Report published in 2019 confirms that in 2018, Rosneft completed 700 km of 2D and 50 km^2 of 3D seismic surveys at the Deryuginsky license area on the Sakhalin shelf, "exceeding the scope that is stipulated by its license obligations".[12] In September 2019 Rosneft subsidiary RN-Shelf-Arctic presented plans to begin exploratory drilling at the Deryuginsky site in 2021, with the first exploration well of Yuzhno-Ombinskaya-1 to be drilled from shore to a depth of 6 km. Preparations for drilling are underway.[13]

In September 2019 RN-Shelf-Arctic also confirmed that preparation for offshore appraisal/exploration drilling at its Kaygansko-Vasyukanskoye Sea field (operated by Elvary Neftegas, owned by Rosneft) was ongoing. The company stated that it was preparing surveys and conceptual designs for development of this field, which will require new technologies given its location far offshore.[14] No further details on the timeline were available.

It was previously reported that drilling and pipeline construction (12.5 km) would begin in 2019 at Venineft's North-Veninskoye (Sakhalin-3) gas production project (a joint venture between Rosneft and Sinopec), however, no information on status of these plans was available.

Following seismic surveys completed in previous years and drilling of the first well in 2019, Rosneft discovered oil and is considering production at its Vostochno-Pribrezhny license area, located in Nabil Bay, eastern Sakhalin. Although this site is distant from the main gray whale feeding areas, it is very near where the Panel previously encouraged the Joint Programme to consider re-locating a control site for noise monitoring. It now seems unlikely, given the increasing industrialization of the Nabil Bay area, that it will any longer have the quiet, undisturbed conditions required for a control site.

[10] See https://www.rosneft.com/upload/site2/document_file/a_report_2018_eng.pdf.
[11] Ibid.
[12] Ibid.
[13] See http://www.interfax-russia.ru/FarEast/main.asp?id=1067529.
[14] Ibid.

In the Rosneft Sustainability Report 2018 (also published in 2019)[15], the company listed species, including the gray whale, with habitat in areas affected by its operations. It states, "the Company analyzes its impact on [these] species and seeks to mitigate it."[16] The same report explains, "Rosneft performs environmental monitoring in the Russian Arctic and the Far East, including marine mammal observations from ships of opportunity. The main objective of monitoring is to supervise those activities aimed at minimizing the environmental impact and to obtain information on the marine mammal distribution in the region of operations. The observations check the general trends and basic rules of distribution and species diversity of marine mammals known from the previous studies. In 2018, the research conducted in the Deryuginsky license area in the Sea of Okhotsk registered 557 marine mammals of six species: orca[s] [killer whale], minke whale, [Steller] sea lion, largha [spotted] seal, northern fur seal, and beluga whale. No incidents with marine mammals were recorded during the observations, and there were no cases of work suspension due to the detection of marine mammals in the safety zone." No further information or results of the research and monitoring activities, or of analyses of data from this and other Rosneft fields, are available in the public domain, other than the information included in the Atlas of Marine Mammals in Russia's Arctic and Far East, produced by Rosneft's Arctic Scientific Centre (see WGWAP-19 report, item 10.1.3).

Within Sakhalin-3 Kirinsky block, Gazprom Dobycha Shelf Yuzhno-Sakhalinsk, LLC continued commercial pre-development of the Yuzhno-Kirinskoye gas, condensate and oil field (discovered in 2010, and described as one of Gazprom's biggest offshore fields, where geological exploration has been completed and the drilling of production wells commenced in 2018, aiming to start production in 2023). The block includes two more gas and condensate fields – Mynginskoye discovered in 2011 and Yuzhno-Lunskoye field discovered in 2016.

6.7 Update on fishing and cruise ship visits to Piltun area

6.7.1 Set-net fishing for salmon at Piltun

Alexander Somov (VNIRO) reported that no commercial salmon set nets were deployed in the Piltun area in 2018 or 2019. This is consistent with the fact that IUCN received no reports of observations of such fishing activity from company or NGO sources in either year.

6.7.2 Cruise ship activities

Berzina-Rodrigo (with support from Diarra) summarized information on advertised cruises to Piltun Bay/Lagoon and other parts of the Sea of Okhotsk in 2019-2021 that specify gray and other whales as attractions (see updated document WGWAP-20/34). These were: (i) June-July and August 2019 and 2020 (Kamchatka), June 2020 and October 2021 (Piltun) by Heritage Expeditions[17]; (ii) June 2019 and 2020 (Piltun) by Silversea Cruises; (iii) August 2020 and October 2021(Piltun) organized by National Geographic Journeys in partnership with Ponant Cruises; and (iv) June 2020 (Piltun) by Baikal Nature, a Russian company (whose website indicates that this particular cruise took place in 2018).

[15] See https://www.rosneft.com/upload/site2/document_file/Rosneft_CSR18_EN_Book.pdf

[16] See Annex 1. GRI Standards Compliance Index, section "Biodiversity" and sub-section "IUCN Red List species and national conservation list species with habitats in areas affected by Operations" at https://www.rosneft.com/upload/site2/document_file/Rosneft_CSR18_EN_Book.pdf.

[17] During the August 2019 cruise at least 30 feeding gray whales were observed in shallow waters just north of the mouth of the Peeka River (река Пика) in the north-western Bering Sea. During another cruise between 17 and 36 gray whales were observed off eastern Kamchatka. See document WGWAP-20/34 for links to trip reports and the full list of species observed on each occasion.

Berzina-Rodrigo again emphasized that although it was clear that visits to the Piltun area, specifically to observe gray whales, and other areas of Sea of Okhotsk continued to be advertised, it was not always possible to determine whether the cruises actually occurred or would occur in the future (unless a trip report is published).

The subject of local whale-watching excursions at Piltun was raised for the first time. Shpak shared second-hand reports that these occur occasionally and involve small vessels that mainly carry local people. Samatov noted that visits by the large cruise ships are reliably noted and reported to the Joint Programme companies if they occur during the whale monitoring season but that it is not always possible to identify the smaller local boats or to determine whether they are being used for whale-watching.

It was suggested and agreed that IUCN should follow-up on previous contacts with cruise-ship operators (especially the on-board naturalists) to request copies of photographs of gray, as well as right and bowhead whales, with information on dates and locations. It was also suggested that efforts be made to learn more about the smaller local vessels – any information should be passed along to IUCN.

6.8 Importance and value of addressing cumulative effects

New and Cooke presented the report of the CETF-1[18] and document WGWAP-20/28 which proposes a framework for putting the Panel's advice into a cumulative effects context.

In order to fulfil its mandate, the Panel needs to determine the level of impacts that would be consistent with the conservation of western gray whales. This requires that impacts be assessed individually as well as in the context of the sum total of all impacts on the population, because all operators and sectors have to 'share' among themselves the responsibility for ensuring that population's finite capacity to withstand impacts is not exceeded. To evaluate cumulative effects, it is necessary to understand the biological status and dynamics of the western gray whale population, how close the cumulative impact is to the maximum sustainable impact, and the relative contributions of the different stressors.

The Task Force recommended use of the definition of cumulative impacts given in the IFC's 'Good Practice Handbook on Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets':

> "*those that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as 'developments') when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities."*

Cumulative effects on gray whales include both lethal events, such as fatal strikes by vessels, entanglements or ingestion of foreign materials (e.g. plastics); and sub-lethal effects, such as disturbance that can reduce feeding rates or increase stress levels and energy expenditure, chronic ingestion events, contamination and habitat degradation. The cumulative impact is the sum total of all the impacts of all these threats on the population.

[18] See the CETF-1 report at https://www.iucn.org/western-gray-whale-advisory-panel/panel/task-forces/cumulative-effects-task-force

In the WGWAP context, the relevant effects include those resulting from (i) Sakhalin Energy's activities, (ii) other operators' activities within the oil and gas sector and (iii) activities in other sectors, such as fisheries, tourism, research and shipping (vessels in transit). Effects may also arise from coastal development (including that secondary to the oil and gas sector) and alterations to habitat, especially lagoons, estuaries, beaches and coastal shallows.

Document WGWAP-20/28 proposes that WGWAP apply a triage to potential or existing threats and impacts, assigning each of them to one of three risk categories:

- **High**: These threats and impacts must be addressed, regardless of what other activities or actions may be taking place;
- **Medium**: These threats and impacts do not necessarily require action when considered in isolation but do need to be included in a cumulative impact assessment. If the total cumulative impact exceeds the threshold of what has been deemed acceptable, these threats and impacts will require mitigation;
- **Low**: These threats and impacts are of little concern at the current time and need not be included in a cumulative impact assessment, but should be monitored and revisited if there is reason to expect they have increased.

Assignment of threats to the Medium category, and judgment of when mitigation of Medium-level threats is required, entails consideration of conservation objectives, such that it is possible to define an overall degree of impact that is not expected to preclude meeting these objectives can be defined. For western gray whales, their historical abundance is thought to have been much higher than current levels. An acceptable total impact level is one that would not prevent or substantially slow recovery in both abundance and range.

An example of a medium-level threat to gray whales on the Sakhalin shelf is injury and mortality from strikes by high-speed vessels, where the Panel has estimated that the current risk is non-negligible, but the impact is likely sustainable (see item 4.3). This threat should be included in a cumulative effects assessment, and mitigation considered if the overall cumulative threat level from all sources rises due to the occurrence of additional activities with the potential to affect the whales.

The steps required to implement the cumulative effects framework include:

- list threat types (e.g. noise, vessel traffic, habitat alteration);
- create an inventory of activities relating to each threat;
- quantify exposures to each activity;
- quantify impact on gray whales (survival, reproduction);
- incorporate into population assessment;
- assess in the context of conservation targets.

It was recognized that quantification of some threats will be very approximate, but at least a rough quantification should be attempted in each case, so as not to waste time on threats with negligible impacts.

In discussion, it was asked whether natural threats should be included. The authors of document WGWAP-20/28 explained that these are normally treated as background noise, which is included in population assessments. Its inclusion reduces the estimated resilience of a population, and hence lowers the estimated total cumulative anthropogenic impact that is compatible with conservation objectives. It was noted that the assessment of carrying capacity, and hence of the scope for population recovery, needs to take account of both natural and anthropogenic factors, including climate change.

6.9 Approaches for developing a cumulative effects framework

In her introductory comments, Carbone Khodabakhsh noted that WGWAP has focussed on activities of the oil and gas extraction industry but stressed that many other 'actors' and processes, including climate change, must be considered in a cumulative effects framework. She added that the framework needs to (i) identify all major sources of pressure or stress on the whales and the ecosystems within which they exist, (ii) assign roles and responsibilities to the actors or agencies involved, be they governments, private companies, advocacy groups, entire industries, specific portions of the public (e.g. consumers of a specific type of product), or the public as a whole. IUCN (led by Berzina-Rodrigo, with support from others) had prepared for this meeting a detailed document and an accompanying spreadsheet to inform the discussion on cumulative effects and western gray whales at Sakhalin (see document WGWAP-20/32 for a summary).

A large portion of the afternoon of Day 2 of the meeting was devoted to small-group discussions of the elements to be included in an 'integrated management approach'. Before breaking into small groups, a number of comments and suggestions were provided by those present. One suggestion was that in the range-wide context, it might be advisable to apply an integrated management approach to each portion of the whales' year-round range and each stage of their life cycle, using the CMP as a guide. There was concern, however, that a rangewide approach would be overly ambitious, and participants agreed that it made more sense to start with a relatively familiar area where the ecology of the whales and their exposure to threats (the term usually used when referring to pressures and stresses) are well understood. A plea was made for standardization at every level – from the overall approach to the terminology and metrics used. If stakeholders are using different standards, for example when collecting and presenting data, the possibilities for fruitful cooperation are bound to be unnecessarily limited.

The small discussion groups reported back on questions prepared in advance by Carbone Khodabakhsh and some of their key responses are summarized in Annex 4.

During the wrap-up discussion, Carbone Khodabakhsh made it clear that the point of this exercise had not been to initiate an international multi-stakeholder platform but rather simply to gather input that IUCN could take forward with stakeholders, making use of its network in Russia.

7 WGWAP RECOMMENDATIONS

Berzina-Rodrigo reported that there were currently 621 recommendations in the on-line database (including 'requests' made of Sakhalin Energy or other parties), of which about 25 remained classified as 'Open'[19]. The meetings this week (NTF-17 and WGWAP-20) had resulted in resolution so that some of those can now be 'Closed', but it was recognized that additional new recommendations have been made in this report and they will remain 'Open' at least for the time being.

Reeves noted that an unfortunate and inefficient process had emerged over the past year involving iterative commentaries on the website database by the Panel and Sakhalin Energy on unresolved issues related to the recommendations. It was agreed by all parties that documentation of such exchanges in the 'Response' column of the Recommendations table on the WGWAP website was not constructive and should be discontinued. The proper place for explaining different views and how any differences have or haven't been resolved is in the final reports of the Panel.

[19] See https://www.iucn.org/western-gray-whale-advisory-panel/recommendations

The Panel urges that IUCN, in consultation with the chair (and with other individuals where appropriate), make a practice of cross-checking to ensure that what is recorded in the Recommendations database matches what is stated in each final report of the Panel, at the time it is released.

8 WGWAP WORKPLAN 2020-2021

In developing the WGWAP workplan for 2020-2021, IUCN and the Panel chair considered the possibility that the Panel, at least in its current structure, will not continue beyond 2021. It was assumed that Sakhalin Energy would continue to operate in a steady state through 2021, with no planned activities such as seismic surveys that might be of significant concern for their potential to harm or disturb gray whales. On that basis, the focus of Panel efforts will be on 'legacy' products, e.g. peer-reviewed publications, brochures and 'best' practices guidelines (see below); helping Sakhalin Energy to fulfil its IFC PS commitments with regard to biodiversity offsets to address 'residual impacts' of Company activities on gray whales (item 4.4); ensuring that a unified western gray whale photo-ID catalogue is available under the auspices of the IWC, including updated cross-matching of images through at least 2020 (item 3.3); and continuing to collaborate with the IWC and its Scientific Committee, particularly in relation to the western gray whale CMP and memorandum of cooperation (item 6.1). In addition, the Panel will continue to review results of the Joint Programme; provide advice on relevant research, monitoring and conservation measures; and, in consultation with Sakhalin Energy and other stakeholders, seek to ensure that the large body of recommendations made by WGWAP and its precursor panels have been documented and implemented to the greatest extent possible (item 7). An external evaluation of the entire 15+-year panel process will be conducted by the IUCN Monitoring and Evaluation Unit, beginning in 2020.

The subjects of the aforementioned 'legacy' products planned for completion by the Panel (and collaborators as appropriate) include the following:

- Developing a 'toolbox' of data collection and analysis methods for evaluating impacts of seismic surveys;
- Defining, assessing and monitoring cumulative effects on a migratory marine species, with Sakhalin gray whales as a case study (including simulations to evaluate effectiveness of mitigation measures for seismic surveys);
- Population assessment of western gray whales, including a description of the Cooke model;
- Rangewide policy and management in relation to western gray whales;
- Co-occurrence of gray whales and vessel traffic and qualitative assessment of ship strike risk;
- Brief informational brochures or checklists to serve as 'best practices guidelines'.

The tentative schedule of meetings is as follows:

- Spring 2020 – task force(s) and Small Group on Offsets (item 4.4) (Gland)[20];
- Autumn 2020 – WGWAP-21 and possibly task force(s) and other (Moscow);
- Late spring or early summer 2021 – WGWAP-22 and possibly NTF (to plan MMP for next Sakhalin Energy seismic survey).

[20] At the time of the release of this report in April 2020, in line with guidance from national and international public health authorities to limit personal interaction and restrict travel due to the coronavirus (COVID-19) pandemic, these meetings had been transformed into virtual meetings (series of on-line sessions).

Other events of relevance to WGWAP and stakeholders in 2020 include the IWC Scientific Committee meeting in Cambridge, UK on 10-22 May[21]; the IUCN World Conservation Congress in Marseilles, France on 11-19 June[22]; the IWC meeting in Portoroz, Slovenia on 25 September – 2 October; and the 11th international conference 'Marine Mammals of the Holarctic' in Moscow in late October or early November (dates to be confirmed). Additional events may arise that would benefit from contributions by Panel members, IUCN or Sakhalin Energy but these will be identified and considered ad hoc.

The importance of publicizing WGWAP documents, including the entire array of products (e.g. reports, recommendations, statements, publications) that are and will eventually be available on the IUCN website, was emphasized. It was noted that the most recent IUCN-led ('external') evaluation of WGWAP had recommended that more time and capacity be invested in disseminating and communicating high-quality, science-based information in appropriate ways to targeted audiences. The Panel acknowledged the great work in this regard done to date by IUCN (Berzina-Rodrigo in particular) and encourages that this continue over the next two years.

9 WGWAP-20 CLOSING REMARKS

Masha Vorontsova (IFAW) spoke on behalf of the NGOs (IFAW, WWF-Russia and Sakhalin Environment Watch) that have played a steady, constructive role in the WGWAP process over the past 15+ years. She stressed the value that they assign to this opportunity to witness and contribute to the exchange of information and points of view and to learn about the status of gray whales and the ongoing human activities on the Sakhalin shelf and throughout the range of western gray whales. She made a special point of welcoming the active participation of GPNS and said that she particularly appreciated their openness, which she hoped would continue and be emulated by other companies. Vorontsova regretted the absence of ENL at this meeting but hoped that the company would make an effort to participate in future meetings. She further noted that it was always good to see the Lenders well represented, keeping an eye on developments as they do.

Vorontsova considered the detailed discussions of cumulative impacts at this meeting to be a long overdue but positive development. She found the apparently deteriorating state of benthos in Nearshore feeding area around the mouth of Piltun Lagoon, and the lack of regular benthic monitoring in recent years, distressing. Although 2019 was a bumper year for calves, with around 20 recorded at Sakhalin, the state of the benthos in what has always been the prime area for mother-calf pairs is of great concern.

According to Vortonsova, the Panel's work is rooted in cutting-edge science and this gives it considerable authority. She drew attention to IUCN's upcoming World Conservation Congress, which offers a platform to publicize the excellent reports and publications that WGWAP has generated over the years, whether directly or indirectly. At the same time, she expressed concern about what will happen if the WGWAP programme ends in 2021. The protection and recovery of western gray whales is a joint responsibility of all involved, and the Panel's advisory role, guided and managed as it is by IUCN, has been and will continue to be a key part of this. Vorontsova expressed her sincere hope that it will be possible for the WGWAP process to continue in some form beyond the current term of engagement.

[21] Ibid.

[22] At the time of the release of this report in April 2020, in light of the pandemic, IUCN and the Government of France have decided to postpone the Congress to 7-15 January 2021.

Reeves thanked Vorontsova for her wise words and for the heartfelt way in which she had wrapped up the meeting. He also thanked all participants for their cooperative and patient attitude and their willingness to share information and ideas. This seemed a hopeful sign for a productive year ahead, and possibly beyond.

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11 SUMMARY OF RECOMMENDATIONS AND/OR REQUESTS FROM THE 20TH MEETING OF THE WGWAP

Recommendation Number	Cross-Reference Agenda item	WGWAP Recommendation	Responsible Party/Parties	Target Completion Date	Response from responsible party/parties
ITEM 2 NOISE ISSUES INCLUDING RESULTS FROM SAKHALIN ENERGY'S 2018 SEISMIC SURVEY AND THE COMPANY'S PLANS FOR FUTURE SURVEYS					
WGWAP-20/01	**2.1**	… the Panel **recommends** that Sakhalin Energy complete the analyses [of distribution and behaviour data collected during its 2018 seismic survey], taking full advantage of the Panel's advice (Appendix 1 [to WGWAP-20 report]), and that the Company refrain from presenting its findings on impacts ('impact' vs. 'no impact') to Russian authorities until the analyses are completed.	**Sakhalin Energy**	**As soon as feasible but report back at NTF-18**	
WGWAP-20/02	**2.1**	… the Panel **reiterates it previous recommendation** that Sakhalin Energy resumes and continues annual acoustic monitoring to protect the integrity of valuable data series as well as to ensure compliance with its MMPP [Marine Mammal Protection Plan] commitments... A basic but effective programme consisting of 3-4 automated underwater acoustic recorders deployed by the Pacific Oceanological Institute (POI) in non-seismic years.	**Sakhalin Energy**	**As of 2020 season and onwards**	

Recommendation Number	Cross-Reference Agenda item	WGWAP Recommendation	Responsible Party/Parties	Target Completion Date	Response from responsible party/parties
ITEM 3 PROGRAMMES ON GRAY WHALE RESEARCH AND MONITORING IN 2018 AND 2019 & ANNUAL POPULATION ASSESSMENT					
WGWAP-20/03	**3.1.4**	The Panel **recommends** that a proper multi-year analysis of all the abundance and distribution data be conducted, taking account of survey timing and effort, platform characteristics, observer capacity and environmental conditions, so that definitive conclusions can be drawn regarding trends in gray whale abundance, by area. The most appropriate analysis involves fitting a spatio-temporal density model to the sightings and effort, so that all data can be used, regardless of gaps in coverage.	**Sakhalin Energy**	**WGWAP-21**	
WGWAP-20/04	**3.2.2**	In light of the value of the photo-ID data time-series from both the Joint Programme and RGWP [Russia Gray Whale Project], the Panel **reiterated** its longstanding **recommendation** that this effort [to photo-identify the presence and dynamics of mother-calf pairs and individuals in Nearshore (Piltun) and Offshore feeding areas] continue by both parties into the future.	**Sakhalin Energy with its Joint Programme partners and Russia Gray Whale Project/IFAW**	**2020 season onwards**	

Recommendation Number	Cross-Reference Agenda item	WGWAP Recommendation	Responsible Party/Parties	Target Completion Date	Response from responsible party/parties
WGWAP-20/05	**3.4**	The Panel **recommends** that researchers working in feeding areas off both Sakhalin and Kamchatka consider the use of UAVs [unmanned aerial vehicles] to support their efforts at finding gray whale faeces as well as for other purposes (e.g. photo-ID, photogrammetry for body condition assessment).	**Sakhalin Energy, GazpromNeft-Sakhalin, Russia Gray Whale Project/IFAW, Kronotsky Nature Reserve**	**2020 season onwards**	
ITEM 4 OTHER SAKHALIN ENERGY ACTIVITIES IN 2019, 2020 AND BEYOND					
WGWAP-20/06	**4.1.2**	The Panel **requests** that Sakhalin Energy provide further details on the ISB [in-situ burning] equipment that it currently holds and on any plans that are in place to supplement and maintain these resources.	**Sakhalin Energy**	**As soon as possible**	

APPENDIX 1. SAKHALIN ENERGY CONCLUSION OF 'NO IMPACT' UNSUPPORTED BY ANALYSES

Prepared by Leslie New, WGWAP Member

During the NTF-17 and WGWAP-20 meetings, members of the Panel expressed concerns with the analyses presented by Sakhalin Energy regarding the distribution and abundance of gray whales, as well as the Company's conclusions presented in document NTF 17-4 and presentations at the meeting that seismic surveys have no impact on the whales. Based on the documentation provided by the Company, the information presented at the meetings and the resulting discussions, the Panel has determined that the Company's conclusions are premature and unsupported by the data and analyses presented. A summary of problems with the approach taken was provided to the Company immediately after the conclusion of WGWAP-20. A more detailed explanation of these problems is provided here.

Data Exclusion

To assess the distribution of gray whales, both the Joint Programme (WGWAP-20/17 and 20) and Sakhalin Energy (NTF-17/4) conduct onshore surveys from four observer stations. However, both the Joint Programme (WGWAP-20/17) and Sakhalin Energy (NTF-17/4) only use data from synchronized scans, unnecessarily excluding any data that were not collected from all four stations simultaneously. The reasoning given in doc. NTF-17/4 is that this was done "…to minimise distortions in the data on the spatial and quantitative distribution of gray whales in the monitored water area, associated with the movements of animals during the interval between the scans from neighbouring OS." However, if the data were collected and analyzed correctly, movements by the animals would not affect estimation of their spatial distribution (e.g., Buckland et al. 2015). This is due, in part, to one of the advantages of using land-based platforms, which is that the animals' movements are unaffected by the presence of the observers.

In addition, Sakhalin Energy unnecessarily discarded a notable amount of the data collected on gray whale movements during its seismic survey MMP (doc. NTF-17/4). Only information on those whales that experienced periods of disturbance and no disturbance on the same track were used to assess the influence of seismic survey operations on the motion routes of whales (NTF-17/4). This violates the principles of good sampling. When determining the effect of a treatment, or in this case a disturbance, as part of an observational or designed experiment, the aim is to sample independently from the affected and unaffected portions of the population (Levy and Lemeshow 2009). This allows researchers to compare the expected behaviour of individuals in the absence of disturbance to what is observed in the presence of disturbance, such as seismic shooting (Levy and Lemeshow 2009). As a result, longitudinal studies are not required to address the issue of changes in movement in response to disturbance. While not necessary, data collected on the same individuals over time can contribute important and valuable information, however to do so requires a proper longitudinal analysis, which the Company has not undertaken.

Incorrect Application of Statistical Analysis

Document NTF-17/4 states that Student's *t*-test was used while estimating fidelity for differences in motion parameters of grey whales at various stages of seismic survey operations. Student's *t*-test relies on two major assumptions, that (i) the data are distributed according to a normal (Gaussian) distribution and (ii) the observations are independent. Given the Company's description of the data and the analyses applied, one or both of these assumptions have been violated to a greater or lesser extent on numerous occasions, rendering inferences made from these statistical tests unreliable.

Document NTF-17/4 describes four movement parameters and seven respiration parameters that are analyzed using the *t*-test. The majority of them violate the normality assumption (Table A1). The normality of the data can be checked statistically. There are standard statistical tests for whether the data are appropriate for use with a *t*-test. The assumption of normality can be readily assessed by examining histograms or q-q plots of the data. Where the data are markedly non-normal, either a normalizing transformation can be applied or a distribution-free test such as Kolmogorov-Smirnov can be used. An advantage of the latter is that effects can be detected which do not involve simple shifts in the mean.

Table A1. This table is a modified version of Table 2.2-3 from document NTF-17/4, including the name of the variable, its definition, and a new column that indicates whether the assumption of normality required by the *t*-test, has been met, and why.

Movement Parameters		
Variable	Definition	Assumption of Normality
Calculated leg speed	The distance travelled between two sequential fixed points within a track line divided by the time interval between the two points	**Possibly Violated**: Data may be skewed, given that speed has a lower bound of 0, so the distribution may not be symmetric.
Linearity	Index of deviation from a straight line, calculated by dividing the net geographic (straight-line) distance between the first and last points of a track line by the cumulative distances along the track	**Violated**: As noted in doc. NTF-17/4, "Linearity values ranged between 0 and 1, with 0 indicating no net movement and 1 indicating a straight line (Batschelet, 1980)." So, the distribution is constrained and cannot take on any real-numbered, continuous value.
Reorientation rates	The magnitude of bearing changes calculated as the summation of absolute values of all bearing changes along a track line divided by the entire duration of the track line in minutes	**Violated**: A bearing is an angle, so the variable is restricted in the values it can take on, and there is a circular relationship between the values. As a result, the distribution is constrained and cannot take on any real-numbered, continuous value.
Distance from shore	Closest distance of animal from the nearby coastline	**Possibly Violated**: Data may be skewed, given that distance to the coastline has a lower bound of 0, so the distribution may not be symmetric.

Respiration Parameters		
Blow interval	Times less than 60 s between subsequent exhalations per surfacing	**Violated**: Data are restricted to be between 0 and 60, so the distribution is constrained and cannot take on any real-numbered, continuous value.
Dive time	Any interval where dive period (staying underwater) is greater than 60 s	**Violated**: Data are restricted to be greater than 60, so the distribution is constrained and cannot take on any real-numbered, continuous value, as well as being skewed and therefore not symmetric.
Surface time	Duration the animal remains at or near the surface	**Possibly Violated**: Data may be skewed, given that duration at or near the surface has a lower bound of 0, so the distribution may not be symmetric.
Number of blows per surfacing	Total number of blows per surfacing	**Violated**: The number of blows is a discrete variable, constrained by zero, so the distribution cannot take on any real-numbered, continuous value, and is highly likely to be skewed and therefore not symmetric.
Frequency of blowing at the surface	Mean number of exhalations per minute during a surfacing	**Possibly Violated**: With a large enough sample size, the central limit theorem may allow for the assumption of normality to hold for the mean number of exhalations. However, a sample size of 30 or greater per calculation of the mean would be required and from the report it is not clear if the data are sufficient.
Frequency of blowing within the entire surfacing–diving cycle	Number of exhalations per minute averaged over the respiration cycle	**Violated**: The number of exhalations per minute is a discrete variable, constrained by zero, so the distribution cannot take on any real-numbered, continuous value, and is highly likely to be skewed and therefore not symmetric.
Time at surface	Percentage (0–100%) of the observation time a whale was observed at the surface	**Violated**: A percentage is constrained to be between 0 and 100%, so the distribution cannot take on any real-numbered, continuous value.

As an example of the violation of normality, Table 4.3.-2 of document NTF-17/4 lists an average distance of the whales from shore of 0.75 km, with a standard deviation of 0.65. The fitted normal distribution, assumed in the *t*-test, predicts that approximately 12% of the observed values would be less than zero, which is not possible (Fig A1).

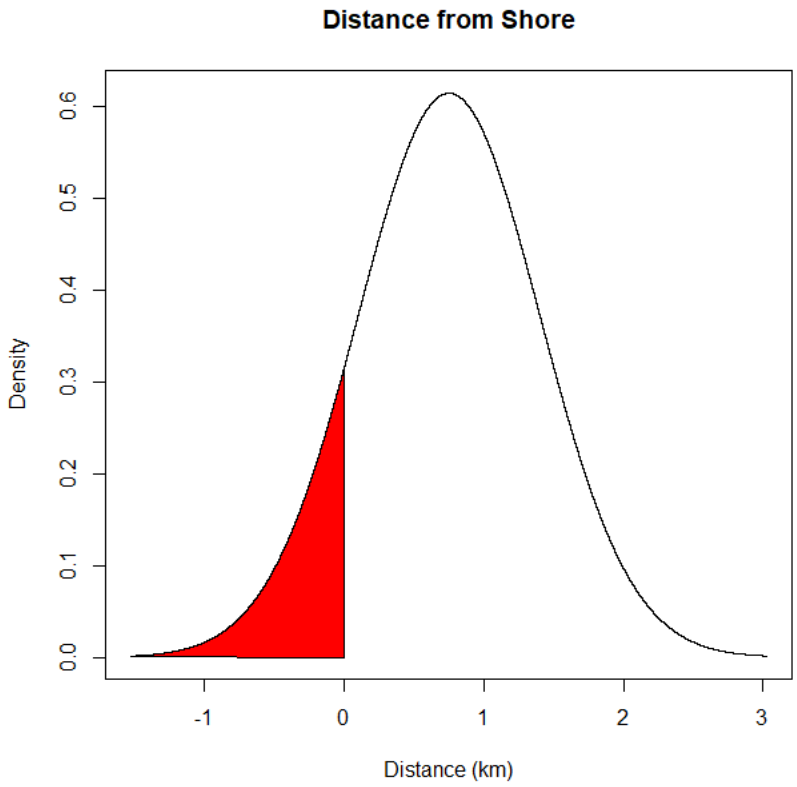

Fig. A1: The normal distribution defined by the reported distance offshore of gray whales sighted during the seismic survey in 2018, with the impossible values less than or equal to zero shaded in red.

Failure to meet the required assumptions of the statistical tests invalidates the conclusions presented in document NTF-17/4 and the presentations given at NTF-17. How severe this problem may be is difficult to assess based upon the information provided in NTF-17/4.

No Estimates of Abundance or Distribution

In multiple documents, including NTF-17/4, WGWAP-20/17 and WGWAP-20/19, the companies claim to have assessed the abundance and distribution of gray whales, although they have never actually done so. Instead, as Sakhalin Energy notes in doc. NTF-17/4, information is only provided on the "…*map of their occurrence*…" and "…*sighting maps*…", which serve as measures of the presence of whales, but not how many there are or where they might be found.

Throughout the reports and presentations (NTF-17/4, WGWAP-20/17, WGWAP-20/19), reference is made to the total number of whales counted as "abundance", which it is not. In order to estimate abundance it is necessary to account for the effort that went into searching for the whales during the counting process, observer error and the availability of whales to be seen, all of which are required to estimate abundance (e.g., Borchers et al. 2013; Buckland et al. 2004; Royle et al. 2014), and at no point have the companies made any attempt to do so. There are multiple, well-established approaches to estimating animal abundance (e.g., Borchers et al. 2015, Buckland et al. 2015; Royle et al. 2014), none of which has been used, and the most common of which have readily available, free software to aid in their application (e.g., Efford 2019; Laake 2013; Thomas et al. 2010).

Plotting the number of whales observed in 1 km^2 grid squares (i.e., WGWAP-20/17, Figure 3) does not estimate the whales' distribution, especially given that no attempt has been made to differentiate between locations where a search for whales was made, but none were seen, and those locations where no search was made. In both of such circumstances, the number of whales observed was recorded as '0' (zero), which is misleading. It is highly probable that gray whales occur in locations other than those searched by observers, yet under the current approach, the results as presented lead to the conclusion that gray whales do not occur in grid cells where no search is made. This is much the same as claiming that an employee never comes to work without ever looking to see if the employee is at his or her desk. The failure to account for differences in search effort in these locations creates a visual bias in the apparent presence of whales on the seascape.

In addition to not actually estimating gray whale abundance and distribution, the data underlying the analyses presented (e.g., WGWAP-20/17 Figures 4, 6 and 7; WGWAP-20/19 Figures 5-1, 5-2, and 5-3) are not comparable across years. This is because the companies did not account for the number of scans or the vessel time when presenting the information (e.g., see Charlton et al. 2019, who account for effort when estimating the abundance of southern right whales in order to allow for comparability across years). Raw counts, with no correction for effort, are not comparable, because the number of whales observed is a direct function of the amount of time spent looking for the animals, which is unknown. For example, 20 whales observed in 30 hours of scanning in year 1 has very different implications than 20 whales observed over 300 hours of scanning in year 2. Yet if we were to follow the process of assessment laid out in documents WGWAP-20/17 and WGWAP-20/19, only the 20 whales in year 1 and 20 whales in year 2 would have been reported, drawing a false conclusion that the number of whales in the area was 'stable'. In reality, should such numbers have been observed, there would have been a significant decline in the number of whales observed per hour scanned from year 1 to year 2. At the very least, a simple solution would be to develop maps of 'sightings per unit effort (SPUE)' where the numbers of whales observed per grid cell is divided by either the amount of survey time or distance in the grid cell.

Changes in survey protocols (document WGWAP-20/19) have not been accounted for when presenting the whale counts, and this also contributes to the lack of comparability between observations from year to year. For example, a higher observation platform (e.g., 25 m on the *Siem Sapphire* relative to 5m on the *Polar Baikal*; document WGWAP-20/19) increases the area visible to the observer, thus making it possible for her or him to see more whales. Therefore, an increase in the number of whales observed that coincides with the use of a higher platform could be due solely to the larger area of visual coverage, as opposed to a change in the whales' abundance or distribution. Effort is not just a function of the time spent by observers scanning for gray whales, but also of the area they are able to observe. Without accounting for effort, in all its forms, the whale count data are not comparable across years or spatial areas and do not support the assertions of no impact.

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Jonathan Hancox, Ramboll
Bruce Mate, Ramboll
Oki Kondo, Mizuho Bank
Frank Marcinkowski, PPCI Inc. (remotely, Day 1)

Observers - NGOs

Alexey Knizhnikov, WWF Russia (Day 1)
Maria (Masha) Vorontsova, IFAW International

Observers – Russian Authorities

Svetlana Sheynfeld, Ministry of Natural Resources and Environment of the Russian Federation (Day 3)
Valery Fedorov, Ministry of Natural Resources and Environment of the Russian Federation (Day 1)

Other Observers

Tatiana Bobrovitskaya, Shell Russia

Boris Dotsenko, GazpromNeft-Sakhalin

Olga Kalashnikova, Shell Exploration and Production Services (Russian Federation)

Ludmila Kivisild, Gazprom Dobycha Shelf – Yuzhno-Sahkalinsk

Tatiana Komova, Shell Exploration and Production Services (Russian Federation) (Day 3)

Anastasia Kunica, M.V.Lomonosov Moscow State University

Pavel Stetyukha, Project Obsky, Gazpromneft-Sakhalin (Day 2)

Alexander Somov, Russian Federal Research Institute of Fisheries and Oceanography (VNIRO)

Roman Turchin, Gazpromneft-Sakhalin

Vladimir Vertyankin, Kronotsky Zapovednik (Nature Reserve)

Interpreters

Alexander Danilov
Grigory Shkalikov

ANNEX 2. FINAL MEETING AGENDA

WESTERN GRAY WHALE ADVISORY PANEL	**6-8 November 2019**
20th meeting	**Radisson Blu Belorusskaya Hotel, Rooms "Mozart" & "Beethoven" Moscow, Russian Federation**

FINAL AGENDA AND TIME SCHEDULE

Day 1 - Wednesday, 6 November 2019		**Documents / presentations**
1. INTRODUCTIONS		
08:45 – 09:00	Welcome coffee	
09:00 – 09:30	**1. Organizational matters** 0:30 [Reeves, IUCN] 1.1 Welcome from IUCN [Erg, Maginnis] 1.2 Chair's welcoming remarks 1.3 Brief introductions of all participants 1.4 Adoption of agenda 1.5 Documents 1.6 Report drafting procedures and timeline 1.7 Logistics	WGWAP-20/1 WGWAP-20/2 WGWAP-20/3 WGWAP-20/4
2. ADDRESSING NOISE ISSUES INCLUDING REVIEW OF RESULTS FROM 2018 SAKHALIN ENERGY'S SEISMIC SURVEY AND PLANS FOR FUTURE SURVEYS		
09:30 – 10:30	**2.1. Addressing noise issues, including review of results from 2018 seismic survey and plans for future surveys** 1:00 2.1.1 Summary of the NTF-16 (April 2019), intersessional work & NTF-17 (November 2019) meetings [Nowacek] 2.1.2 Update on 2018 seismic survey monitoring and mitigation programme results and progress with analyses (including responses to WGWAP recommendations) [Sakhalin Energy] 2.1.3 Update on Sakhalin Energy's plans for future seismic surveys [Sakhalin Energy] 2.1.4 Conclusions and suggestions for recommendations *Relevant open recommendations (including those addressed intersessionally or at NTF-17):* • *WGWAP-13/007 on automated detection of loud noise periods* • *WGWAP-18/04 on control site data review* • *WGWAP-18/05 on automated detection of anthropogenic noise and whale sounds* • *WGWAP-18/10 on sampling during periods without noise events* • *WGWAP-18/18 on new crew vessel noise signatures* • *WGWAP-19/02 on the revision of Perimeter Monitoring Line (feeding area boundary) for future seismic surveys* • *WGWAP-19/03 on poor weather considerations in future MMPs for seismic surveys* • *WGWAP-19/04 on 2018 seismic survey MMP data analysis* • *WGWAP-19/05 on acoustic monitoring in years without seismic surveys* • *WGWAP-19/11 & 12 on use of side-scan sonar and multi-beam echosounders*	NTF-16/ REPORT
10:30 – 10:50	Coffee break	

3. OUTCOMES OF PROGRAMMES ON GRAY WHALE RESEARCH AND MONITORING IN 2018 AND 2019 & ANNUAL POPULATION ASSESSMENT		
10:50 – 14:00 (incl. 1 hour lunch between 12:15 – 13:15)	**3.1 Summary of 2018 fieldwork results and 2019 preliminary results (incl. progress with studies/analysis using long-term data)** 2:10 3.1.1 Update on progress with analyses of Joint Programme data and preparation of peer-reviewed scientific publications using long-term data, 2002-2016 (including benthic and acoustic) [Sakhalin Energy] 3.1.2 Distribution [Sakhalin Energy] 3.1.3 Photo-ID (incl. drone technology) • Joint Programme [Sakhalin Energy] • Russia Gray Whale Project [Burdin] • Summary of the Photo-ID and New Technologies Task Force meeting (April 2019) [Weller] • Update on joint Photo-ID catalogue under IWC auspices [Weller] • Cross-matching of new whales sighted during 2012-present [Weller] • Annual assessment of biological and demographic characteristics of western gray whales [Cooke] 3.1.4 Q&A and discussion *Relevant open recommendations:* • *WGWAP-16/020 on assessment of tag injury from photos* • *WGWAP-18/08 & 19/19 on cross-matching photo-ID catalogues 2012-2018* • *WGWAP-18/10 on sampling during quiet, undisturbed periods* • *WGWAP-19/20 on traditional shore-based distribution monitoring* • *WGWAP-19/21 on comparison between traditional vs drone-based monitoring*	PHIDNTTF-1/REPORT WGWAP-20/17_RU-EN WGWAP-20/18_RU-EN WGWAP-20/19_RU-EN WGWAP-20/20 WGWAP-20/21 WGWAP-20/22 WGWAP-20/23 WGWAP-20/31 WGWAP-20/INF.1 RU-EN WGWAP-20/INF.3 WGWAP-20/INF.4 WGWAP-20/INF.5 WGWAP-16/10-RU-EN WGWAP-16/10-RU-maps

4. OTHER SAKHALIN ENERGY ACTIVITIES IN 2019, 2020 AND BEYOND		
14:00 – 15:30	**4.1 Updates on other Sakhalin Energy activities in 2019 and plans for 2020 onwards** 1:30 4.1.1 Oil spill response planning and drills, including 2019 exercise /site visit and follow-up actions [Sakhalin Energy, Dicks remotely, Marcinkowski remotely] 4.1.2 Updated Marine Mammal Protection Plan, including Panel's and Lenders' review [Sakhalin Energy, Reeves, Hancox] 4.1.3 Report on regular Marine Mammal Observer program and ship strike avoidance measures, including speed limit implementation [Sakhalin Energy] 4.1.4 Other activities 2020-2022 [Sakhalin Energy] 4.1.5 Update on Sakhalin Energy's plans for IFC PS6 implementation and progress with the development of key associated documents 4.1.6 Conclusions and suggestions for recommendations *Relevant open recommendations:* • *WGWAP-17/09 on cameras, accelerometers and risk estimation from increased vessel speed* • *WGWAP-18/02 on noise activities with potential to violate MMPP* • *WGWAP-18/03 on noise-generating systems or tools* • *WGWAP-18/14 on speed limits listed in MMPP* • *WGWAP-18/15 on oil spill-related actions* • *WGWAP-19/05 on MMPP compliance, especially regarding underwater noise* • *WGWAP-19/07 on GPS data analysis vs use of accelerometers* • *WGWAP-19/08 on review of the distribution data in relation to ship strike risk in the navigation corridor* • *WGWAP-19/13 on acoustic monitoring after new supply vessel measurement program* • *WGWAP-19/14A on publication of available information on right whale occurrence* • *WGWAP-19/18 on Panel access to Company environmental monitoring reports*	WGWAP-20/5 WGWAP-20/6 WGWAP-20/7_RU/EN WGWAP-20/8_RU/EN (updated) WGWAP-20/9 WGWAP-20/10 WGWAP-20/11_1_EN/RU WGWAP-20/11_2_EN/RU WGWAP-20/12 WGWAP-20/13 WGWAP-20/14_EN/RU WGWAP-20/15 WGWAP-20/16 WGWAP-20/30
15:30	Adjourn	

Day 2 – Thursday, 7 November 2019		**Documents / presentations**
INTRODUCTIONS		
08:45 – 09:00	Welcome coffee	
09:00 – 09:05	Introductions of new participants in the room (if any)	
5. SCOPE OF WORK FOR PROGRAMMES ON GRAY WHALE RESEARCH AND MONITORING IN 2020 AND BEYOND		
09:05 – 09:45	**5.1 Programme plans in 2020 and beyond** 0:40 5.1.1 Scope of work of Joint Programme 2020, including Panel review [Sakhalin Energy, Reeves] 5.1.2 Company timeline for development of a Scope of Work for Joint Programme 2021 [Sakhalin Energy] 5.1.3 Update on Russian Gray Whale Project plans for 2020 and beyond [Burdin] 5.1.4 Q&A and discussion on overall challenges, synergies, opportunities etc. 5.1.5 Conclusions concerning future engagement of Panel in reviewing and advising on Joint Programme	WGWAP-20/24 WGWAP-20/25 WGWAP-20/26 WGWAP-20/31
6. ADDRESSING CUMULATIVE IMPACTS ON THE SAKHALIN SHELF		
09:45 – 10:25	**6.1 Setting the scene** 6.1.1 Role/importance of Sakhalin in a range-wide context 0:40 • Key anthropogenic threats/risks/pressures identified in the draft revised Conservation Management Plan [Weller, Reeves] • Other range-wide scientific issues: any gray whale observations outside Sakhalin feeding areas, including Kamchatka [Vertyankin, anyone with information]; any other range-wide scientific issues, e.g. update on unusual mortality event in the US [Weller], US Navy work on WGWs in South China Sea [Nowacek] Q&A and discussion	WGWAP-20/INF.2 WGWAP-20/INF.5 WGWAP-20/INF.6-EN/RU WGWAP-20/INF.7 WGWAP-20/INF.11
10:25 – 10:45	Coffee break	
10:45 – 11:00	6.1.2 Russian policy landscape/context: space for government updates on relevant activities 0:35 • Activities at the Federal level • Activities at the Sakhalin Oblast level [Tsarenko] Q&A and discussion	WGWAP-20/INF.8 WGWAP-20/INF.9 WGWAP-20/INF.10
11:00 – 12:00	6.1.3 Cross-sectoral landscape in Sakhalin: space for updates on industry activities in and near the whale feeding areas in Sakhalin / Sea of Okhotsk in 2019 and beyond 1:00 • Results of western gray whale monitoring in Ayashsky block in 2019 [GazpromNeft-Sakhalin] • Results of industrial environmental control during the Common Depth Point (CDP) 3D marine seismic surveys in Ayashsky licence area in 2019 [GazpromNeft-Sakhalin] • Industrial environmental monitoring during the construction of the well “Ayaskaya Nr.2” in 2019 [GazpromNeft-Sakhalin] • Preliminary results for monitoring of whales in the offshore feeding area [GazpromNeft-Sakhalin]; • Short IUCN overview on 2019 activities and future plans of other operators;	WGWAP-20/27 WGWAP-20/34 WGWAP-20/INF.12-EN/RU WGWAP-20/INF.13 WGWAP-20/INF.14 WGWAP-20/INF.15-EN/RU WGWAP-20/INF.16-EN/RU

	• Brief update on other sectors such as fisheries, cruise ships and interactions with whales and related threats [IUCN, anyone with new information]; • Space for NGO update on relevant activities; Q&A & discussion *Relevant open recommendations:* • *WGWAP-17/23 on fishing activities in and near the offshore feeding area*	
12:00 – 13:00	Lunch	
13:00 – 13:40	**6.2 Importance and value of addressing cumulative effects** [New, Cooke] 0:40 6.2.1 Summary of the Cumulative Effects Task Force meeting (April 2019): importance of addressing the cumulative impacts, ecological context/seascape perspective and challenges 6.2.2 Approaches for developing a cumulative effects framework 6.2.3 From assessing cumulative effects to integrated management: an overview of key players and factors [IUCN]	CETF-1/REPORT WGWAP-20/28 WGWAP-20/32
13:40 – 15:40	**6.3 Facilitated conversation with all participants on the way forward for addressing cumulative impacts on the Sakhalin Shelf** [IUCN] 2:00	
15:40	Adjourn	

Day 3 – Friday, 8 November 2019		**Documents / presentations**
INTRODUCTIONS		
08:45 – 09:00	Welcome coffee	
09:00 – 09:05	Introductions of new participants in the room (if any)	
6. ADDRESSING CUMULATIVE IMPACTS ON THE SAKHALIN SHELF (CONTINUED)		
09:05 – 10:05	**6.4 Time for a recap from previous day and next steps** 1:00 [New, Cooke, IUCN]	
7. WGWAP RECOMMENDATIONS		
10:05– 10:20	**7. Update on WGWAP Recommendations** [Reeves, IUCN] 0:15 7.1 Presentation by IUCN on the status of the database, etc. 7.2 General discussion [on the understanding that consideration of specific open recommendations were included under relevant topical items throughout the meeting]	WGWAP-20/29
10:20 – 10:40	Coffee break	
8. PLANS FOR 2020-2021 AND OPTIONS FOR BEYOND 2021		
10:40 – 11:40	**8.1 WGWAP Workplan 2020-2021** [Reeves, IUCN] 0:35 8.1.1 Presentation 8.1.2 Discussion **8.2 Options for beyond 2021** [IUCN] 0:25 8.2.1 Discussion on needs and audience for a system that delivers independent scientific advice on relevant issues 8.2.2 Next steps	
11:40 – 11:50	**9. ANY OTHER BUSINESS** 0:10	
11:50 – 12:00	**10. WGWAP-20 CLOSING REMARKS** 0:10	
12:00	Adjourn & lunch	

ANNEX 3. LIST OF DOCUMENTS

List of documents and materials distributed in connection of the 20th meetings of the WGWAP (with links to download those designated as public)

DOCUMENT #	TITLE	LANGUAGE	STATUS
PRIMARY DOCUMENTS			
GENERAL			
WGWAP-20/1	Agenda (including time schedule)	English	Public
WGWAP-20/2	Пповестка дня КГЗСК-20 (включая расписание)	Russian	Public
WGWAP-20/3	List of documents distributed in connection with the 20th meeting of the WGWAP	English	Public
WGWAP-20/4	Список документов, распространяемых в соответствии с 20м заседанием КГЗСК	Russian	Public
AGENDA ITEM 2. ADDRESSING NOISE ISSUES, INCLUDING REVIEW OF RESULTS FROM 2018 SEISMIC SURVEY AND PLANS FOR FUTURE SURVEYS			
NTF-16/ REPORT	Report from the 16th meeting of the Noise Task Force (NTF-16, April 2019)	English	Public
AGENDA ITEM 3. OUTCOMES OF PROGRAMMES ON GRAY WHALE RESEARCH AND MONITORING IN 2018 AND 2019 & ANNUAL POPULATION ASSESSMENT			
PHIDNTTF-1 /REPORT	Report from the 1st meeting of Photo-ID and New Technologies Task Force (PHIDNTTF-1, April 2019)	English	Public
WGWAP-20/17_en	Report on Gray Whale Monitoring Program Off Northeast Sakhalin Island in 2018 (incl. Appendix 1. Joint Program Publications)	English	Public
WGWAP-20/17_ru	Отчет по Программе мониторинга серых китов у северо-восточного побережья острова Сахалин в 2018 г. (вкл. Приложение I. Опубликованные работы по Совместной Программе)	Russian	Public
WGWAP-20/18_ru	Фотоидентификация серых китов (Eschrichtius robustus) у северо-восточного побережья о. Сахалин в 2018 году (Приложение II. к отчету по Программе мониторинга серых китов у северо-восточного побережья острова Сахалин в 2018 г.	Russian	Public
WGWAP-20/18_en	Photo-Identification of Gray Whales (Eschrichtius robustus) off the Northeast Coast of Sakhalin Island in 2018 (Appendix 2 to the Report on Gray Whale Monitoring Program off the Northeast Sakhalin Island in 2018)	English	Public

DOCUMENT #	TITLE	LANGUAGE	STATUS
WGWAP-20/18_ppt	Presentation on Photo-ID Results under the Gray Whale Monitoring Programme Offshore Sakhalin in 2002-2018 O.M. Tyurneva, Yu.M. Yakovlev, V. Vertyankin, Peter van der Wolf . Результаты фотоидентификационных работ в рамках Программы мониторинга серого кита, проведенных в 2002-2018 гг. у побережья о. Сахалин. О.М. Тюрнева, Ю.М. Яковлев, В.В. Вертянкин, Питер ван дер Вольф.	English Russian	Public
WGWAP-20/19_en	Distribution and Abundance of Gray Whales in the Waters of the Northeast Sakhalin Shelf in July-October of 2018 (Appendix III to the Report on Gray Whale Monitoring Program off the Northeast Sakhalin Island in 2018)	English	Public
WGWAP-20/19_ru	Распределение и численность серых китов в шельфовых водах северо-восточного Сахалина в июле-октябре 2018 г. (Приложение III. к отчету по Программе мониторинга серых китов у северо-восточного побережья острова Сахалин в 2018 г.)	Russian	Public
WGWAP-20/19_ppt	RESULTS OF GRAY WHALE DISTRIBUTION AND ABUNDANCE MONITORING OFFSHORE NORTH-EAST SAKHALIN IN 2018 - 2018 Gray Whale Monitoring Programme Offshore North-East Sakhalin РЕЗУЛЬТАТЫ МОНИТОРИНГА РАСПРОСТРАНЕНИЯ И ЧИСЛЕННОСТИ СЕРЫХ КИТОВ В ШЕЛЬФОВЫХ ВОДАХ СЕВЕРО-ВОСТОЧНОГО САХАЛИНА в 2018 г. «Программа мониторинга серых китов у северо-восточного побережья о.Сахалин в 2018 г.»	English Russian	Public
WGWAP-20/20_en WGWAP-20/20_ru	Presentation: 2019 Gray Whale Joint Monitoring Program Implementation[23] Выполнение совместной программы мониторинга серых китов в 2019 году	Russian/ English	For internal use
WGWAP-20/21	Maps with results of Photo-ID & distribution survey 2018	Russian	For internal use
WGWAP-20/22	An updated list of published or expected papers of the Joint Programme in 2019 and plans for 2020	English	For internal use
WGWAP-20/31	Presentation on the Russia Gray Whale Project (RGWP) results in 2019 and plans for 2020	English	Public
WGWAP-20/23 (updated)	Updated population assessment by Justin Cooke/WGWAP	English	Public

[23] Note for reference: Scope of Work of the 2019 Programme for Gray Whale Monitoring Off the North-East Coast of Sakhalin Island is available as document WGWAP-19/19-EN-RU
https://www.iucn.org/sites/dev/files/wgwap19_19_en.pdf &
https://www.iucn.org/sites/dev/files/wgwap19_19_ru_.pdf

AGENDA ITEM 4. OTHER SAKHALIN ENERGY ACTIVITIES IN 2019, 2020 AND BEYOND			
WGWAP-20/5 (also for NTF-17)	Final revised Sakhalin Energy's Marine Mammal Protection Plan (MMPP) v. 2 September 2019 (with the exception of the "peak" season definition to be discussed and agreed with the Panel) + Panel comments 14 October 2019	English	For internal use
WGWAP-20/6 (also for NTF-17)	A summary of data from Joint Programme and description on how the timing of the arrival of whales and 'peak' was determined: a cover note and a document submitted by Sakhalin Energy on Analysis of Seasonal dynamics of the abundance and distribution of gray whales in the Offshore and Piltun feeding areas off the northeast coast of Sakhalin (based on historical 2005-2007, and current available data 2015) + Panel comments 03 October 2019	English	For internal use
WGWAP-20/7_en WGWAP-20/7_ru	Company Standard CTO 318.04.69-2015 Regulation on In-situ Burning of Marine Oil Spills. Technical Committee for Standardization TC 318 of Marlflot: Saint Petersburg, 2015 (9 sections, 7 Appendices, 38pp)	English/ Russian	For internal use
WGWAP-20/8_en (updated)	Marine Mammal Observer Program 2018 Close- Out Report (including results of speed limit implementation), final updated version, October 2019	English	Public
WGWAP-20/8_ru (updated)	ПРОГРАММА НАБЛЮДЕНИЯ ЗА МОРСКИМИ МЛЕКОПИТАЮЩИМИ В 2018 ГОДУ ЗАКЛЮЧИТЕЛЬНЫЙ ОТЧЕТ (including results of speed limit implementation), final updated version, October 2019	Russian	Public
WGWAP-20/9	Combined file: WGWAP requests/questions to Sakhalin Energy on its 2018 MMO Close-Out Report and 2019 MMO Manual and information and responses provided by Sakhalin Energy, July-October 2019	English	For internal use
WGWAP-20/10	СПРАВОЧНИК НАБЛЮДАТЕЛЯ ЗА МОРСКИМИ МЛЕКОПИТАЮЩИМИ 2019 (Marine Mammals Observers Manual 2019)	Russian	For internal use
WGWAP-20/11_1_en WGWAP-20/11_1_ru	Presentation: Sakhalin Energy's MMO Programme 2018 and preliminary results of 2019 field season Программа наблюдений за морскими млекопитающими в 2018 году и предварительные результаты полевого сезона 2019 года	English / Russian	For internal use
WGWAP-20/11_2_en WGWAP-20/11_2_ru	Presentation: Analysis of the results of speed limits increasing for Sakhalin Energy crew change vessels during 2017–2018 navigation seasons Анализ результатов увеличения скоростных лимитов для судов смены персонала платформ «Сахалин Энерджи» в навигационный сезон 2017-2018 гг.	English / Russian	For internal use
WGWAP-20/12	Preliminary Panel briefing note by Brian Dicks, WGWAP Associate Scientist on Sakhalin Energy's OSR exercise observation (September 2019)	English	For internal use

WGWAP-20/13 (also for NTF-17)	Presentation: Sakhalin Energy's offshore activities 2019-2023 (including any update on echo-sounders)	English	Confidential
WGWAP-20/14_en WGWAP-20/14_ru (also for NTF-17)	Presentation: Measurement and modelling of anthropogenic acoustic fields generated in the Piltun summer-autumn feeding area of gray whales by «Sakhalin Energy» new vessels working near the PA-B and Molikpak platforms (by Alexander N. Rutenko, POI FEB RAS) Измерение и моделирование антропогенных акустических полей, формируемых в Пильтунском районе летне-осеннего нагула серых китов новыми вспомогательными судами, работающими с платформами ПА-Б и Моликпак (д.ф. м.н. Александр Николаевич Рутенко, ТОИ ДВО РАН)	English/ Russian	For internal use
A WGWAP-20/15	Video from new crew change vessels' outdoor cameras, as provided by Sakhalin Energy for Panel's review (per recommendations WGWAP-17/08 & 19/06)	N/A	Confidential
WGWAP-20/16	Update on Sakhalin Energy's Critical Habitat Assessment	English	*Expected soon*
WGWAP-20/30	B.Dicks, WGWAP summary note on the review of the Regulation on in-situ burning of marine oil spills – Company Standard CTO 318.04.69-2015 (9 sections, 7 Appendices, 38pp)	English	Public
AGENDA ITEM 5. SCOPE OF WORK FOR PROGRAMMES ON GRAY WHALE RESEARCH AND MONITORING IN 2020 AND BEYOND			
WGWAP-20/24	WGWAP Open Statement of Concern on decline of the amphipod prey base in the nearshore feeding area of gray whales near Piltun Lagoon, Sakhalin Island, Russian Far East, 11 July 2019	English / Russian	Public
WGWAP-20/25	2020 Final Program for Gray Whale Monitoring off the North-East Coast of Sakhalin Island		Not yet available at the time of the meeting
WGWAP-20/25_en_ppt WGWAP-20/25_ru_ppt	Presentation: Gray Whale Joint Monitoring Program Scope of Work 2020 План работ по Совместной программе мониторинга серых китов в 2020 году	English / Russian	For internal use
WGWAP-20/26	The marked up version of the comments of the 2020 Draft Program for Gray Whale Monitoring off the North-East Coast of Sakhalin Island, v. August 2019 with Panel comments September 2019	English	For internal use

AGENDA ITEM 6. ADDRESSING CUMULATIVE IMPACTS ON THE SAKHALIN SHELF			
CETF-1/REPORT	Report from the 1st meeting of the Cumulative Effects Task Force (CETF-1, April 2019)	English	Public
WGWAP-20/27	IUCN overview of oil and gas project off northeastern Sakhalin and in or near gray whale feeding areas, as well as other projects off Eastern Sakhalin, v. October 2019 (based on publicly available information)	English	Public
WGWAP-20/28	Proposed framework for putting Panel's advice into a cumulative effects context (by Leslie New and Justin Cooke/WGWAP)	English	Public
WGWAP-20/32	Summary of IUCN stakeholder analysis for East Sakhalin, v. updated 8 November 2019	English	Public
WGWAP-20/34 (updated)	IUCN overview of cruises/expeditions to Piltun & elsewhere in the Sea of Okhotsk, as well as Kamchatka coast in 2019, 2020 and beyond, v. November 2019	English	Public
AGENDA ITEM 7. WGWAP RECOMMENDATIONS			
WGWAP-20/29	Summary table from IUCN of WGWAP-19 and previous outstanding recommendations and company responses[24]	English	Public
FOR INFORMATION DOCUMENTS			
AGENDA ITEM 4. OUTCOMES OF PROGRAMMES ON GRAY WHALE RESEARCH AND MONITORING IN 2018 AND 2019 & ANNUAL POPULATION ASSESSMENT			
WGWAP-20/ INF.1_RU-EN	Лабай В.С., Ким Сен Ток , Смирнов А.В., Частиков В.Н., Шевченко Г.В., Цхай Ж.Р. (2019). Оценка экологической ёмкости среды для серых китов (Eschrichtius robustus) в известных районах нагула у северо-восточного побережья о-ва Сахалин. В: Морские млекопитающие Голарктики. Сборник научных трудов. 2019. Том 1. Москва, с. 174 - 185. Labay V.S., Kim S.T., Smirnov A.V., Chastikov V.N., Schevchenko G.V., Tzkhay Zh. R. (2019). Assessment of carrying capacity of the of gray whales (Eschrichtius robustus) habitat in their feeding areas off the north-eastern Sakhalin Island. In: Marine Mammals of the Holarctic. Collection of Scientific Papers. 2019. Vol. 1. Marine Mammal Council: Moscow, pp. 174-185 DOI: 10.35267/978-5-9904294-0-6-2019-1-174-185	Russian/ English	Public

[24] Available on the public WGWAP Recommendations Database, accessible via https://www.iucn.org/westerngray-whale-advisory-panel/recommendations or directly at https://portals.iucn.org/wgwap

WGWAP-20/ INF.3	Kriksunov, Y., Alyautdinov, A., Bobyrev A. and Chistov, S. (2016). Study of associativity between the spatial distributions of gray whales and their prey species offshore north-east coast of Sakhalin Island. Regional Studies in Marine Science, Volume 8, November 2016, pp 466-479 https://doi.org/10.1016/j.rsma.2016.03.011 (a paper, based on 2014 Moscow State University report, which has analysed 2002-2012 data; for the 2014 report, see doc WGWAP-16/10 & Maps)	English	Public
WGWAP-20/ INF.4	Durkina, V.B., Chapman, J.W. and Demchenko, N.L. (2018). Ampelisca eschrichtii Krøyer, 1842 (Ampeliscidae) of the Sakhalin Shelf in the Okhotsk Sea starve in summer and feast in winter. PeerJ, April 2018, pp 1-21 https://doi.org/10.7287/peerj.preprints.3496v3	English	Public
WGWAP-20/ INF.5	Proceedings of the Russia-China bilateral workshop on Marine Biodiversity for a Healthy Ocean – Biodiversity, Functional Groups and Ocean Health. First Circular. 10-11 October 2019. Vladivostok, Russia: A.V. Zhirmunsky National Scientific Center of Marine Biology, Far Eastern Branch of the Russian Academy of Sciences Institute of Oceanology and Chinese Academy of Sciences. http://www.imb.dvo.ru/misc/wwwimb/files/First_Circular_Russia-China_Symposium_2019-En.pdf * includes a detailed summary of work on the variation in prey availability in the western gray whale nearshore and offshore feeding habitats off Sakhalin	English	Public
AGENDA ITEM 6. ADDRESSING CUMULATIVE IMPACTS ON THE SAKHALIN SHELF			
WGWAP-20/ INF.2	Guazzo R.A., Weller D.W., Europe H.M., Durban J.W., D'Spain G.L., & Hildebrand J.A. (2019). Migrating eastern North Pacific gray whale call and blow rates estimated from acoustic recordings, infrared camera video, and visual sightings. Scientific Reports, Vol 9, Article number: 12617. https://doi.org/10.1038/s41598-019-49115-y	English	Public
WGWAP-20/ INF.6_RU	КРАТКАЯ ИНФОРМАЦИЯ о полевых работах, в рамках программы экологии серого кита в Кроноцком заливе в 2019 году (В.В.Вертянкин) и презентация (and presentation)	Russian	Public
WGWAP-20/ INF.6_EN	BRIEF SUMMARY of the fieldwork under the Gray Whale Ecology Programme in the Kronotsky Bay in 2019 (by V.V. Vertyankin) (unofficial translation in English)	English	Public
WGWAP-20/ INF.7	Cubaynes H.C., Fretwell P.T., Connor B., Gerrish L., & Jackson J.A. (2018). Whales from space: Four mysticete species described using new VHR satellite imagery. Marine Mammal Science, 35(2): 466–491 (April 2019). https://doi.org/10.1111/mms.12544	English	Public

WGWAP-20/ INF.8	Стратегия сохранения биологического разнообразия Сахалинской области на период до 2025 года (Sakhalin Oblast Biodiversity Conservation Strategy until 2025)	Russian	Public
WGWAP-20/ INF.9	Minutes of the Biodiversity Expert Working Group (EWG) under the Sakhalin Oblast Interdepartmental Environmental Council, Yuzhno-Sakhalinsk – 27 November 2018	English	For internal use
WGWAP-20/ INF.10	Minutes of the Biodiversity Expert Working Group (EWG) under the Sakhalin Oblast Interdepartmental Environmental Council, Yuzhno-Sakhalinsk – 28 May 2019	English	For internal use
WGWAP-20/ INF.11	Update from Brandon Southall regarding the efforts to further evaluate the US Navy discoveries in the East China Sea: an audio file now released (in follow up to the memo from Chuck Gagnon, US Navy[25])	N/A	Public
WGWAP-20/ INF.12_EN	Presentation by GazpromNeft-Sakhalin: The results of environmental monitoring of Western Gray Whales at the Ayashsky License Area in 2019	English	For internal use
WGWAP-20/ INF.12_RU	Презентация от «Газпромнефть-Сахалин»: Результаты проведения экологического мониторинга охотско-корейской популяции серого кита на Аяшском участке недр в 2019	Russian	For internal use
WGWAP-20/ INF.13	Video by GazpromNeft-Sakhalin on ecological monitoring of gray whales in 2019	English / Russian	For internal use
WGWAP-20/ INF.14	Video by GazpromNeft-Sakhalin on the software package developed by GPNS for automated digital recognition of individual whales in photographs	English / Russian	For internal use
WGWAP-20/ INF.15_EN	Presentation by GazpromNeft-Sakhalin: Industrial environmental monitoring results when performing CDPM 3D marine seismic acquisition within Ayashsky in 2019	English	For internal use
WGWAP-20/ INF.15_RU	Презентация от «Газпромнефть-Сахалин»:Результаты производственного экологического контроля при проведении морских сейсморазведочных работ МОГТ 3D в пределах Аяшского ЛУ в 2019	Russian	For internal use
WGWAP-20/INF.16_EN	Presentation by GazpromNeft-Sakhalin: Operational environmental monitoring of environmental conditions at Ayashsky subsoil plot and operational environmental monitoring when drilling Ayashskaya No.2 well in 2019	English	For internal use

[25] See document WGWAP-17/INF.6: Gagnon, C. 2016. Western gray whale activity in the East China Sea from acoustic data: Memorandum for Dr. Brandon Southall. Paper IWC/66/CC29 presented to the IWC Conservation Committee, October 2016. 2pp.
https://www.iucn.org/sites/dev/files/wgwap_17-inf.6_iwc_66-cc29_wgw_observations_east_china_sea.pdf

WGWAP-20/INF.16_RU	Презентация от «Газпромнефть-Сахалин»: Производственный экологический мониторинг состояния окружающей среды на Аяшском участке недр и производственный экологический контроль при строительстве скважины Аяшская №2 в 2019	Russian	For internal use

ANNEX 4. OVERVIEW OF QUESTIONS AND MAIN POINTS RAISED BY SMALL DISCUSSION GROUPS AT WGWAP-20

Collated by IUCN – all views and opinions are those of individual participants

What could be the goal and objectives of an integrated management initiative for the Sakhalin shelf?

- The goal should be identified through a proper process which includes, among other things, a common understanding of the value of western gray whales (and other biodiversity). In order to achieve this, it is essential that core leaders are identified and indigenous interests are appropriately represented.
- The benefit of using one species (or in this case population, such as western gray whales) is that this would help focus.
- Sub-objectives could be set to address specific threats.
- The main objective should be to conserve biodiversity, ensuring human activity brings minimum damage to biota of Sakhalin shelf.
- The goal should be to achieve biodiversity conservation in the context of increasing anthropogenic impacts.
- Assuming that a mechanism is in place for implementation, the objective should be biodiversity conservation and sustainable use of resources on the Sakhalin shelf, with the tasks defined as (i) finalizing an updated CMP and bringing it to the attention of interested parties or actors and (ii) creating a system for collaboration among regulatory bodies, users, scientific institutions and civil society.

Other questions or points raised:

- Is an integrated management initiative the most effective approach?
- For a migratory species with dispersed distribution, how can norms or regulations pertaining to the object of biodiversity be determined?

What should be the focus of such an approach in Sakhalin? Single species/population vs ecosystem; single sector vs all users?

- A focus on species/population would be more pragmatic but the goal should be set at the ecosystem level. Western gray whales will bring players (actors) to the table.
- The focus should not be at the range-wide level but at the 'Discrete Management Unit' level (as defined by IFC PS6, Guidance Note 6, paragraph 65) – area with a clearly demarcated boundary within which the biological communities and/or management issues have more in common with each other than they do with those in adjacent areas.
- The health and viability of western gray whales are inherently linked to the ecosystem, so this question is not relevant.

What are the benefits of an integrated management approach?

- Avoids duplication (no need to re-invent the wheel).
- Shared responsibility and joint actions (e.g. in applying mitigation measures during seismic surveys).
- Shared resources, economies of scale, cost savings and cost-effectiveness (e.g. from coordination), synergy.
- Integrated impacts can only be managed with a coordinated approach.

- Compatible with and supportive of the CMP.
- Allows for coordination of actions by different actors and facilitates access to information.
- Encourages development of common or unified databases based on biodiversity monitoring and research (e.g. under the auspices of Federal Service for Supervision on Natural Resource Use of the Russian Federation, IWC or others as appropriate, in an electronic format).
- More opportunities to optimize and increase collection of data on the state of the ecosystem.
- Minimization of ecological risks by increasing the amount of information available.
- Standardization of methodology used to pursue mutually agreed-upon goals.
- Local actors may not come onboard unless it is to their benefit.
- Cumulative effects can only be managed effectively through an integrated approach.

Which entities should be involved? And what should be the roles and responsibilities of the identified actors?

- Any entity with influence (or power) that is interested in the identified goal and objectives.
- Groups that are not present but could be convinced to become engaged.
- There should be broad support (including funding) from industry groups with shared objectives rather than individual-stakeholder objectives.
- Resource users, nature protection and scientific organizations or institutions.
- Organizations that can take action (e.g. operators) and require action (e.g. regulators).
- Organizations, groups or individuals (experts) with relevant knowledge and expertise.
- Leadership and coordination.
- Governmental bodies with responsibility to supervise, control and implement regulations.
- Civil society organisations that can monitor implementation of rules, commitments, procedures etc.

Other point raised:

- It is critical to involve stakeholders from the beginning of the process (i.e. at the assessment stage).

What are the three main factors for success?

- Identify and engage stakeholders early in the cumulative impact assessment process.
- Build on (and involve) existing multi-sector organizations, groups and initiatives (e.g. BG)
- An accountability framework (with tasks, deliverables, timelines etc.).
- Funding is a critical enabler for the initiative to deliver on its goal and objectives.
- Ensure that there is a stick and a carrot built into the system
- Educate people to become more responsible consumers.
- Leadership (at local and national levels) is critical.
- Keep things simple and practical.
- Coordination, standardization and unification.
- Cost-effectiveness.
- Understand that the concept of cumulative impact is meant to take into consideration (integrate) the stresses or pressures experienced by the animals throughout their range, i.e. not only the effects of activities by one company or at one site (i.e. it is a ‘big-picture’ approach.
- Motivate or incentivize stakeholders to find ways to work together to understand, avoid or mitigate, and monitor impacts.

- Approach the problem by focussing on three main threats, e.g. noise, gear entanglement, ship strike.
- Understand what's out there and assess the contributions of individual factors to cumulative impact.
- Initiative should come from inside Russia to maximise trust; others can contribute but it's best that they not lead.
- Create better or new legislation for nature protection at local and federal levels.
- Coordinated action to conserve individual animals and biodiversity generally.
- Practical steps such as letters signed by a respected individual or scientific body.

Final overarching comments

- Need to identify and involve cooperative arrangements that are already in place, e.g. the Biodiversity Group.
- Don't expect to have a utopian system – take logical, progressive, small steps to improve the situation as it presently exists. Don't try to design a perfect system at the start.
- Russian history of freedom of access to nature.
- It is important for all entities active on the Sakhalin shelf to preserve this whale population.
- 'Integrated solutions' might be a better term for the process than 'integrated management'.
- The constructive involvement of government regulators and business partners is a key part of the process.